The Influence of Safety Culture on Safety Performance in Saudi Arabian Construction Industry

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List of Abbreviations

KSA	Kingdom of Saudi Arabia
OSHA	Occupational Safety & Health Administration
OHSAS	Occupational Health & Safety Assessment Specification
HSE	Health & Safety Environment
ISO	International Standard Organisation
H&S	Health & Safety
OHSE	Occupational Health & Safety Environment
CAPA	Corrective & Preventive Action
GOSI	General Organisation for Social Insurance
UK	United Kingdome
US	United States
SAQ	Safety Attitude Questionnaire
GEL	General Environment Law
EPS	Environment Protection Standard
PPE	Personal Protection Equipment
ILO	International Labour Organisation
EHS	Employee Health Scheme
NIOSH	National Institute for Occupational Safety & Health

USA	United States of America
NEBOSH	National Examination Board in Occupational Safety & Health
IOSH	Institution of Occupational Safety & Health
IIRSM	International Institute of Risk & Safety Management
SIA	Safety Institute of Australia
APOSH	Asia Pacific Occupational Safety & Health
NSC	National Safety Council
PAR	Participatory Action Research
SPSS	Statistical Package for the Social Sciences
KMO	Kaiser-Meyer-Olkin Measure
ANOVA	Analysis Of Variance
FAD	Foundation Associated Degree
BSc	Bachelor of Science
MSc	Master of Science

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Declaration

I declare that the work contained in this thesis in my own original work. Where work and ideas or concepts have been taken or adapted from any source, they have been properly cited and referenced.

Abstract

Over the past decades, there has been a realisation that safety, within the Saudi construction industry, has been facing challenges. Even though there are good safety practices in many organisations, the industry lacks well publicised legal provisions and standards for employers to use as a means with which they can incrementally develop a safety culture in the workplace, and eventually, improve the safety performance of the industry. This research, therefore, explores and evaluates the influence of current safety culture on safety performance in the Saudi Arabian construction industry. It aims to develop a framework that could be used as a stepwise process for improving safety culture, and positively impact the safety performance in Saudi Arabian construction.

The research adopted interpretivism philosophy as the epistemological position and subjectivism as the ontological assumption, which depends on people's interpretations and their actions. In line with the philosophical stance, the research adopted a deductive reasoning by developing a theory of the issues of safety culture through research questions; and then adopted a research strategy of case study and survey to execute the research. It also adopted a mixed methodology where both qualitative and quantitative methodologies were envisaged to be relevant to the research. The survey approach included semi-structured interviews and questionnaire as techniques. For the questionnaire survey, 135 responses were received from the ranks of managers, engineers, foremen, and labourers in Saudi Arabian construction companies. Using SPSS software, and with the help of the ANOVA test for correlations, the research was able to isolate 29 factors that were associated with commitment to safety procedure, including training and practices. The highest ranked factor was on helping workers secure necessary training in order to avoid accidents and ensure safety.

The results from the survey were corroborated by interview results from the three case studies. Using thematic analysis, interview data identified six main factors as components of safety culture in construction organisation in Saudi Arabia. Based on the empirical evidence from the data, the research concludes that the industry, as a whole, has a positive appetite to improve safety culture; and that there is a good realisation that safety performance can only be achieved if there is a good safety culture in the industry. The research also found that even though there is a positive outlook for safety culture, the industry struggles to operationalise it and make it pervasive industry wide. The major reason for weak operationalisation of the safety culture has been the lack of strong framework for consistent implementation of safety practices, which can integrate regulations, standards and best practices from local and international organisations that operate in the Saudi Arabian industry. The value of this research lies in the potential is has to helping stakeholders realise the highly correlation between the safety and organisational culture, and to make a connection with the overall improvements in the productivity of the industry while reducing number of accidents in their work places; hence developing a sound safety culture.

The research has a two tiered recommendation, short term and long term recommendations that need to be instituted on a continuous basis. The first tier recommendations relate with the short

term improvement in improving commitment to safety practice in order for employees to feel that the safety culture is relevant such as the habit of using PPEs in the workplace is recommended. The second tier recommendation relates to improving the commitment to safety procedures, proper training for construction activities and applying reward management system in the workplace. The two tier recommendations require a regulatory and standards based framework from the industry in order to localise safety culture for improved safety performance in Saudi Arabia.

1. CHAPTER ONE- INTRODUCTION

1.1 Background

The Kingdom of Saudi Arabia (KSA) is one of the most rapidly growing nations in the Middle East and this exponential growth is engendered in the many projects underway in the construction industry. However, Bubshait and Al-Juwairah (2002) lamented that the whole level of construction safety in Saudi Arabia has been rather low with less than 60% of adherence to safety rules. Liska, Goodloe and Sen (2013) also noted that instead of tackling safety directly, many construction companies in Saudi Arabia have tried to control the rising costs of accidents and reduce projects delays due to the accidents. This highlights the need for effective policies on health and safety in Saudi Arabia. However, it is important to know that the solution to this existing problem does not end with just having policies on health and safety in place. This is because Stank, Daugherty and Gustin (2004) mention that though a number of safety policies exist in the construction industry, field supervisors and site managers do not adhere to them adequately. On the part of Friedman (2010) however, it is not a measure of what one knows but how experienced one is. Rather, personal responsibility is about the commitment that individual employees have in implementing safety polices that exist in their workplace.

Health refers to the state of optimum physical and mental wellness for the individual, including the absence of disease or infirmity (World Health Organisation, 2003). Safety refers to the state of being free from risks, internal or external to the person (Confer and Confer, 1999). It refers to the state of being secure in his physical and mental space including the absence of harm provided for by the environmental setting as expected for and by a reasonably prudent man (Confer and Confer, 1999). Health and safety also includes the process established by authority figures and leaders within the workplace, the community or even the family setting in order to

minimize risks of injury or illness (Confer and Confer, 1999). Health and safety therefore includes measures, which identify, evaluate and control risks to individuals (Occupational Health and Safety-Alberta, 2015). The coverage and complications of health and safety are based on the environment, the community, and workplace, including the activities carried out within such setting (Occupational Health and Safety-Alberta, 2015). Health and safety therefore includes elements, which seek to identify and assess health and safety issues within the work setting. It also covers the measures for control, which seek to reduce or totally eliminate the risks imposed on individuals from environmental hazards (Occupational Health and Safety-Alberta, 2015). Health and safety also includes measures, which seek to promote individual competency and training especially within the work setting (Occupational Health and Safety-Alberta, 2015).

Data available from the KSA indicates that the Occupational Safety and Health Administration (OSHA) and the Health Standards 1926 and 1910 are mentioned as examples of existing health and safety policies that have easily been overlooked by the construction industry. In an independent study, Symons (2005) noted that there are several site managers and supervisors who refuse to adhere to health and safety policies because they hold the opinion that the solution to increasing cases of accidents and injuries at the sites is not in documented policies. For most of these supervisors and managers, the need for field based practical interventions that address specific problems at the site should be the way forward. Liska, Goodloe and Sen (2013) lamented that as rates of injuries and accidents have been said to go up by up to 23% in the last decade, there is evidence that the field-based interventions are not working well. This calls for the need to revisit the use of documented policies that can be factored into the overall safety strategy of the organisations operating industrywide (Hovden et al., 2008).

There are many factors that can influence the safety performance of an organisation in any industry; they range from policies ((British Standards Institution (BSi) 2014; DeJoy et al, 2010) to working rules established in the organisation through industry practice (Hale and Borys, 2013, 2013a). Other factors include, among other things, the way the industry and its organisation can benchmark international best practice (Tingey-Holyoak et al., 2011) and how the industry can effectively operate in the regulatory framework for safety (Henriqson et al., 2014). For this research, however, it was noticed that there has been a gap in knowledge with regards to the evaluation of the impact that safety culture has on the safety performance of the construction industry. According to Ankrah et al., (2009) safety culture has a significant influence on the safety of business operations; it is one of the crucial factor that has the propensity to negatively influence the safety of workers and end users of the product or service from industry (Atak and Kingma, 2011). This research, therefore, aims to develop a framework on how to improve safety culture that affects Safety performance in Saudi Arabian construction industry.

1.2 Culture and the Safety Performance of an Organisation

Roberts et al., (2012, p778) define culture as an inclusive approach to doing things developed by a company. They further argued that culture could lead to many attributes, some of which include, but not limited to how people behave, how the establish working systems, procedures and routines to follow; and how everyone can formally or informally agree to follow these processes so that they can become the norm (Roberts et al 2012, p778). The critical view of culture at organisational level is that it has a possibility to be influenced by those responsible for making procedures, standards and norms (ibid). The main conduit to influence culture, according to Roberts et al., (2012) is organisational vision, goals, strategies and business systems that have been adopted. The implication of this approach to influencing culture is that one can take formal or informal knowledge about organisational vision and influence fellow

workers. Safety is no different from other goals that can be set by the organisational strategic managers, argues Henriqson et al., (2014). This is because an organisation can include procedures for how to work safety so that it can be a "norm"; however, Shi and Shiichiro (2012, p535) disagrees with proposition by arguing that because "safety" can be to some people, it cannot easily be influenced through setting up goals and leave it at that. For this reason, industries such as aviation have a robust approach to the implementation of safety as a cultural issue (Atak and Kingma, 2011) because they realise how devastating if can be if not take care of; and how positive it can be if harnessed within the work systems (ibid). According to Morrow et al., (2014) safety culture can be defined as the shared assumptions that are developed for the work environment in order to operate safely on a day to day basis. Once used over a period of time these assumptions become valid steps that can be crucial to the safety performance of the organisation (Morrow et al., 2014, p38).

According to Öz et al, (2013) the attitude, behaviour and conduct of workers have severe impact on the level of adherence to safety standards; in turn the safety performance of organisations (Bellamy et al 2008, p.462). Generally speaking, safety performance relates to the level which organisations are able to adhere to expected time periods without experiencing accidents or incidents in their working environment (Fogarty and Shaw 2010, p.1455). A summation of accidents and incidences from organisations operating in a particular industry results on a picture of safety performance (Bellamy et al, 2008; Lardner and Scaife (2006)). In other words, safety performance reflects the level of resources allocated to safety programmes, the competence of workers, management attitudes and general human traits (Fogarty and Shaw 2010; Netjasov and Janic, 2008). According to Kontogiannis and Malakis (2009) safety performance data does not only reflect the number of incidences, but also the legal cost; health related experiences and regulatory penalties (Cesarini, Hall, and Kupiec, 2013, p. 1). A

construction industry with a poor safety record sends a signal of poor safety performance from design to delivery, resulting in high cost of doing business (Gangolells et al 2010, p107).

In addition Assaf et al., (2001) opined that poor safety performance increases overhead costs related to health and safety; it also increases uncertainty as to the eventual cost of the welfare, safety and health of employees (operatives and managers). Ali et al, (2013) was of the view that project performance is hindered by the list of accidents an organisation may have accrued; and this can negatively impact the reputation of the organisation such that it may not be a preferred bidder due to poor safety record. There are many factors that influence safety performance, these include, but not limited to the technological advancement and mechanisation of the industry (Shin, 2015; Sidawi and Al-Sudairi, 2014); the general working conditions especially the climatic conditions – such as the heat stress due to exposure to hot climate (Rowlinson et al, 2014), and the manner in which the jobs are planned for execution (Jannadi, 2008). According to Al Haadir and Panuwatwanich (2011, p148) the construction industry of Saudi Arabia has challenges to deal with safety performance on many fronts. They further argued that the general lack of awareness of safety risks amongst the construction workforce has been high over the years because organisations have been cutting costs in order to improve profitability (ibid). Poor safety performance in Saudi construction industry and the Middle East in general, is compounded by the general influx of migrant workers who speak many languages, and have communication challenges (Loney et al., 2012).

For the organisation to develop an ideal safety performance it would have to undergo processes of mediation whereby the best practice norms used in the work environment can be seen as the best way to safety conduct the business (Höpfl 1994, p55). It can, therefore, be argued that safety performance emanates from a collection of procedures and practices that have been proven to work so as to separate them from those practices that would not guarantee safety in

the work environment (ibid). Safety performance, if harnessed well, could lead to a culture of preventing accidents (Clarke 2003; Wadick, 2010).

More specifically, however, safety performance in Saudi Arabia relates to the specific number of accidents that can be categorised in accordance with the area of interest for the research project. For instance, Mosly (2015, p228) measured safety performance in terms of the number of accidents emanating from "general – construction site; workers' personal protective equipment (PPE); heights and fall protection; machinery; and excavation". Based on his measurement criteria, he found that safety performance for the Saudi construction industry was very weak. However, he could not obtain clear statistical data about accidents in the industry as is the case in other countries. According to ACE Insurance Brokers (2016) the Kingdom of Saudi Arabia does not have a body that collects information about industrial accidents in the construction industry per se; however, the country compiles "work-related injuries in Saudi Arabia occur in the construction and manufacturing sectors, according to the General Organisation for Social Insurance (GOSI)".

There is no such a thing that an organisation can simply select an off the shelf, readymade safety performance package; rather it would have to navigate the elements for personal safety requirements of the people and the regulatory requirements of safety (Wadick, 2010). This implies that safety performance would need to be a deliberate organisational goal which can be developed with a deliberate strategy at all levels of management in order to establish means of evaluating safety practices and traits (Wadick, 2010); hence safety performance borders on safety culture. Williamsen (2013) opined that a culture of safety provides project leaders with the courage to follow through all the decisions on work that are made because some decisions may not be taken seriously by subordinates, and will, in fact, become meaningless. This means that the call to have documented safety policies will be a way towards establishing and implementing a safety culture because such culture will ensure that safety practices are

followed in the field. Zou, Redman and Windon (2008) mentioned that in the Saudi construction industry, there is a need to develop and integrate a conservative Saudi safety culture into the design of the construction industry. Awad (2013) mentioned that, many project leaders in Saudi Arabia in the past have been unsuccessful because they have failed to consider the importance of making safety a part of the organisational culture in a manner that forms a safety culture for the construction companies.

Symons (2005) noted that when a safety culture is instituted, it overlaps between both the safety and the organisational culture, ensuring that none of this would take premium over the other. Once this happens, project leaders are reminded to be systematic when making decisions concerning safety and safety performance, especially when these safety decisions are needed the most (DeJoy, Gershon and Schaffer, 2004). In construction industry, every project leader should be conscious of the situations involving the safety of their workers in order to ensure the safety of those who work in the construction site. They also have to consider the best safety solutions that are culturally acceptable (Nelson, 1996; Simon and Frazee, 2005). With a safety culture, leaders will be able to ensure the safety and cultural needs of the organisation, to understand them well so that their decisions concerning the project are correct and well informed. In effect, these conditions would be able to ensure that safety standards and safety performance are of the highest quality. For the construction industry of Saudi Arabia there has been no evidence of a clear strategy to positively influence the safety culture of organisations so as to improve the safety performance of the industry; hence the need to undertake this research so as to fill the knowledge gap in safety practices in the KSA.

1.3 Research Problem

When one undertakes an evaluation of the safety climate of the construction industry safety performance through publicly availed records it is possible to realise that accident, safety and health records in the construction industry in Saudi Arabia highlight poor safety performance. For example, the General Organisation for Social Insurance (GOSI) as given by Alasamri, Chrisp and Bowles (2012) noted that there were as many as 261,076 serious injuries recorded from 2004 to 2010, indicating an annual rate of 3,413.9 serious injuries per 100,000 employees. Compared to figures from other parts of the world such as Germany (0.94 per 100,000 workers in 2011 alone) (HSE, 2014a), UK (0.74 per 100,000 workers in 2011) (HSE, 2014a) and the US (1.7 injuries per 100 full time workers in 2008) (HSE, 2014a), these figures are very high. Alasamri, Chrisp and Bowles (2012) went on to further indicate that this is especially significant as a total of 2176 deaths were experienced within the same period, representing an average of 28.3 deaths per 100,000 employees. The grim statistic for number of incidences in the industry has been presumed to mask safety culture and safety performance inefficiencies attributable to organisational strategies to operate in safety working environments.

According to Carrillo (2012) the failure of those taking on projects in Saudi Arabia to understand the importance of having a safety culture means that they will likely to make decisions that are unacceptable, and in the end, these decisions might end up risking the entire project. This implies that the decisions made by project leaders could significantly affect the daily safety activities of almost all of the construction companies in Saudi Arabia, including how the company should be managed, and how teams and individuals should work with each other in order to achieve safety goals (Han-Kuk, Jae-Sik, Kim and Byung-Hak, 2008; Hopkinson, 2000). The main research problem is to develop a mechanism that could be used

to act a lighthouse for the evolutionary development of a strong safety culture in construction organisations of Saudi Arabia with a view to creating a positive impact on safety performance.

1.4 Justification for the Research

According to ACE Insurance Brokers (2016, p.1) "work-related injuries in Saudi Arabia occur in the construction and manufacturing sectors; as at 2015, there were 355,000 injuries reported in the construction and manufacturing sectors over the past five years, accounting for almost 88% of the total number of accidents in all sectors". Further breakdown shows that "impact and collision accidents accounted for 30% of all injuries; falls accounted for for 28% of the total number of accidents and that around 94% of injuries were sustained by expatriate workers" (ACE Insurance Brokers, 2016, p1). It has been established that the Saudi Arabian construction industry and organisations therein have the capacity to benchmark and secure international safety standards and policies that could make their business safe; however, data is showing that there is no clear mechanism to collect data and be able to link it to causes of accidents. Establishing clear cause effect of accidents from their working environment and promote a safe climate (Fernandez-Muniz et al., 2012) has become a fundamental issue for the industry. For example, may organisations have been setting safety goals for their projects as expected in an internationally recognised industry (Young et al, 2010). However, the problem for organisations operating in the KSA has been the chronic underutilisation of safety policies as they strive to implement and adhere to health and safety policies that form the basis of the safety culture. This means that even though individual construction companies may be aware of the Occupational Safety and Health Administration (OSHA) and The Health Standards 1926 and 1910, and even if they have their own health and safety rules, these rules and standards are not being adequately implemented. It is not surprising therefore that Alasamri, Chrisp and Bowles (2012) stated that most of the accidents and deaths that have been talked about earlier "were caused by employee's safety culture due to the fact that majority of the employees (95%)

in construction are from migrant workers" (p. 1). This means that there is considerable disparity when it comes to the implementation of safety culture among different employees. Over the years, there have been studies that have been engaged the issue of safety performance in Saudi Arabia based on the number of accidents that small and medium enterprises as well as large organisations have been having (Jannadi and Al-Sudairi, 1995; Al-Utaibi, 1996; Al-Amoudi, 1997; Jannadi and Assaf, 1998; Baig, 2001; Alasmari, 2010, Alasamri et al., 2012). However, the lists of accidents from subsectors of the industry have not taken a holistic view of it in order to determine if there is any causality between safety performance and safety culture. This implies that for the KSA, the influence of the safety culture on construction projects has been recognised as one of the most important aspects in construction companies and as such, a number of literatures concerning it have been written, with its influence in Saudi Arabia also presented (Chan and Chan, 2011; Geller, 2002; Gordijn, 2006). However, there has been a gap in the operationalisation of the safety culture on construction businesses with a view to target safety performance, amongst other key performance indicators typified by construction business.

According to Chan and Chan (2011), the influence of the safety culture overlaps organisation culture and safety; it also focuses on the people within an organisation and how they view the safety requirements that are imposed on them, including how they come to accept these requirements as being part of their work environment. Geller (2002), Gordijn (2006), and Geller (2000) state that the way forward for many project leaders is to create an environment which is highly receptive to the safety culture because these leaders have to come to the realisation that the acceptance of the safety culture is the key which would determine whether the safety measures being applied would become a success or a failure.

Guha, Thakur and Biswas (2013) suggested to adopt a strategy, which could be used in the implementation of safety standards in construction projects, would make a difference on how well these changes would be received by the workers. This would determine the level of success of newly implemented safety standards. Asad, Jubeen and Iqbal (2013) and English (1993) state that the best way to determine safety in the construction industry of Saudi Arabia is for the managers to recognise that it is normal human behaviour to resist any changes to their work environment, especially when these changes are incompatible with their own culture. With this realization, project leaders in the construction industry should find useful strategies in the implementation of the safety standards, strategies that are compatible with the organisational culture because without it, there might be a failure in the safety performance (Cooper, 2002; Stare, 2012). It is because of the need to consider the larger organisational culture in individual construction companies in relation to the implementation of safety policies and rules that safety culture is said to overlap and embody both a safety and organisational culture. Brown, Eastham and Heng-Yu (2006) further explained that in the context of Saudi Arabia, safety culture is seen to overlap with organisational culture as such culture would help develop a safe environment for construction workers. This can be done with the most consideration for the organisational culture because the workers may not automatically accept changes. According to Adams (2001), project leaders should ensure that the construction workers, who are the ones who tend to be most affected by the safety standards of their work environment, have a complete understanding of the reasons behind the safety considerations that are being implemented. Also, Yau, Ho, Wing and Chau, (2008) mentioned that, when project leaders understand this, they will develop the realization among workers that they are working not only in their employers' best interests but also for their own interests. Despite the good availability of means to implement an effective safety culture which can positively influence the safety performance of the industry, there has been in increase in the number of serious injuries and

deaths on Saudi Arabian construction sites; hence highlighting the importance of health and safety in the construction industry as compared with other industries. According to Ivensky (2008) and Williams (2002), the construction industry is considered as one of the highest risk occupations in Saudi Arabia, when compared with other occupations such as teaching, nursing, banking, and managerial jobs. This is because in the construction industry, workers face various dangers through the equipment, tools and materials they use in their work (Tcankova, 2002). It is therefore justified for a research to be undertake with an overarching aim of developing a mechanism that could be used to improve safety culture, on one hand and improve the safety performance of the industry, on the other hand.

1.5 Aim and Objectives

The aim of the research is to develop a framework on how to improve safety culture that affects Safety performance in Saudi Arabian construction industry. The main objectives of the study are to: -

i. To investigate the type of organisational culture prevailing in the construction industry in Saudi Arabia;
ii. To explore the impact of the safety culture on safety performance;
iii. To discuss the safety policies practiced in the construction industry of Saudi Arabia;
iv. To explore factors affecting the implementation of safety policies in the construction industry of Saudi Arabia;
v. To develop a framework on safety culture leading to better construction safety performance in Saudi Arabia.

1.6 Research Questions

The following research questions have been designed to guide the research argument as well as generate the necessary data necessary to evaluate the aims and objectives.

i. What are the organisational cultural trends typifying Middle Eastern construction firms and how to these trends compare with the international standards and practices in safety?
ii. To what extend does the safety cultural practices of an organisation impact organisational safety performance in the construction industries around the Middle East?
iii. What safety policies do construction organisations implement as the promote safety in their business environments within the construction industry of Saudi Arabia?
iv. What is the significance of safety rules, regulations and law to the formulation of safety policies in the construction organisations and to what extent do safety policies under the regulatory framework foster the implementation of safety in the work place?
v. What are the main factors used to develop the framework of culture and safety that could have a significant impact on fostering safety in the construction industry of Saudi Arabia?

1.7 Scope of Research

Even though the Health & Safety of an organisation requires several inputs in order to ensure effectiveness, the scope of the current study is specifically limited to the areas of safety culture. The rationale for limiting the scope of the study to safety culture is due to the impact that the safety culture has had on human lives and property at the construction site. Specifically, the focus is placed on the degree to which construction companies in Saudi Arabia have adhered

to safety culture principles and how they have implemented and managed risks and safety within their projects.

The Health and Safety Executive (2014b) discusses that the "safety culture of an organisation is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organisation's health and safety management". Based on this explanation, the safety culture refers to the organisation's norms and attitudes related to the health and wellbeing of its members in relation to the conduct of their duties and the fulfilment of their tasks. Project performance is different in this case because the project performance would cover the conduct of tasks in the fulfilment of the project (HSE, 2014b). The evaluation or assessment in this case would be focused on how the project is carried out, whether it has been successfully carried out based on the plans or designs of the project. Safety performance would cover how the safety measures and requirements in the workplace have been carried out and have been observed by the company and its people (HSE, 2014b). It would determine how well the company has complied with safety standards, not how well it has completed the project.

1.8 Overview on Research Methodology

The methodology seeks to define and explain the processes used by the researcher in collecting primary data from the respondents who were involved in the study. There are several frameworks by which methodology can be undertaken, of which; the Saunders Framework (2009) was selected, and summarised in Figure 1-1. Also known as the onion process, the Saunders framework divides the research methodology into five major sub-sections with each providing a detailed explanation to the research process (Saunders et al., 2003). This framework was applied for this research because it presents different layers for the study to be carried out. The different sub-sections provided data gathering methods and applications,

which helped answer, the different research questions presented. The techniques and procedure used included the interviews and questionnaires, which were carried out in this study with the different respondents. The mixed methodology was applied on this research. The case study provided more focus to the objectives of the research, allowing the research questions to be considered using more defined parameters. The deductive method was also applied as this study presents hypothesis, which is later proven try, or not. It applies a method of discovery through its qualitative elements. The deductive approach also applies in relation to the different information gathered for this study and evaluated for validity and reliability. Interpretivism relates to the argument that this study is being considered from a philosophical perspective as the researcher considers knowledge as complicated phenomena.

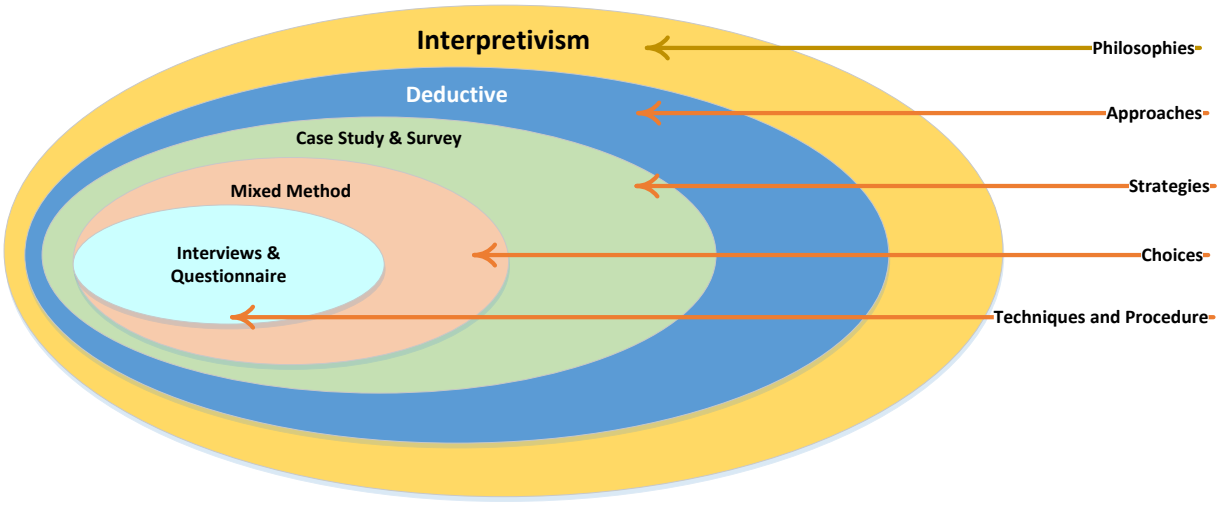

Figure 1-1: A summary of the key steps taken for the research process (Adapted: Saunders et al., 2009)

1.9 Contribution to Knowledge

The main contribution to knowledge from this research has been the revelation of the fact that there is no tangible mechanism for which companies in the construction industry of Saudi Arabia can use to operationalise safety culture with a view to positively influence the safety performance of the business. The research has also contributed to the knowledge by

establishing a framework that can be used by organisations to institute measures of influencing safety culture and seek to improve safety performance. With the proposed framework it is possible for construction businesses to establish correlations between organisational safety culture and safety performance so that strategic managers can highlight key areas to invest if they are interested in uplifting the safety performance of the business. Establishment of the framework has the potential to engage all levels of management and shop floor operatives so that they can all commit to a developing a positive safety culture for better safety in the workplace.

1.10 Thesis Structure

Chapter one - Introduction: The first chapter shall present the background of the study, the research problem, the justification of the research, the aims and objectives, the research questions, the scope and limitations, and the research methodology presented in brief. This chapter shall provide an overview of the entire research, providing a context and a foundation for the next chapter.

Chapter two - Literature Review: Chapter two shall present the organisational culture, cross culture studies cultural diversity, the types of culture in construction organisations, safety, safety policies in the construction industry, safety records related to Saudi Arabia, safety policies in Saudi Arabia, the components of the safety culture in the construction industry, and implementation challenges in Saudi Arabia. The literature review also provides details on the theme of organisational culture in the construction industry and its impact on organisational culture in terms of safety standards. A discussion on the different types of organisational cultures will be presented including how each culture is said to impact on safety practices in organisations. In terms of elements impacting on the implementation of safety practices, this study considered factors as well as strategies and commitment issues on policies redirecting

focus on the main issue on safety and the safety culture. This chapter will also focus on training and adjustments including technical competence being major elements affecting safety and commitment into best practice and safety culture.

Chapter three - Research Methodology: The third chapter presents the research methodology, which includes the research philosophy, the strategies, the data collection process, as well as the data analysis. This chapter presents the different kinds of philosophies considered for this study and how they may or not apply to this study. The research approach is also presented in relation to deductive and inductive methods. The research design will also be presented with a focus on the mixed-methods approach, which applies to this study. Research strategy including the methods for this research will thoroughly be explained with an eventual focus on case studies, interviews, and the survey method. The tools for research, which is the questionnaire, will also be presented in this paper especially in the context of data gathering and data collection processes. Ethical considerations as well as reliability and external validity shall further provide details to this study, helping ensure its overall details.

Chapter four - Results: The fourth chapter presents the results of the study, including a summary of the procedure and materials applied during the research process. This chapter shall present an analysis of the questionnaires based on extracted factors as well as descriptive factors and types of data. It shall also present an analysis of the interviews specifically focusing on the participants and the themes established from the interviews. The interview analysis shall focus on the specific responses of the participants in relation to the specific aims of this research. It shall present the answers, which may or may not support safety policies and a culture of safety in the Saudi Arabian construction industry.

Chapter five - Discussion: The fifth chapter includes the discussion, the overview of the issue, as well as the overview of the findings for the different research questions. Each research

question is considered for this chapter. The general conditions are first presented in this chapter and then the respondents, being stakeholders of the construction industry in Saudi shall present their perspective on safety considerations. Possible admissions on safety issues would be presented including details on gaps in the safety measures in the Saudi construction industry. The discussion shall also include details on correlations made to the literature review specifically on how each research question was presented earlier in the chapter.

Chapter six - Conclusion/Recommendations: Finally, the last chapter presents the conclusion as well as the limitations and recommendations for future research. The final chapter provides a clear summary of the results based on each specific research question. The answers shall be based on the different studies presented in the literature review, but mostly from the different respondents included in this study. The limitations of the study shall refer to research difficulties, ethical dilemmas and demands, including access to the respondents. Recommendations shall cover recommendations for future studies, for the practice, to theory, and the knowledge in the construction industry.

1.11 Summary and Way Forward

What is discussed in this chapter is the general background for health and safety and specifically the health and safety within the construction industry of Saudi Arabia. It provides a general background for the construction industry and specifically the safety issues which have industry in terms of safety and accidents in the workplace. The specific research problems were also presented including the justification for this research and for such questions. The aims and objectives were also discussed including the scope and limitations of the study. Finally, the thesis structure is laid out for the reader to clearly foresee. In the following chapter, the literature review shall be presented and shall present the different related studies, which would help provide a deeper understanding of this dissertation.

2. CHAPTER TWO- LITERATURE REVIEW

2.1 Introduction

Culture, as a phenomenon, is an issue that embodies the way communities live and how they work – because it involves a summation of all forms of behaviour that could be used to generalise how society can be perceived (Buchanan and Huczynski, 2010). In addition, societal culture tends to filter through to organisational culture (Buchanan and Huczynski, 2010; Ismail et al., 2012). The process of filtration of societal culture and values to an organisation is seen as a crucial influence to organisational behavioural patterns that can be observed in many organisations (Kotter, 2008; Kotter, and Heskett, 2012). A research that examines issues of culture at both societal and organisational level would therefore consider issues that could critically impact the wellbeing of the organisation and the impact it would have to the industry as well as the communities at large. This chapter undertakes "a critical examination of the type of organisational culture prevailing at an international level in order to establish the main factors" (*objective i*) that could be impacting the safety culture of the construction industry in Saudi Arabia. The chapter also evaluates "the potential impact of the safety culture on safety performance from the international community perspective" (objective ii) so as to form the basis for analysing the primary data on safety culture in Saudi Arabia. The chapter "discusses the safety policies practiced in the construction industry of Saudi Arabia" (objective iii) as well as "exploring factors affecting the implementation of safety policies in the construction industry of Saudi Arabia" (objective iv). The chapter takes a critical integration of the issues raised on safety culture and safety performance in order to set the basis for developing "a framework on safety culture leading to better construction safety performance in Saudi Arabia" (objective v). The chapter chronologically argues that a comprehensive understanding of "culture" is extremely vital for one to create the link between organisational culture and safety;

and that safety culture of any industry is embedded in societal, industrial and organisational cultural values of any country. The chapter concludes that the safety culture has a significant role in the wellbeing of its workforce; but it does not necessarily guarantee safety unless the industry and the regulatory framework thereof could proactively support the decision makers on safety so as to enhance the responsiveness of culture could be embedded in the dealings of an industry.

2.2 Culture

For decades "culture" has been used as a management feature; however, it comes out with a dichotomy in meaning – firstly it has been used as a representation of how an organisation can promote the value systems that act as a cohesive tool for members of the teams Holt and Wigginton (2002). Secondly, culture is perceived to mean ethnicity, nationality or a set of people whose attributes can be generalized amongst them (ibid). This shows that there is no clear and definite definition for culture, but various authors as well as scholars have attempted to establish a standard definition of culture. Kroeber and Kluckhohn (1952) for instance define culture as a set of "patterns, explicit and implicit of and for behaviour acquired and transmitted by symbols, constituting the distinctive achievements of human groups, including their embodiment in artefacts" (p. 181, cited by Adler, 1997, p. 14). They further note that culture relates to traditional ideas, often systems, which may be end-results of action or conditions for future reactions. Schwartz (1992, cited by Avruch, 1998, p. 17) also has a similar concept of culture in terms of references to "derivatives of experience, more or less organised, learned or created by individuals of a population, including those images or encodements and their interpretations transmitted from past generations, from contemporaries, or formed by individuals themselves. In other words, culture is seen as a cumulative experience of experiences as well as images from a specific population or individuals in a population.

However, the categorisation of culture does not represent an all-encompassing view of it; it misses out the fact that culture is necessary for one understand how humans behave either at their homes or in the work place hence the need to ensure that culture is seen from the perspective of mapping all elements of things people have, what they think and whatever they do in their social realm (Holt and Wigginton, 2002). It shows that culture involves a collection of people's interests; things such as share values, attitudes, ideologies and beliefs as well as customs that generally define a group of people (Hoecklin, 1995; Schneider and Barsoux, 2003). The importance of culture to industry does not end in the anthropocentric view, rather, it is driven by the strategic realisation that no driver for change can be achieved without creating an influential force that could positively impact people's interests and values (Wheelen and Hunger, 2006). This implies that business strategy of any industry need not ignore people's culture (Thompson and Martin, 2005); but if they did the industry would face major challenges (Morton and Ross, 2008). For instance, if the culture of a construction industry is one that does not manage change business could be negatively impacted by the reactionary approach to management (Leavy, 2010; Lazarus and Clifton, 2001). It is therefore strongly believed that leadership, authority, work attitudes and practices emanate from a culture within the organisation and the communities such that these attributes have significant influence on performance (Holt and Wigginton, 2002).

2.2.1 Culture Model

According to Holt and Wigginton (2002) the work promoted by Hofstede facilitated the categorisation of "culture" in order to simply the meaning. They argued that Hofstede's developed a four dimension abstraction of culture, herein shown on Figure 2-1 whereby the meaning of every attribute had two dimensions – the positive element as well as the negative element of culture (Hofstede, 1994). The first dimension looks at "masculinity" which is the situation where there can be a culture that promotes assertiveness as opposed to that which

offers nurturing and rapport (ibid). The second dimension for culture according to Hofstede (1994) looks at "uncertainty avoidance" where a culture could either drive formal structuring of the situation so as to avoid uncertainty and the opposite would be the situation where there is little regard for anything formal (Holt and Wigginton, 2002).

The third dimension looks at the "individualism" where there can be self-centeredness on one hand and collectivity and harmony on the other (ibid); while the fourth dimension of the Hofstede model of culture presupposes that there is an issue of "power distance" whereby there can be a high level of distance between powerful individuals and the less powerful hence creating a "them and us" type of structure while the opposite would be the view that social integration is extremely vital (Jandt, 2004; Matsumoto, 1996).

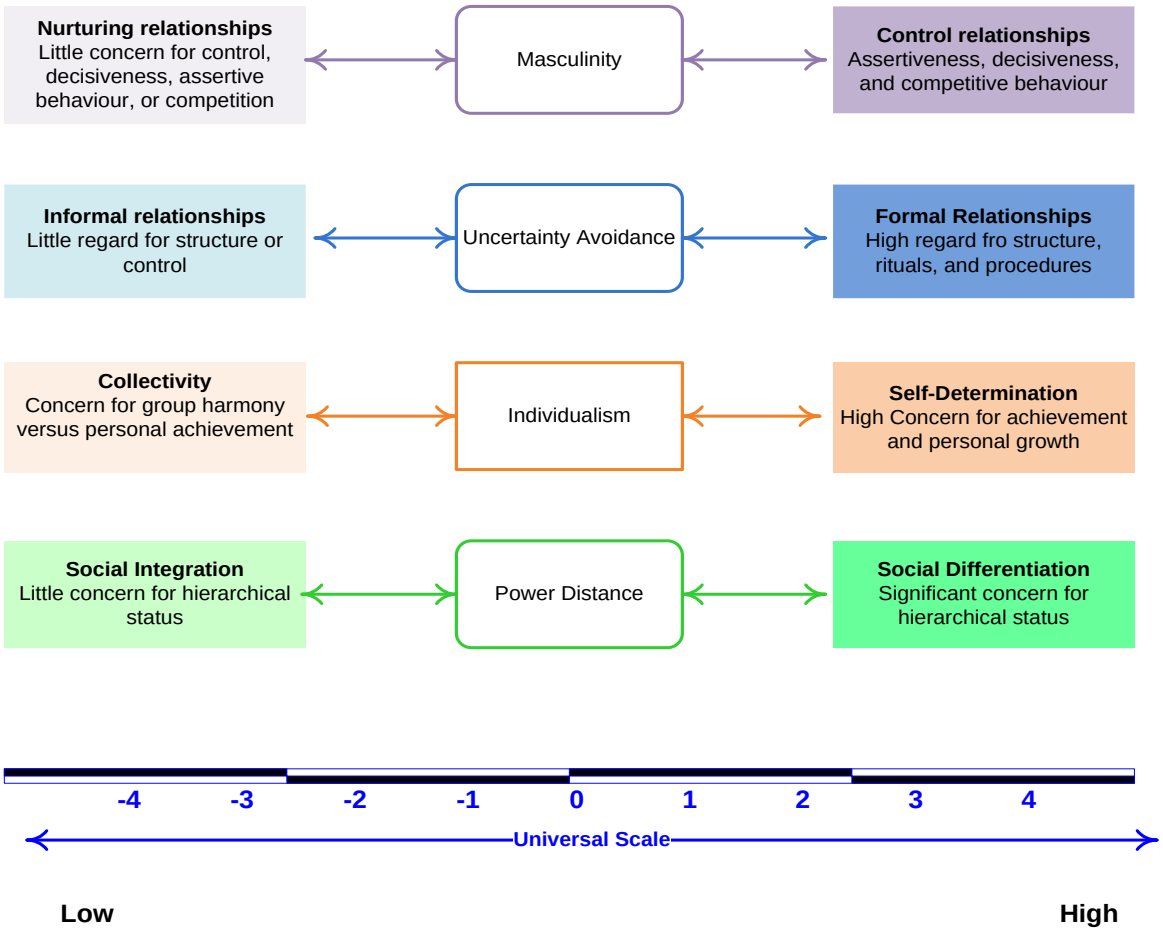

Figure 2-1: An abstraction of the Hofstede's view of Culture and its dimensions (Source: Holt and Wigginton, 2002)

Even though Hofstede' (1994) conceptualisation of culture as shown in Figure 2-1 is useful, I it could be argued that it cannot be used to explain the dynamism on how people use culture in their strategic decision making (Johnson et al., 2009). This implies that "culture" forms a crucial strategic factor for strategic business decisions because organisations can use it to understand the approaches to take if they are to operate effectively and competitively (Ille and Chailan, 2011) or if they are to do business in a particular region or country, argues Lowe, 2003). For example it can be difficult for one to use "power-distance" factor on Hofstede's model of culture because other attributes of culture may eventually become useful to a business or an industry at large.

However, Hofstede (1994) and Matsumoto, (1996) discussed that culture includes values, beliefs, and actions of a group of individuals; these may be different for individuals and for different generations. As such, culture involves a set of norms, which may be different based on each passing generation. These norms could be depicted from Figure 2-1; and that it can be echoed in the discussion by Spencer-Oatey (2008, p. 3) who argued that culture is a set of values on life, policies, and beliefs which are shared by a people and which impact on how they behave. In other words, culture relates to accumulated acts and behaviour, long-practiced by a group of people and accepted as norm in their group. Culture also guides their behaviour and values.

If an organisation considers all elements of culture depicted n Figure 2-1, it could be considered a very encompassing concept; however, there could be dominance of particular attributes depending on the region or ethnicity. For example, in the earliest written definitions, culture was often associated with Western civilization (Jandt, 2004). Anthropologist Edward Taylor set forth the concept of different societies going through different levels of development, from

the days of savagery and barbarism, and then ending up in what is known as western civilization (Jandt, 2004). This perspective however associated cultural superiority with the western culture (Fullan, 2014). This did not stop the eastern cultures like that of China also considering their culture as superior (Martin, 1985). The western culture became dominant for many years and for the most part there were also significant attempts to minimize or reduce its impact on the global society (Alvesson, 2012). At present, the understanding of culture has taken on different meanings for different countries (Martin, 1985). Within this context, culture may include a community which is "large enough to be self-sustaining; that is large enough to produce new generations of members without relying on outside people" (Jandt, 2004, p. 6). It also includes the conglomeration of the community's thoughts, their behaviour, their values, their concepts, and their experiences alongside the development of these elements in the context of other cultures (Jandt, 2004; Daft, 2012).

2.2.2 Middle East Culture

Using the Hofstede's (1994) categorisation of culture, it was vital to assess if there are any relations with the general patterns culture at regional level. Currently, it can be argued that in the Middle East, religion has a significant role in people's daily activities, their politics, their work, and their business dealings with each other (Barbiz, 2011). A critical evaluation of the Islamic culture under this section forms a core issue for this research to establish the international perception of the region, beliefs, values and traits in order to examine how its people perceive issues relating to safety. The initial perception of Islamic tendencies at regional level (Middle East and North Africa [MENA]) has been visual; this starts with day to day dress code such as plain white clothes and head gear; meaning that people's daily activities, as well as their relations and dealings with each other (Barbiz, 2011) can demonstrate that they are Moslems. Islam teaches and expects their followers to be generous, to be respectful, and to be modest. Since Islam is the dominant religion in the Middle East, these qualities are often

observed in the Muslims in the region (Barbiz, 2011). Despite the harmony that Islam tries to portray there is a culture of high level of "power distance" because of the strict hierarchical structure of authority and there is a high level of "masculinity" because of high level of control which is largely driven by gender, age, and the role one plays in society (Holt and Wigginton, 2002; Matsumoto, 1996; Hofstede', 1994) - see Figure 2-1. Such a perception would largely influence the structure of organisations – be they for business or otherwise.

The other view of culture in the MENA region is that which family values and tribal connections with families having a significant impact on how an individual behaves (Barbiz, 2011). Family members support each other financially and even emotionally, with the protection of the family's honour being a huge part of their culture (Barbiz, 2011). The Middle East culture is also considered loyal with family members and tribal members often working with each other for the family business (Barbiz, 2011). Aside from such loyalty, the Middle East culture is also steep in hospitality with individuals being very welcoming of different people and such hospitality also seems to be observed in the social and professional lives of the people (Barbiz, 2011). Guests are often well-received and meetings are often carried out with traditional coffee and other food. The Middle East culture puts a high value on relationships and foreigners working with them are also expected to cultivate such relationships with the Middle Easterners (Barbiz, 2011). This shows that there are deep elements of collectiveness within societies, if we base the argument on the Hofstede model. However, Barbiz (2011) opined that people in the MENA region prefer personal business undertakings and dealings to group undertakings; even if there is a high level of mutual trust with each other and the only way such mutual trust can be built is to personally carry out meetings (Barbiz, 2011). The mutual trust emanates from the religious upbringing and family customs. As a result, they prefer to conduct business with those they already know. It is therefore important

to have other people who may already know the other people before conducting meetings or business with such individuals (Barbiz, 2011).

In the Middle East culture, individuals greet each other by saying "As-salam alaikum" or "peace upon you" and it is responded with "Wa alaikum assalam" or "and upon you be peace" (Barbiz, 2011)". Meetings are conducted first with all participants greeting each other and shaking hands with each other. Small talk about family (except the person's wife or daughter) sometimes follows each hand shake. Addressing the Middle Easterners with appropriate titles is also important. In terms of work, there is less demand for Middle Easterners to work because most of them are provided with business opportunities as soon as they are emancipated (Cammett, et.al, 2015). This is due to the fact that the region is a major producer of oil and income from such resource is enough to support their population. Majority of the workers in hard labour and in demanding work routines are therefore the foreign workers; there are however also local workers with these foreign workers (Cammett, et.al., 2015). These foreign workers are also expected to abide by the culture in the country and the culture of the Middle Easterners (Cammett, et.al, 2015). There is also a mixture of other work cultures in the region because of the presence of these foreign workers. Nevertheless, the basic principles of sharing, generosity, family loyalty, and of mutual trust are dominant in the region (Cammett, et.al, 2015).

Hofstede (1984) view of culture succinctly addresses the attributes that reflect the MENA region where symbols, rituals, heroes, values, and the like can be associated with non-verbal and verbal communication (Hofstede, 1985). People undertake activities in a specific culture; and that they demonstrate particular values such as feelings about their own being (Jandt, 2004; Hofstede, 1984). The heroes are the people who present as models of the culture. These heroes are included in the stories of a specific culture, including their related literature (Rushing and Frentz, 1978).

This section has shown that ultimately, culture reflects acts of sharing and transmitting thoughts and behaviours to other people and to succeeding generations. Culture can also relate to those individuals who believe they are a part of a group (Alvesson, 2012). This is otherwise known as one's cultural identity, or identifying with the assumed acceptance of a person identity into a group which has been sharing values and symbols including conduct (Jandt, 2004). By knowing a person's cultural identity, there may be a tendency to stereotype all the people in such culture into a specific mould (Daft, 2012). However, a person may have different traits distinct from the culture he or she is identified with (Daft, 2012). Some cultures are therefore considered very much diverse. In understanding the cultural identity of a person, it is possible to understand the problems that each person within that culture may be facing (Fullan, 2014).

According to Collier and Thomas (1989), each person has his own cultural identity and such identity may or may not be the same identity, which associates a person with the different countries in the world. In evaluating where individuals have learned and understood their values, myths, and symbols, there is actually no specific connection or understanding of culture except that which individuals develop on their own (Collier and Thomas, 1989). The knowledge gleaned from other cultures is also often limited based on an individual's bias of one's specific culture. For instance, an adult Chinese would unlikely never fully comprehend the experiences of individuals growing up in Australia (Jandt, 2004). In developing an understanding of culture, it is important therefore to also comprehend the different experiences, which would impact, and guide individuals in their life (Cummings and Worley, 2014). This would include the way they talk, their language, their gestures, their social activities, their religion, values, customs, food, health, transportation, and political as well as their economic systems (Jandt, 2004). Culture encompasses all the things people would want to know and what they need to do if they are to operate in the MENA region. However, the interest of the research lies in the need to assess how culture could reflect the actions (or lack of them) on safety

decisions for an industry (Morton and Ross, 2008); and how culture, as a factor, could be measured when it comes to safety in construction businesses of Saudi Arabia. However, before undertaking such an evaluation of culture that typify the construction industry it is vital to examine the meaning of organisational culture and its role in moulding workers to be safety conscious in the work environment.

2.3 Organisational Culture

Organisational culture gained wider acceptance in 1980s; however, its ideals and ideas are traceable as far back as the 1940s where human relations perceptions gained firm footing in organisations (Baker, 2002). Theorists advocating human relations considered the interpersonal, nonmaterial, and the moral foundations of commitment including cooperation as more important matters than the instrumental elements highlighted by the rational system advocates (Baker, 2002). A more human relations consideration draws inspiration from the earliest sociological elements of culture admitted alongside groups as well as societies (Durkheim, 1964; Geertz, 1973). A focus on organisational culture has not gained as much leverage in terms of an organisational science making social science more quantitative (Parmelli, et.al., 2011). Research on organisational culture has been directed more towards what can actually be quantified, including the attitudes and perceptions of employees, and the conditions known to match the perceptions of employees (Parmelli, et.al, 2011). The revival of interest in organisational culture relates to a shift in the earliest organisational literature, eventually transitioning to the more organic and manageable asset in organisational management (Baker, 2002; Parmelli, et.al, 2011). Organisational culture can be defined as the way things are done in an organisation (Buchanan and Huczynski, 2010); and this is driven by the way the organisation has been structured (Anderson, 2010) and how the leaders of the organisation have set it up for the business to succeed (Abrell-Vogel and Rowold (2014).

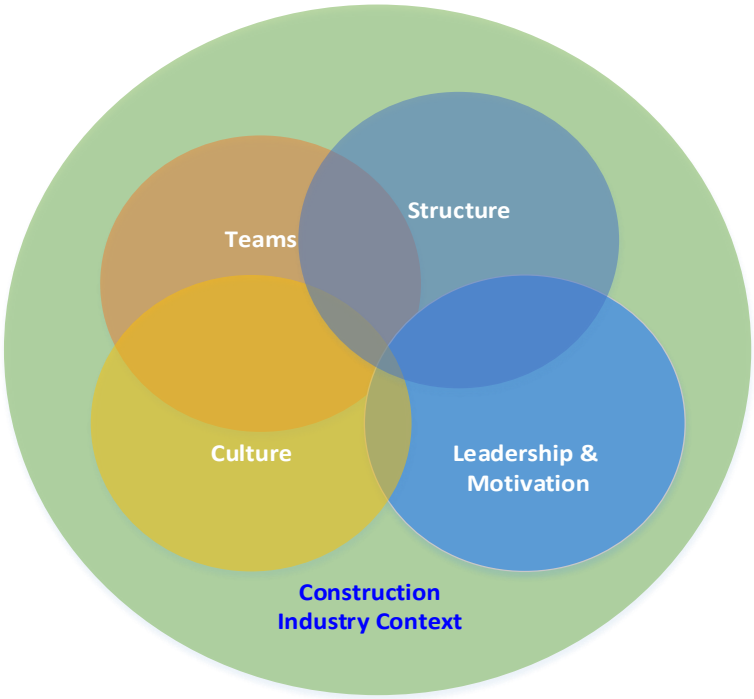

Figure 2-2: Contextualisation of organisational culture for companies working in the construction industry (Idea from adapted from: Motawa et al., 2007, Morton and Ross, 2008; Lazarus and Clifton, 2001).

Notice that in Figure 2-2 there is a depiction of the factors influence the development of organisation culture – for instance, if the company promotes team work and that the leader structures their operations to that effect, they can be motivated to perform (Bratton et al., 2007); hence making the issue of organisational culture a behavioural issue within an organisation. Another critical issue to consider from Figure 2-2 is the influence of general culture on the organisation this because the way people behave is linked to societal norms (Buchanan and Huczynski, 2010). Schein (1992) believes that organisational culture is "pattern of shared basic assumptions that the group learned as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and therefore to be taught to new members as the correct way to perceive, think, and feel in relation to those problems" (Schein, 1992, 12; Baker, 2002, 3). Although the different elements of the organisational culture may not have been too obvious before, this is not anymore the situation today. Due to

the increased focus placed on the management of culture, organisations have recognised the value of emphasizing and focusing on basic assumptions (O'Reilly, et.al., 1991). This has been known to occur in instances of knowledge management where more focus is given towards presenting tacit information in an organisation as less tacit. As such, this relates to proclivities towards sufficiently understanding what has been considered before as unmanageable or uncontrollable (Schein, 1992).

While most organisations have a culture, some cultures may be stronger or weaker than others largely because of the influence of leadership (Baloğlu, 2012). Therefore, it can be argued that a strong culture is one which has been presented as a complete set of values and beliefs for any organisation (Shafritz, et.al, 2015). The focus has been on the general consistency of values, beliefs and actions for the members of the organisation and the extent that these values or beliefs are being applied throughout the organisation (O'Reilly, et.al, 2014). Some of the initial elements of organisational cultures often considered the strong cultures to be advantageous for organisations because it helped ensure commitment, identity, and the motivation of the members of the organisation (Baker, 2002; Cheung, et.al, 2012). It is noted however that to some extent, a strong culture is relevant for some organisations more than others. Charitable organisations or the non-profit organisations may look for ways to focus on culture more than the profit-oriented organisations. There may also be noted issues in a strong culture and such culture may not always be the ideal goal (Perrow, 1979). The specific controls often associated with a strong culture may lead to individuals putting significant pressure on themselves, often preventing the manifestation or implementation of change. Strong cultures may also be a new means of manipulation within the organisation (Perrow, 1979). Such a culture may also prevent the establishment of goals, where the means of doing overshadows the original goals of an organisation (Merton, 1957).

2.3.1 Organisation Culture and Performance

Organisational culture has been applied in many ways; for example, it used to be felt that culture was critical to improving integral indoctrination and coordination in organisations; however the open system in organisations has acknowledged the fact that culture is also crucial in ensuring that adaptability of the organisation (Cheung, et.al., 2012). The original perspective of a strong culture may not match the organisation's ability to change. Admitting that culture is very much significant for the organisation's development, the new perspectives may require various options relating to organisational culture (Shafritz, et.al., 2012).

Schein (1992) has understood that strong cultures in organisations have been seen as a means of supporting and preserving the organisation. Still, in relation to the fact that a strong culture may not necessarily be advantageous for current organisations, which are more, accepting of change, Schein (1992) indicates that even if a strong organisational culture is also stable, it would not necessarily mean that the organisation would also not be accepting of change. In some instances, a strong culture may want to change if it would not be the popular thing to do (Chatman, et.al., 2013). Among the more modern organisations, the culture must be strong, but must also have its limits, able to distinguish the basic assumptions, which are crucial to the organisation and all other elements, which are not as relevant. At present, in most organisations, the environment seems to be changing and becoming more diverse and heterogeneous (Baker, 2002; Shafritz, et.al., 2015).

While there are varying perspectives on organisational culture, there are also various views on how such organisational culture is implemented. There are different perspectives on the culture, which can also be presented in a variety of options. In one option, known as the consistency hypothesis, presents the concept of common ideas and beliefs supporting coordination among the members of the organisation. In another hypothesis – the mission hypothesis – it is indicated that with shared purposes and strategies, coordination of common goals can be made possible

(Baker, 2002; Hysong, 2014). In the involvement hypothesis, it is indicated that with more participation, a sense of ownership is developed, including organisational loyalty. Finally, the adaptability hypothesis recognises the fact that beliefs are able to impact on how organisations understand signals relayed from the outside world. These concepts highlight the various elements of culture, including the emphasis on the elements and applications of culture. The consistency and mission hypothesis seems to help promote stability and the last two seem to highlight change (Yilmaz and Ergun, 2008; Cheung, et.al., 2012). The consistency and the involvement hypothesis also highlight the workings of the internal organisation, while the mission and the adaptability hypothesis seem to understand culture as a means of managing the relationship of the organisation with its outside world (Baker, 2002).

Organisational culture has been known to have an effect on organisational performance (Wang, et.al., 2011). In the book by Peters and Waterman (1982) the family business school approach has been presented. Studies on other companies have also been carried out with Cameron and Quinn (1999) discussing how some successful 1990s organisations like Wal-Mart, Southwest Airlines, and Tyson Foods have not performed well in terms of critical success. These indicators include low bargaining power for suppliers and buyers, rivalry for competition, and significant market shares which allow for scale and rivalry for the competition, diverting direct competition with possible dominant parties (Baker, 2002; Wang, et.al., 2011). Some successful companies have manifested with strong leaders, which have then allowed for some distinct strategies with strong cultures which can also help allow for the realization of strategies (Hysong, 2014). There has also been sufficient support for the fact that failures in organisations may be attributed to the refusal to introduce shifts or changes in the organisational culture (Kotter and Heskett, 1992).

In the study by Kotter and Heskett (1992) where they set out to study the successful organisations and considered the main elements differentiating such firms from the less

successful organisations, it was revealed that majority of the analysts agreed that organisational culture was the essential factor to the success of the organisations. Also, there seems to be general support for the participation perspective of culture, where more participation from employees also meant more organisational success (Kotter, 2008 Kotter and Heskett, 1992). Contrary to the above evidence, it has also been understood as a point of argument that successful companies did not necessarily mean exceptional companies (Peter and Waterman, 1982). This means that these companies did not adjust well to the changes in society with failure to adapt to changes being a significant factor affecting success (Christensen, 1997). Such contradiction indicates the importance of adopting more comprehensive assessments on the impact of organisational culture. The proof accumulating on successful companies not staying successful for much longer also indicates how the traditional concept of a strong culture may have to be superseded with a more accepting admission of the kinds of culture and the roles which it plays, including the importance of changes in the culture in order to sustain the organisation (Baker, 2002; O'Reilly, et.al., 2014). For instance, having a strong and sustainable culture is important in the initial stages of any organisational development, however after this stage, it is important for the organisation to apply a more differentiated culture, one which is also accepting of change (Baker and Singkula, 1999). In order to promote long-term goals, a specific type of culture may not be needed, but a more flexible type may be more essential. As such, the dynamic conceptualisation of culture and the roles which leaders play in supporting the organisational culture seems to affect the future and present goals and progress of organisations (O'Reilly, et.al., 2014). As pointed out by Schein (1992), leadership at present is very much based on the management and the reconstruction of culture. As such, leaders have to have the ability to evaluate how well culture is doing and when it has to be adjusted (Cheung, et.al., 2012). Evaluating and managing organisational culture and also establishing

when significant changes would be needed is important in order to promote organisational goals in the long run.

Culture and organisational culture are, therefore, based on the practices and norms in the organisation, practices that are being applied in the work setting. This chapter also presents ideas related to organisational culture, and the impact of such culture in the workplace. Ideas on the work culture in Saudi Arabia have also been presented, mostly in terms of a minimal local work force. The priority in the culture and organisational setting in Saudi Arabia is the private sector with foreign workers and the oil and petroleum industry. Various perspectives of the organisational culture shall be presented below in order to further be informed about the organisational culture existing in the work setting, and where Saudi Arabia fits in these different types of organisational culture.

2.4 Types of Organisational Culture

Different writers have perceived the topic of organisational culture from many different perspectives and according to Schein (2008), organisational culture encompasses "the set of shared, taken-for-granted implicit assumptions that a group holds and that determines how it perceives, thinks about, and reacts to its various environments" (p. 26). On their part, Gilley and Maycunich (2003) stated that organisational culture is made up of "what employees perceive to be the pattern of beliefs, values, expectations that guide behaviour and practice within an organisation (p. 149). In comparison, both writers identify organisational culture to be more of a perceived act, not a reality that influences organisational processes. This notwithstanding, such perceived consciousness affect the beliefs, values, expectations, and reactions of the people within the organisation. In the sub-sections below, four major types of organisational culture and their implications on organisational safety practices are outlined

from the perspective of different writers. Four types of organisational culture include: policy-orientated culture, goal-orientated culture, clan culture, and control culture.

Glendon and Litherland (2001) posited that organisations that practice a policy-orientated culture are highly rigid and instructive. According to Gilley and Maycunich (2003), these are organisations that believe in the power of paperwork. As a result, they get everything about the values, attitudes and principles of the organisation on a piece of paper. Furthermore, leaders of these organisations ensure that all stakeholders within the organisation, particularly employees, put the written policies of culture to work. Kunreuther, McNulty and Kang (2002) measured the advantages and disadvantages that a policy-oriented culture would have on organisational safety practices.

On the merit, it was stated that a policy-orientated culture ensures that there would be adequate record keeping on issues of organisational safety practice (Mroszcyk, 2009). This point can well be agreed with since policy-orientated cultures are highly documented and that they keep sufficient data on safety measures and actions that are taken within the organisation (Ahmad and Gibb, 2003). This way, safety procedures will be followed without fail. This merit notwithstanding, the policy-orientated culture has been tagged as one that is rigid to change, even if the changes will be good for safety management within the organisation (Kotter and Heskett, 2012). The reason the policy-orientated culture is rigid to change is that it needs a very complex bureaucratic process to administer the necessary changes (Bruno and Lay, 2008). Where very urgent changes are needed to meet specific safety standards, the tendency for changes not being met is thus higher.

The other type of organisation culture is the goal-orientated culture. Writing on the goal-orientated culture, Gilley and Maycunich (2003) indicated that organisations that practice this form of organisational culture would often set specific goals to attain. Moreover, their attitude,

behaviour and reaction to work are all focused on getting these goals achieved. Kotter and Heskett (2012) went ahead to clarify that this is different from having the normal mission and vision statements at work. Rather, it ranges very deep into focusing on very specific aspects of organisational goals, so much so that all stakeholders are given specific roles to play in accordance with the set goals. Lee (2008) related the provisions of a goal-orientated culture where possible effects relate to safety practice, especially within a construction company.

In this, it was noted that goal-orientated culture organisations are very focused on safety, especially if they have any safety standards and goals they want to attain. This is because the entire orientation of the company is to attain their goals without incurring any losses. Burke (2008) however criticised the situation whereby goal-orientated cultures are very much focused on considering new developments in terms of safety, even when these areas are not part of what has been documented as an overall goal of the organisation. Frost et al. (2005) however disagreed, stressing that most goal-orientated cultures have added values such as motivation and rewards for employees as just some of the ways to ensure that they would reach the goals set by the organisation. According to Ahmad and Gibb (2003) this has been praised as a positive sign for safety practice in the organisation because when safety goals are set, employees are encouraged through such motivations and rewards to go all out to achieve them.

In different organisations, there may be related cultures and philosophies dominant therein. The third type of organisational culture is the 'cooperate or clan' culture where the place is welcoming, very much like families. In this culture, the focus is on sustained personnel capital growth as well as group cohesion. There may also be a generating adhocracy philosophy where the workplace is a lively setting to work in and the goal relates to providing new goals and gains. The final type of organisational culture is the control culture where the culture is very much organised with standards used to assess performance and productivity highlighted by the

managers. A complete market culture may also be seen in some instances with good results considered to be a major target and emphasis on gaining sufficient wins in terms of unifying the community.

In summary, the different types of organisational culture considered for this paper are the following (Figure 2-3):

- Clan or cooperate where the culture is based on cooperate and family-oriented practices and cultures. Using the abstraction from Figure 2-3 it can be possible to argue that an organisation culture that is corporative in nature is supportive (Hoecklin 1995, p67).
- Control culture where the culture is strict and specific standards are indicated in order to ensure compliance. This culture avoids ambiguity and is heavily reliant on the roles (Hoecklin 1995, p67)
- Policy-orientated culture where the culture and practices are geared towards the fulfilment of policies. In most cases, there can be a medium to high level of power distance in order to ensure policies can be implemented (ibid).
- Goal-orientated culture where the culture and practices are geared towards the observation of goals and objectives for the organisation (Thompson and Martin, 2005).

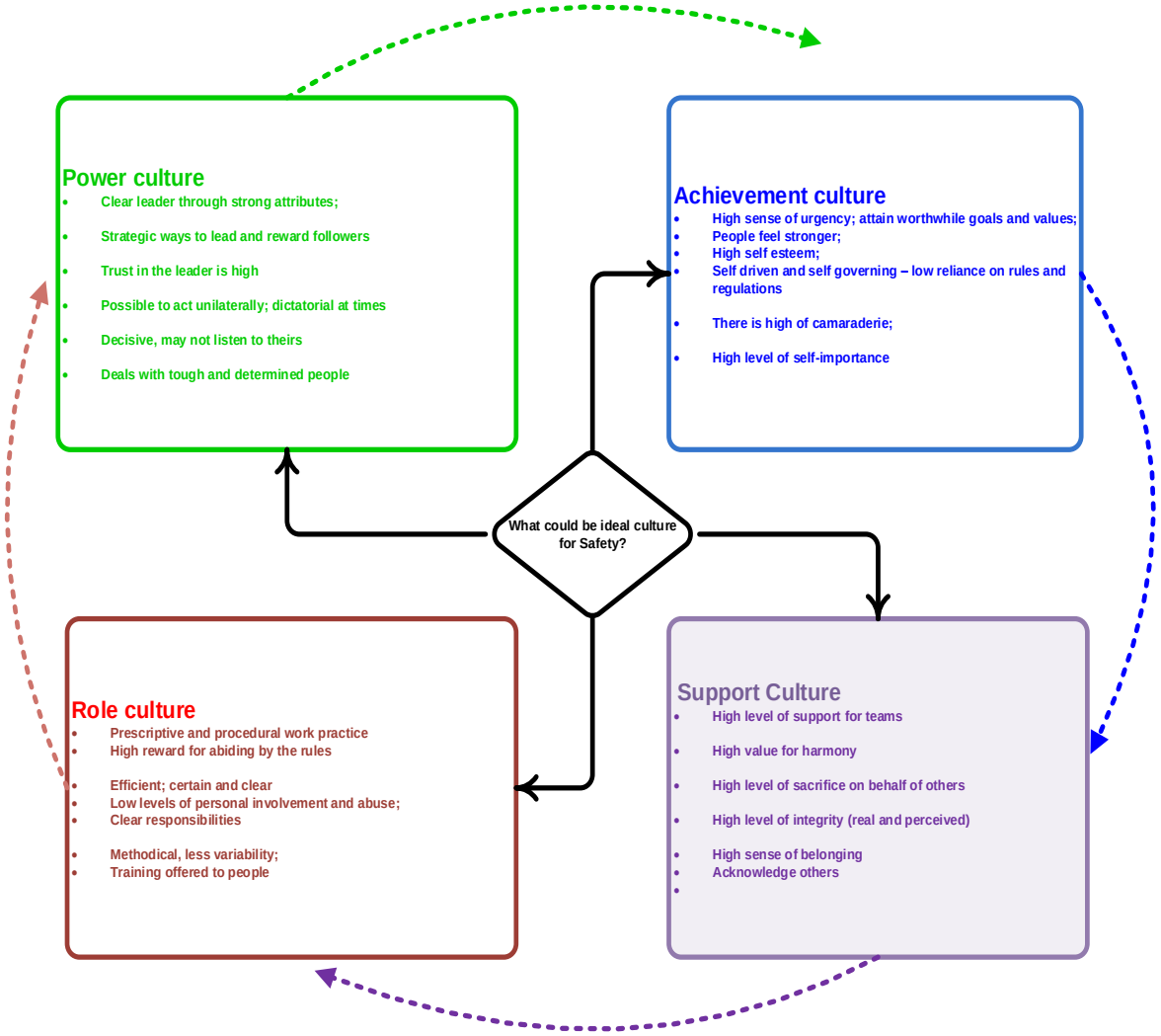

Figure 2-3: An abstraction of the meaning of organisational culture to typical construction organisations (Source: Morton and Ross, 2008)

Depending on the perception one takes about organisational culture has been the role it plays on organisational behaviour (Buchanan and Huczynski, 2010); which eventually impacts safety culture of the organisations and the industry at large (Morton and Ross, 2008). Another issue to consider when it comes to organisational culture has been the

impact of cultural diversity due to the migrant workforce employed globally (see section 2.4).

2.5 Organisation Culture in Construction Industry

Like any other industry, construction organisations around the world have their culture that can be explained using the Hofstede's Cultural dimensions (1984); mainly because different people coming from different parts of the world have made construction as their main business stay. Consequently, Hofstede (1984) mentioned that the way and manner in which people from different countries will approach organisational culture in relation to their business culture would be different. Hinze and Wilson (2010) however indicated that globalisation seems to transforming into a system that is making cross-cultural influence very powerful. In the opinion of Mroszcyk (2009), this means that it is possible for people from one part of the world to learn and adopt the safety culture of others.

Consequently, McGraw Hill Construction (2008) mentioned that globalisation in today's world is very relevant and has a great significance in business organisations. Boin and Schulman (2008) stated that the concept of cross-cultural studies is very much related to this topic. Under these conditions, not only are the numbers of multi-nationals also increasing day by day, but events are also increasing in importance in terms of cross-cultural studies and trainings for cultural diversity. With the changing situations, employees of construction businesses are bound to accomplish projects with different team members. It has become complicated for the employees to understand the body language of different team members, and thus, friction is often started, often directly impacting different projects. It also implies

that because of the growing concern of cross-cultural activities, the need for cultural diversity and training has gained greater relevance (Slocum and Hellriegel, 2009).

Therefore, a concrete understanding of the classification of organisation culture is essential in order to improve the performance, the health and the safety issues in organisations. In the construction industry, there are concerns in the workplace, which are provided more importance, especially in relation to cultural and cross-cultural elements.

Within the construction industry, the organisational culture has been seen and applied in different ways. Zohar and Tenne-Gazit (2008) argue that most of the industry players have settled for organisational cultures that emphasise support. This means that for these companies and organisations, the need to secure organisational goals as a shared responsibility is greatly admired (Bruno and Lay 2008). Because of this, such companies rightly identify the place of all stakeholders including clients, consultants, contractors, general public and the government in the construction of their organisational cultures. In a study by Hofstede and Minkov (2010), major practical organisational cultures that have been used in various companies, two of which may be replicated in the construction industry were compared to find out at which time each of these may benefit a particular firm. These cultures were the supportive culture and the innovative culture. By and large, the supportive culture was found to be the type of culture that recognises the hierarchical approach and thus identifies the different ranks and personnel ranking and place within the organisation (Figure 2-4).

Figure 2-4: Shared Responsibility (Source: Circle of Impact, 2010)

According to Bruno and Lay (2008), in supportive cultures, organisational management, processing, attitude, and values are all about sharing of responsibilities and supporting each other in order to realise organisational goals and objectives. Gilley and Maycunich (2003) explained that organisations with supportive cultures acknowledge the success and failures of individual members as the success and failures of the entire organisation. Because of this, these organisations are always seen working together in creative ways to reach their goals. Lee (2008) acknowledged that organisations with supportive cultures always have sufficient energy behind their quest to foster change when it comes to safety practices. Burton, Lauridsen and Obel, (2004) mentioned that, because the responsibility of implementing safety standards, principles and strategies is not left with only a few people within the organisation, there is always the sharing of ideas, competencies, skills and knowledge to ensure that safety practices are standardised and are up to industrial standards.

This merit notwithstanding, Burke (2008) touched on the limitations of supportive culture, saying it hardly promotes individual innovation and creativity. Meanwhile, such individual innovation and creativity will be identified as an important paradigm aimed at having diverse unique approaches to solving day-to-day safety challenges that the organisation is faced with. Holt (2005) had mentioned that it would also be noted that in any typical organisation, there are people who function best when they are made to put into use their individual innovative skills. For such people, the changes that they will play second fiddle to others when it comes to safety implementation (Figure 2-4). The application of the organisational culture to construction business has resulted in the argument that safety can only be operationalised if there is shared responsibility between stakeholders at an organisational level as shown in Figure 2-4. The essence of the shared responsibility theory for this study is that if the stakeholders within the construction industry can adequately implement the safety culture. The best way out is for them to work as a team. Where roles are broken down for different people within the organisation.

2.6 Organisational Culture in Saudi Arabian Construction industry

Organisation culture in companies operating in the Saudi construction industries are not immune to the impact of general culture as explained by Hofsted model; in fact there are more elements that can be added to the Saudi context. For instance, Hinze and Wilson (2010) opined that there was more to Saudi organisational culture in construction because there was an element of innovative culture which has largely been accepted in the Saudi Arabian construction industry. Instead of examining organisational culture for Saudi construction industry in generalities, it could be prudent to use Kaarst-Brown et.al, (2004) model, shown here in Figure 2-5. It shows that in Saudi Arabia it is crucial to consider

organisational culture with reference to the competing values framework that includes clan, adhocracy, hierarchy, and market, herein summarised in Figure 2-5. It can dictate how an organisation develops the "way things are done" in their organisation because of the influence that strategic managers may have on the business depending on their orientation depicted on Figure 2-5.

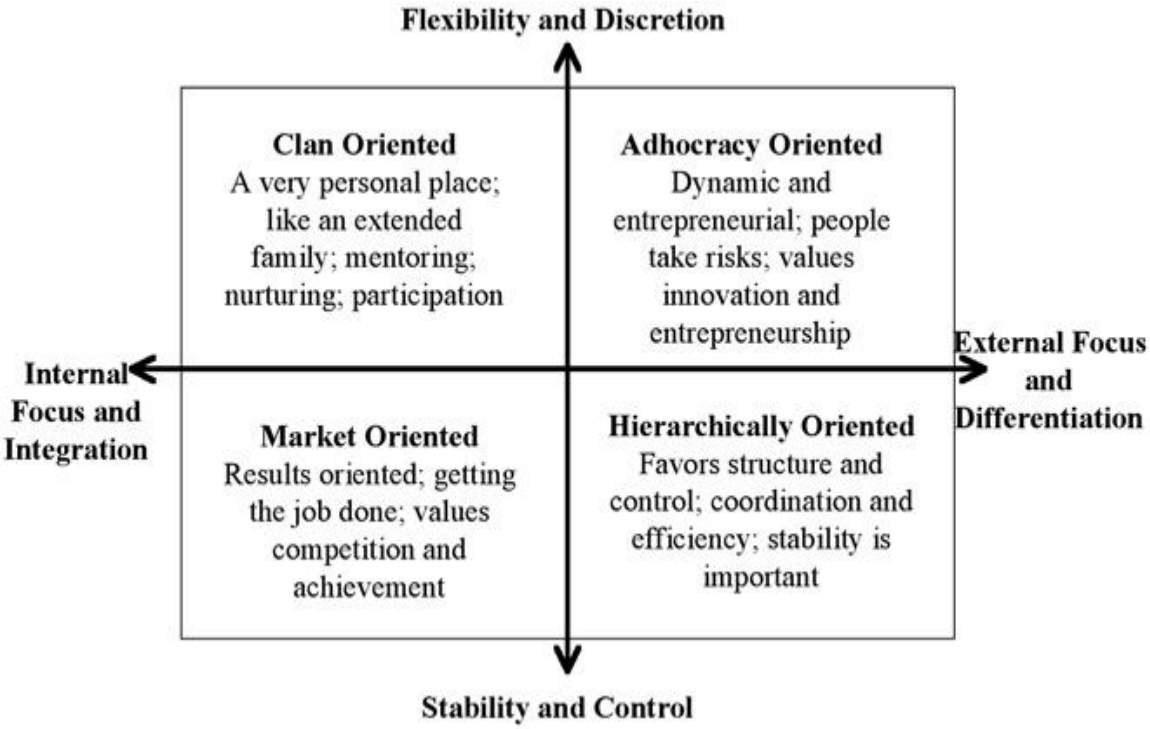

Figure 2-5: Competing Values Frameworks (Source: Kaarst-Brown et.al, 2004).

For instance, some members see some organisations in the construction setting as effective organisations especially where the organisation is able to easily adjust to changes. This can be seen for instance where constant changes in the structure are observed. On the other hand, the government construction companies may sometimes be seen as more efficient, when they are generally stable (Kaarst-Brown, et.al, 2004). Organisations can also be considered

efficient where their internal qualities would be considered coherent, and when organisations are able to function consistently. In the adhocracy organisational culture for construction companies, the efficacy criteria are found at the upper right corner. This type of culture is usually seen in the young organisations (Kaarst-Brown et al., 2004). Employees are also challenged to be creative and innovative.

In the market culture, power is divided between the parties and teams. However, outside elements support the development of the market culture. In this market culture, the motivation is external, but power is focused which is the opposite in adhocracy. The efficacy of the market culture is in its profit shares (Kaarst-Brown, et.al, 2004). The market culture values productivity as well as competition. In the clan culture, the organisation seems to be like an extended family with its shared goals and values. There is also a significant commitment to the company and its goals. The work is usually carried out through team-work (Kaarst-Brown, et.al, 2004). Finally, in the hierarchy culture, which is mostly in the public sector, there is better stability; however, with various changes in the environment, the other types of organisational culture are prioritized (Kaarst-Brown, et.al, 2004). After specifying these different types of organisational cultures, the discussion below shall evaluate the existing organisational culture in the Saudi Arabian construction industry. The Saudi organisational culture for construction businesses, therefore, fall under these continuum explored by Kaarst-Brown, et.al, (2004); over and above the typical attributes that impact every organisation operating as a business in today's construction markets. It also implies that expertise and specific role expectations of those operating in the Saudi construction businesses are very much depended on the organisational setting.

2.7 Safety as a Factor in Organisations

There are different conceptualisations of safety. According to Oakes (2011) safety is a state where an organisation is doing what it is being expected to do in order to keep the workers, those it comes in contact with and the general public safe. What it is expected to do relates to different standards and policies referring to engineering and architectural statements, designs, and visions as well as policies. For most organisations, regardless of space or size of space, safety is a normative element as it supports specific concepts of what is acceptable and what is expected (Oakes, 2011). Under these conditions, ensuring a home's security from external threats is part of a home's steady state. Proske and van Gelder (2009, p. 265) also discuss that there is no fixed definition for safety, but that safety relates to a "situation with a lower risk compared to an acceptable risk". They also associate safety as a feeling where all possible means are made in order to decrease or reduce threats (Proske and van Gelder, 2009). In other words, safety relates to an absence or a minimization of risks or threats to an individual's normal state.

Safety can have different meanings to different people and companies. Safety comes from the French 'sauf' which also translates to the state of being sufficiently protected from the social, financial, emotional, psychological, physical, political, and academic implications of failure, damages, mistakes, accidents, or harm (Carnegie Mellon University, 2011; Williams, 1998). This is a very broad definition and as such, it has been difficult for many governments to establish a safe work area. Where any parties concerned with the safety standards would not actually support or believe the concept of safety, the safety system can break down (Carnegie Mellon University, 2011). In other words, where workers actually feel safe in their work place, they may not exert any effort to ensure that they are safe in

their workplace (Williams, 1998). Richter and Koch (2004); Carnegie Mellon University (2011) stated that, companies may sometimes have high safety records and this may be based on their strong safety culture, where all the parties believe that any safety related act has to be supported and applied in the workplace in order to ensure a safe workplace. Safe workplaces are a major requirement for dangerous workplaces, including the construction industry. The section below shall discuss safety in the construction industry.

The argument for this research has been centred on how safety becomes influenced by societal culture and the dynamics of organisational culture such as those alluded to in sections 2.2; 2.3 and 2.4. For instance if an individual is impacted by the style of leadership because their leader is over controlling (Figure 2-1) it can be possible that the individual's behaviour would be negatively impacted (Figure 2-2); such that their response to safety needs could be blurred by their perception of life in that organisation. Therefore a comprehensive review of culture has shown that it forms an umbrella for organisational operations such that issues such as safety become subsets of the larger sets of other important things decided upon.

2.7.1 Safety Culture Values

Safety values relate to central elements from members of organisations wherein decisions are made and actions are tested (Taylor and Thomas, 2003). The safety culture values are also associated with the espoused values of the construction industry. In general, there is a noted associated between organisational safety and beliefs are presented in observed safety behaviour (Taylor, n.d). This association can be seen through the safety values and attitudes in the workplace. Organisational strength within these sectors can imply share safety

standards (Taylor, n.d). Managers consider these values as important and preferred conditions, allowing shared safety attitudes to be supported (Taylor and Thomas, 2003). Safety values may be verbally expressed, but may also be seen in documents. As such, they are then incorporated into the organisational structure (Taylor, n.d). These values are also like beliefs, which have to be specifically owned and supported by organisations (Taylor and Thomas, 2003). These beliefs and values are also reviewed regularly and reinforced in order to manage the changing needs of the construction industry. These values affect the general safety culture in the organisation. Often impacting on the decisions made by the managers, and how the elements of the safety standards can be implemented in the workplace. From these values better outcomes in terms of safety can be established. There are also components, which have to be understood in order to ensure a safety culture in the construction industry – see section 2.8.

2.7.2 Value for Safety

Safety as a value can be perceived as an ethic that helps support how persons view safety related behaviour, in work, at home, as well as in the community (Cooper, 2001). Such ethic guides behaviour (Cooper, 2001). For the workplace, this implies that safety is not just a priority, but it is an ethical standard, which supports every action of the individual. In countries like Sweden for instance, safety value is being applied into action. This country understands the importance of safety, and they have been prompted to make changes in their roadways in order to force the people to drive safely (Cooper, 2001). Cooper (2001) said that, roads have been built narrower in order to prevent buses from overtaking each other when unloading or picking up passengers. Therefore, in the construction setting, the safety

value can be seen in terms of how the leaders and workers prioritise safety and how they embrace safety as an ethical standard which would guide their actions. In order to further understand safety value in the construction setting, it is important to further discuss the safety culture and injury or accident rates in the construction setting.

In the construction industry therefore, components like leadership, employee behaviour, and values. All these factors make up aspects that may endanger the construction safety or aspects, which actually help ensure safety. It is important to ensure that these components are in good working condition in order to promote and ensure workplace safety. The discussion below discusses in detail about the safety culture and injury/accident rate in order to establish details on these rates that can eventually provide a status update on occupation safety in the construction setting.

2.8 Safety Culture in Construction Industry

According to Dedobbeleer and Beland (1991) the cultures of construction industries vary from country to county; different subcultures in different trades, the multi-structured projects, the changing work setting, and the continually changing work force. One of the first instruments used in the safety climate of the construction industry was based on Dedobbeleer and Beland (1991). Fang et al, (2006) opined that safety culture can be defined as the way safety is considered in an organisation including "indicators, beliefs, and values that the organisation owns about safety". On the other hand, Zohar (1980) argued that safety climate is the totality of perceptions on safety understood and practices by workers in different institutions. Still, the safety culture and climate are different matters and as such; much debate have been undertaken on both terms especially as it has also caused confusion

in regards to safety (Guldenmund, 2000). Safety climate can be viewed as an element of the safety culture, or an indication of the actual application of the safety culture (Lee and Harrison, 2000). The safety climate has also been considered an element of the overall safety culture within the organisation (Cooper, 2000, Neal, et.al, 2000). The safety climate has also been conceptualised as an element of the safety culture with the two terminologies having to be considered alternate terms (Glendon and Stanton, 2000). Guldenmund (2007) acknowledged that the safety climate and culture are not separate matters, but they are distinct approaches to securing shared objectives within institutions.

According to Lingard and colleagues (2009) supervisors, managers and workers are all responsible for the implementation of safety initiatives within construction industry. As an organisation grows, so is the impact it makes on safety culture (Fung et.al, 2005). Generally speaking, institutional structure, policies and project specific factors influence safety culture. However these factors are not all technical, many are considered as social-technical; human and work related centred on general management (Fang and Wu, 2014; Cox and Cheyne, 2000).

Atak (2011) opined that organisations tend to evaluate safety culture as a way of ensuring that the can have data necessary to influence the culture. Langford, et.al, (2000) also recognised that the safety culture comes about because of major institutional development and growth and may sometimes be a major issue in the initial stages of new companies. Ek (2007) and Pidgeon (1998) also studies the negative effects of safety cultures in any organisation including the elements of safety work which can help promote change processes. In general, as culture is socially established in groups, it would not be the case

for these processes to establish similar cultures within the organisation (Antonsen, 2009; Tam, et.al, 2004). In the construction industry, where teams at some point are considered temporary institutions, safety conditions impact organisational growth and development; hence safety culture would require adequate consideration (Fang and Wu, 2013; Abdelhamid and Everett, 2000). However, not many studies on construction have been carried out on organisations development and the safety culture (Gherardi, et.al., 1998; Choudhry et.al., 2009; Teo, et.al., 2005). There is no specific or valid ways to evaluate, assess, and evaluate the safety culture and some issues have yet to be understood (Mengolini and Debargeris, 2007; Rowlinson, 2004).

At international level, many organisations have been using surveys to extract information from their workers in order to assess the safety culture (Zhou, et.al, 2009; Mohamed, et.al, 2009; Guldenmund, 2007; Harvey, et.al, 2002). Another issue in the safety culture surveys relate to the measures used which are usually too general, making the determination of specific actions in relation to non-specific predictors difficult (Ajzen, 1991). In effect, Guldenmund (2007) and Biggs, et.al, (2013) admit that assessment of safety culture require new strategies other than questionnaire survey. Causal analysis applications have been used to assess the complications related to incidents impacting the safety culture (Goh, et.al., 2010; Williamson, et.al., 1997). Goh, et.al, (2010) and Huang, et.al, (2007) pointed out how causal loop structures in these tasks and a system in thinking may be applied to understand the systemic elements supporting the safety culture, also to determine some elements in improving safety, and later preventing recurrence of incidents. To decrease misunderstandings in concepts and to differentiate between policy and practice, Zohar (2008) and Larsson, et.al, (2008) emphasized how the safety climate must be assessed within

organisations and within workgroups being separate elements with different assessment scales. In the study by Flin (2007), a safety climate survey was used to determine the perceptions of the workers and their attitudes in relation to worker and the patient safety for health organisations. The study grouped the safety climate into two – organisation and department/team safety climate (Flin, 2007). Admittedly, the framework for measurement and the tools in measurement were the two primary points observed in evaluating the safety culture (Fang and Wu, 2013; Huang and Hinze, 2006). In the meantime, safety culture assessment and improvement designs must also be considered alongside each other to evaluate actual and overall impact (Fang and Wu, 2013; Huang and Hinze, 2006).

Different case studies on the safety culture have been carried out through the years and in different fields of work, including aircraft maintenance, air traffic control, oil and gas, healthcare, research and development, nuclear power plants, railway industry, and fishing vessels (Fang and Wu, 2014; Atak and Kingma, 2011; Ek, et.al., 2007; Havold, 2009; Flin, 2007; Navestad, 2010; Mariscal, et.al., 2012). Different results have been drawn from these studies. In the paper of Atak and Kingma (2011), the outcomes in safety culture in different organisational processes were considered, in the context of startup stages in new institutions. The study revealed that the working processes in these institutions often indicate to issues within the safety culture. In evaluating the culture of safety within the Swedish air traffic control setting, the authors established that there were two units which had higher scores in safety (Ek, et.al., 2007). This implies that the safety culture and the level of the organisation do not seem to be aligned with each other. Fang and Wu, (2012) also discuss that better records in construction administrative units were also found. Such misalignment implies the importance of using a holistic method in order to assess the safety culture.

Flin (2007) suggested the use of a safety climate model and a model, which can assess injury outcomes in order to explain elements of the safety climate in health patients and health worker injuries. However, this study did not evaluate the aspects of the model (Sorenson, 2002). The author nevertheless set out to consider the issue of shifting actions and attitudes in studies carried out in the safety culture and climate. Which would be discussed in this thesis. Moreover, some main elements related to the improved safety culture improvement design were also established (Sorenson, 2002). Atak and Kingma (2011) were able to establish some issues in terms of structural quality including conflicts in interests in terms of safety production as primary concerns leading to a safe internal system and a structure and management safety commitment.

In the study by Havold (2009), an attitude of safety in the management appeared to have a significant impact on the organisation safety policy based on a safety climate assessment for fishermen and fishing vessels. Mariscal and colleagues (2012) indicated how their questionnaire was able to determine proof in relation to favourable safety conditions including aspects, which need improvements. The authors considered the issue on working groups, which would help improve safety cultures through provisions on opportunities for individuals to consider applicable actions and establish more outcomes including efficient communication processes. Navestad (2010) pointed out that the role is specifically associated with the safety culture campaign in related culture changes; there is also emphasis on the bottom-up approach in terms of work groups and related sub-cultures. In terms of human-related aspects, Wu and colleagues (2011) admit that the behaviour of employers including safety professionals in terms of the safety culture is important. They also acknowledge that organisations must establish training activities in order to help supervisors

comprehend their roles in relation to safety, also to understand how they can be safety leaders and therefore manage effectively their safety culture (Peckitt, et.al., 2004). By assessing the aspects relating to interventions on projects. Hale and colleagues (2010) considered the differentiating aspects of constructive communication between the rank, file employees and the managers in relation to energy and creativity used by managers and coordinators. Which can then help motivate the lower level managers and improve their monitoring and learning. In motivating managers and coordinators, a better safety culture in the construction industry can be established.

2.8.1 Safety Culture in Construction Organisations

Kulchartchai and Hadukusumo (2010) established how safety issues on workers were primary concerns for managers assigned to establish a safety culture. Issues relating to the presence of unskilled labourers, unsafe work practices, and a high rate of turnover were considered as common issues in the construction industry (Fang and Wu, 2013). On the other hand, the outcomes on the structural equation model established how the company's commitment to safety, its safety actions and motivations, the involvement of subcontractors, the safety in the field, and accountability impositions against unsafe behaviours comprise some of the variables which encapsulate the culture of safety, later to be applied to establish safety performance (Molenaar, et.al, 2010). Authors Pungvongsanuraks and Chinda (2010) suggested and set forth a style in assessing the primary elements affecting the safety culture and related improvements. They considered safety culture consolidation in terms of the safety culture and performance as a foundation for an improved design in the construction safety setting (Fang and Wu, 2013; Kartam, 1997).

Because of the failure in the theoretical standards for the safety culture and its assessment, the methodology and the aspects considered in the above studies differ very much (Mohamed, 2003; Chinda and Mohamed, 2008). Moreover, the link between the safety climate and performance in the construction setting has also been considered. Choudhry and colleagues (2009) established how climate factors; namely, management commitment and employee involvement as well as inappropriate safety procedures and behaviours could predict the perception of workers about safety performance. As such, the safety climate may be utilised in order to assess and improve the safety of sites and projects being built (Chinda and Mohamed, 2008). In the study by Zhou, et.al, (2011) a specific factor structure in the safety climate based on a couple of surveys in a Chinese construction company was assessed. The study was able to determine effective methods in order to ensure better safety behaviour in relation to statistical changes on specific variables.

2.8.2 Safety Culture in Saudi Construction Organisations

While businesses in the Saudi construction industry have to deal with the varied nature of the workforce there has been no clear indication of how safety culture has been impacting other performance indicators. However, there have been efforts to report on the performance of the industry in terms of number of accidents or the plans to deal with safety risk assessment (Jannadi and Al-Sudairi, 1995; Al-Utaibi, 1996; Al-Amoudi, 1997). Mosly (2015) stated that despite the substantial improvements achieved in safety through the years, the rate of accidents is still the highest in the construction industry. For example, the number of accidents in the construction industry is higher than any other industry in Saudi Arabia. This is also the case in many countries worldwide. This shows that even though there are

issues relating to safety culture, they have not been explicitly examined in order to assess their impact on performance (Jannadi and Assaf, 1998; Baig, 2001; Alasmari, 2010). According to the Alasamri; Chrisp and Bowles (2012), this is with a view to finding out their interactions in improving safety. It is expected that the results of the study will be of immense benefit to contractors for measuring their own safety culture performance and paying attention to weaker aspects.

2.9 Components of Safety Culture in Construction

There are several components of the safety culture in the construction industry. Some of these components relate to leadership, employee behaviour, and values. These components all affect the occurrence of accidents/injuries in the construction workplace.

2.9.1 Safety Culture and Leadership

The culture of safety is largely based on strong and effective leadership. Leadership is the driving force for culture and "in turn drives behaviour" (Oil and Gas Producers, 2013, p. 11). The top leaders of any organisation build on a safety culture and this culture would usually emanate from the provision of resources, a committed safety staff and employees, as well as safety trainings and investigations carried out within the company. With more time and commitment rendered by the leaders of the organisation, safety management systems can be established including site-level tools. Managers at different levels of the organisation have to be the safety leaders as well. Some individuals often manifest some qualities often related to leaders. Leaders who place a value on production and the personnel seem to be directed more towards securing best results for the company (Blake and Mouton,

1964). There are different types of leaders and leadership qualities, which have to be applied by safety leaders. The most common type of leadership qualities in this case are the transactional and the transformational leadership style. In general, the transaction leaders work more as leaders, not so much managers. These individuals impose objectives; they evaluate performance, and impose corrections where necessary. For the transformational leaders, these parties have a vision, and they usually prompt other people to act beyond their selfish interests (Nanus, 1992). Although safety leaders require transactional qualities, they also need transformational qualities in order to fully engage the employees. The safety leader also has to make adjustments to his style and to the situation in the workplace in order to ensure that the safety of the workers at all times.

Evaluating the different cultures and ensuring sufficient coordination for these cultures has also been considered a critical aspect of leadership (Singer, et.al., 2009). Sufficient cultural management has also been important in order to ensure the success of changes being implemented in the organisation. In other words, cultural management has been a primary leadership and management element (House, et.al., 1991). People have been aware of successful leaders in organisations, especially those who have been able to change the culture of their organisations (Baker, 2002). There have also been successful political and charismatic leaders who seemed to perform better in terms of their economic and political performance (House, et.al., 1991). Still, a successful cultural management does not necessarily lead to effective individual leaders or charisma (Collins and Porras, 1994). In some cases, charisma does help, however in the end, effective and reliable leadership may be more effective (Collins and Porras, 1994).

Crucial elements for affecting and conceptualising culture. The effective planning of important cultural elements, securing consistent culture. Mission with goals and processes, promoting formal principles on the organisational goals, promoting sustainable goals and systems, and finally, performance evaluation and measurement (Wenger and Snyder, 2000). Organisational culture is also associated with coaching, mentoring, as well as both formal and informal training (Schein, 1999). Wenger and Snyder (2000) said that it also relates to the management and promotion of strong organisations and communities. As a strong management of organisations and communities is made possible, the value of promoting a safety culture and maintaining safe employee behaviours is also observed. The section below shall seek to understand the safety culture and employee behaviours in the workplace.

2.9.2 Safety Culture and Employee Behaviours

Employee behaviour also has an impact on safety culture. An employee's behaviour or attitude towards safety is generally related to his "value expectancy for safety" (Uryan, 2007, p. 48). The employee's behaviour and attitude towards safety is also related to the individual's feelings about different matters. Which would be associated with his or her personality. These elements impact on an individual's actions and also his behaviour (Baron, 2008). An employee would likely expect either positive or negative outcomes in relation to his or her actual intended actions (Hall, 2006). Such intentions on behaviour are subjective in value and are associated with a person's assessment. Still, the subjective values of an intention can prompt an individual to manifest specific actions in relation to behaviour based on the expected outcome (Uryan, 2007). An individual's strength flows from his attitude and behaviour, which mostly relates to a behavioural intention and an assessment of the

possible result. Individual attitude indicators are often meant to show an employee's feelings in relation to risks in the workplace, the use of safety tools, their commitment to safety including the attitudes on safety regulations, intended violations, additionally unintended errors or accidents. The employee attitude is admitted as an element of the safety climate and also a major predictor for planned actions or behaviour (Ajzen, 2005). In general, Aizen (2005) also discuss that an employee's attitude and behaviour are very much associated with group or organisational norms, including the management attitudes regarding safety. An employee's behaviour and attitude toward safety therefore has a direct impact on their desire or intention to comply with safety policies (Uryan, 2007). Where the employee's behaviour and attitude is welcoming and engaged with the safety standards and policies in the workplace. Workplace injuries and accidents can be avoided. Such safety standards are also associated with safety values observed by the employee and by the organisation. The discussion below shall further discuss safety values.

2.9.3 Safety Culture and Injury/Accident Rate

Based on the Centre for Construction Research and Training (2012) global rates indicate that fatal injuries from construction work in some industrial countries registered at an average of 3.3 to 10.6 deaths for every 100,000 workers. The rates of death for the US were particularly high at 9.7 deaths for every 100,000 workers. These rates are similar to the rates in Spain and Italy, but about three times the rates registered in Norway. However, in terms of nonfatal construction injuries in the US, rates in America were low when compared to other industrial nations where 1.7 injuries for every 100 workers were noted (Centre for Construction Research and Training, 2012). This rate may however be associated with

underreporting in the US. Switzerland has the second lowest rate in fatality in the construction industry, but their nonfatal injury rates seem to be high. These are based on data also from the International Labour Organisation (ILO), which has been able to gather data on fatal and nonfatal occupational injuries in some industrial states (Centre for Construction Research and Training, 2012). These rates are different for developing countries, which have poor safety policies. The ILO (2014) discusses that in developing countries, injuries and fatalities are at least ten times higher when compared to developed countries mostly because developing countries are inadequately implementing safety standards in the construction industry. Safe workplaces and gadgets are often not provided to workers, or if they are provided are of poor quality (ILO, 2014). With these rates or injuries, the safety culture in the construction industry may be considered to be of poor quality or poor placement. In other words, the construction industry does not have a strong and effective safety culture, sufficient to adequately prevent injuries and/or fatalities in the workplace. In knowing these rates, it is also important to understand how a culture of safety in the construction industry would impact on improvements for safety.

2.10 Safety Performance

Generally safety performance implies the results of safe working records over a time period (Atak and Kingma, 2011; Fogarty and Shaw 2010, p.1455); it works in such a way that if there are many reported incidences the performance for safety could be termed as poor. Safety performance is a function of many factors, amongst which is safety culture (Morrow et al., 2014). It also means that the attitude, behaviour and conduct of workers have severe impact on the level of adherence to safety standards; in turn the safety performance of

organisations (Bellamy et al 2008, p.462; Öz et al, (2013). The ultimate safety performance of an industry is a summation of accidents and incidences from organisations operating in a particular industry (Bellamy et al, 2008; Lardner and Scaife (2006). If the record is poor organisations can be forced to expend resources in order to rectify safety performance records; hence factors such as the competence of workers, management attitudes and general human traits (Fogarty and Shaw 2010; Netjasov and Janic, 2008) are crucial to improved safety performance. According to Kontogiannis and Malakis (2009) safety performance data does not only reflect the number of incidences, but also the legal cost; health related experiences and regulatory penalties (Cesarini, Hall, and Kupiec, 2013, p. 1). A construction industry with a poor safety record sends a signal of poor safety performance from design to delivery, resulting in high cost of doing business (Gangolells et al 2010, p107).

In addition Assaf et al., (2001) opined that poor safety performance increases overhead costs related to health and safety; it also increases uncertainty as to the eventual cost of the welfare, safety and health of employees (operatives and managers). Ali et al, (2013) was of the view that project performance is hindered by the list of accidents an organisation may have accrued; and this can negatively impact the reputation of the organisation such that it may not be a preferred bidder due to poor safety record. There are many factors that influence safety performance, these include, but not limited to the technological advancement and mechanisation of the industry (Shin, 2015; Sidawi and Al-Sudairi, 2014); the general working conditions especially the climatic conditions – such as the heat stress due to exposure to hot climate (Rowlinson et al, 2014), and the manner in which the jobs are planned for execution (Jannadi, 2008).

2.11 Safety Performance in Construction Industry

In the construction industry, safety refers to a safe workplace where the employees or workers are kept safe on their jobs and projects, mostly by *"reducing accidents that result in injuries and schedule delays, while also reducing the risks of litigation and regulatory action"* (Cesarini, Hall, and Kupiec, 2013, p. 1). A high safety record in this case within the construction industry implies a high and good reputation for the company, allowing for competence and ensuring the management of insurance costs over time (Cesarini, et.al., 2013). Promoting a good safety culture relates to a company-wide plan, which calls for the participation of chief executives to secure ideal work conditions for workers on site. Safety is a requirement which must also be imposed on subcontractors, who are called on to adopt an effective and strict safety work ethic, specifically on-site and during at-risk operations or stages (Cesarini and Hertel, 2005).

In considering the construction industry, it is important to understand that different relationships emanate from this industry, with parties working with organisations in order to finish specific projects (Nifa, 2013). This industry has often been criticised for its vulnerability to change and innovations, often comparing it with other companies and industries. It is an industry, which has also been able to ensure product delivery to its clients using different single as well as unique activities (Nifa and Ahmed, 2010). Such activities often include differentiated and diversified construction networks working in collaboration with each other (Sexton and Barret, 2003).

The qualities of the construction industry are as an industry whose elements work with each other as temporary units in order to finish construction projects (Nifa, 2013). The

development and accomplishment of these projects are based on smooth coordination with different firms and units within temporary organisations. Projects are also sometimes disputed with misunderstandings possibly arising from the different organisations or units (Nifa, 2013). In turn, this can lead to advantageous relationships which can sometimes become adversarial (Nawi, et.al., 2005). Partnering in this industry has been seen in the year 2000s in countries like the US, Australia, and Japan. These developed nations have been considered primary examples as far as success in procedures and contracting has been concerned (Naoum, 2003). The use of partnering in the construction industry for these developed states has been credited to the fact that relations in the industry has often been limited in terms of trust, honesty among clients and contractors (including subcontractors) (Humphreys, et.al., 2003).

The construction company model is based on projects and on the efficient completion of projects. Elements of successful projects include cost, schedule and quality (Gransberg and Molenaar, 2004). The efficient completion of projects may sometimes be assessed based on a specific budget, on workmanship, or its timely completion. Still, inefficient safety management may impact on cost, the quality of the project, or the time within which it is completed (Nawi, et.al., 2005). Significant fines may be seen as major burdens on one's budget, with working hours lost because of inefficient safety management. With inadequate safety, the quality of work is compromised. Some work incidents may also be fatal. In the UK alone, work fatalities from construction incidents represent about a third of all work fatalities in the country (Nugraheni and Scott, 2008). The construction industry in Australia is actually considered their third most dangerous industry (Fraser, 2007). Table 2-1 represents the occupational health and safety as ranked by the Health and Safety Authority

in Europe (2014). From the table, it can be deduced that the health and social work sector ranks highest in terms of injuries and accidents in the workplace with a total of 1475 incidents and 19.8% in 2014 alone.

Table 2-1 Health and Safety Authority in Europe (Source: Health and Safety Authority, 2014)

	N	**Percentage**
Health and social work	1475	19.8
Manufacturing	1266	17
Wholesale and retail trade	1024	13.8
Public administration and defence	859	11.6
Transportation and storage	832	11.2
Construction	442	5.9
Admin and support service	337	4.5
Education	197	2.7
Accommodation and food	196	2.6
Water, sewerage, and waste	190	2.6
Other service activities	158	2.1
Financial and insurance	123	1.7
Information and communication	86	1.2
Agriculture, forestry, and fishing	81	1.1
Professional, scientific, and technical	48	0.6
Arts, entertainment	42	0.6
Mining and quarrying	30	0.4
Electricity, gas, etc.	29	0.4
Real estate	16	0.2
All	7431	100

This is followed by the manufacturing industry and the wholesale and retail industry, then by public administration and defence, transport, and by the construction sector with 442 accidents or injuries or 5.9% of the recorded injuries in 2014 alone. These statistics are

however in Europe which may have better safety technologies as compared to other countries which are not as safety conscious. While these statistics do not rate the construction industry as a top industry in terms of injuries, it is important to still give these injuries and incidents significant attention in order to prevent these rates from increasing.

Cheung, Wong, and Wu (2011) and Hart (2010) have carried out studies on how and why safety should be promoted in the construction industry. These authors acknowledge that within a safe working environment, significant profit can be enjoyed. An efficient way of ensuring safety is to generate a culture of organisational safety in the construction industry (Nawi, et.al., 2005). Companies can actually change the qualities of their environment, making it more safe and where these qualities can be improved further; a better safety culture in the organisation can be established (Chan, 2012). Companies with good safety records are also known to have a "consistent safety culture" (Chan, 2012). Still, in considering the actions and decisions of the managers and the field employees, some issues in terms of beliefs, behaviour, and values may also be observed. Such issues may lead to an inefficient safety culture in the company (Molenaar, Brown, Caile, and Smith, 2002).

The dimensions of the safety climate include significant features in the safety climate, including the following features: "importance of safety, effects of required work place on safety, status of safety committee, status of safety officer, effects of safe conduct on promotion, level of risk at the work place, management attitudes to safety, and the effect of safety conduct on social status" (Chan, 2012). Through the Safety Attitude Questionnaire (SAQ) was setup in 1991 by Donald and Cantaer in order to assess the attitudes of workers on safety applying questionnaires as instruments of assessment, seemingly appearing as

very like management safety audits (Ibrahim, et.al., 2012). The Questionnaire was applied in the safety research of different companies and has been considered as reliable tools in establishing safety performance in the workplace (Donald, et.al., 1991; Ibrahim, et.al., 2012). Other safety tools have been established to determine safety, with elements related to organisational commitment and communication, personal roles, competence, risk-taking, and barriers to safety behaviour and accident reporting (Coyle, et.al., 1995; Chan, 2012). The safety climate assessments also covered different measuring tools and perceptions (Williamson, et.al., 1997). In the factor models evaluated by Dedobbeleer and Beland (1991), they included worker assessment of management attitudes related to safety of workers, perception of attitudes of foremen, availability of resources, and safety training at the start of employment. Ibrahim, et.al., (2012) ; Chan (2012) mentioned another factor considered was the involvement of the workers on their safety, the control of work conditions, and regular meetings on job safety. This discussion progresses in relation to job safety and work conditions. It is important to also consider the statistics on the construction industry in order to assess the rates of accidents and incidents in the construction industry.

2.11.1 Statistics on the Construction Safety

Various statistics exist about safety issues in the construction industry across the globe. This is due to no internationally accepted standards on safety, and most of the research works on statistics have used generalised and arbitrary forms of measure. For example, Zhu, Di, Gui and Clissold (2010) emphasised on the nature of hazards that are commonly reported on construction sites. In the study, it was noted that there are safety hazards and health hazards within construction sites across the globe. Of the safety hazards, Covey (2010) indicated

that falls from heights, electrocution, excavation accidents, crash by vehicles, and strikes by falling objects are the highest ranking causes of safety accidents. As for health hazards, Wokutch and Vansandt (2010) mentioned that noise, asbestos, solvents and the manual application of strength have been identified as the highest-ranking causes of health problems. In terms of fatalities per annum per 100,000 workers, different places of the world have been associated with different numbers of casualties. The chart below gives different numbers of casualties for selected places and countries.

There are limited statistics specifically establishing construction statistical rates in relation to accidents or incidents. The International Labour Organisation (2014) presents general data on work-related incidents and latest claims indicate that about 1.1 million deaths have been attributed to workplace deaths and about a quarter of these incidents are associated with the exposure to hazardous substances, which may lead to cancer, respiratory disorders, and cardiovascular diseases. These rates of work-related deaths and injuries are likely to double by the year 2020 if no improvements are implemented (ILO, 2014). Moreover, the ILO estimates that about 250 million of the workplace accidents cause occupational diseases. Death as well as injuries in the workplace is still significant issues in developing countries where many workers are involved in heavy manual labour and activities including construction, logging, and mining (ILO, 2014). The ILO also declares that about 600,000 lives a year would have been saved where safety practices are put in place. About 250 million work-related accidents often lead to work absences (ILO, 2014). The OSHA also details that in 2014 alone, there were about 4679 workers who were killed on the job, and most of these deaths and work-related injuries were Latino workers. The most sources of deaths were from the construction industry, with about five deaths a year (OSHA, 2014).

Most of these deaths were due to falls, electrocution, being struck by an object, or being caught-in/between objects (OSHA, 2014).

There are also children who bear the consequences of occupational accidents. Asbestos has actually been known to lead to the deaths of 100,000 workers per year (ILO, 2014). The ILO has estimated that the rise in fatality rates in the developed states has been very much high, but much higher for developing countries like the Middle East, India, and China (ILO, 2014). In these countries, hazardous risks have become 100 times more risky and the sites in these developing states have become 10 times more risky as compared to industrialized nations (ILO, 2014).

Neave (2011) discusses that because of the lack of accurate record-keeping processes by the Saudi Arabian government and by the private sector on the occupational health and safety, it is difficult to actually deduce the number of construction injuries in the workplace. The reports submitted to the ILO are different from the numbers assessed by the Human Rights Watch in terms of construction injuries (Neave, 2011). The best sources of information seem to be reports from the media. In assessing such data, it has been established that close to 32% of construction injuries in Saudi Arabia and including the Middle East are caused by falls. Falling objects are striking another common source of injury.

Developed countries have also indicated major reductions in serious injuries in their workplaces because of the structural changes they have imposed in the workplace (ILO, 2014). Still, the changing qualities for work have led to different work hazards, such as musculo-skeletal issues, mental issues, asthma, allergic reactions, stress, as well as exposure to hazardous chemicals including asbestos, chemicals, and radiation (ILO, 2014). These

issues are all present in the construction workplace making the construction setting one of the most dangerous workplaces to be exposed to.

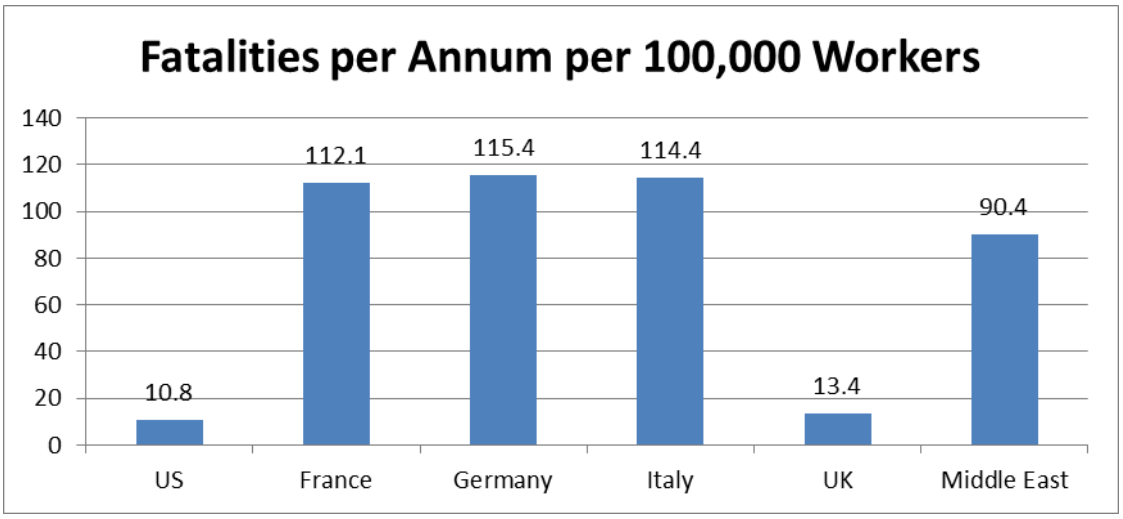

Figure 2-6: Fatalities per Annum for 2012 (Source: Health and Safety Executive, 2012)

From the statistics above, it would be noted that whereas some countries and regions of the world have very high numbers of fatalities, others have also managed to keep very low numbers. From international rates on construction industry accidents and safety rates, the discussion below shall specifically discuss safety rates in the Saudi Arabia construction industry. Germany has the highest fatalities per annum per 100,000 workers and Italy, as well as France follows closely behind. The Middle East follows, with the UK and the US recording the least fatalities in their workers. These statistics represent high numbers of fatalities in different countries. The discussion following shall present the safety records in the Saudi Arabian construction industry.

2.11.2 Safety Records in Saudi Arabian Construction Industry

According to Al Haadir and Panuwatwanich (2011, p148) the construction industry of Saudi Arabia has challenges to deal with safety performance on many fronts. They further argued that the general lack of awareness of safety risks amongst the construction workforce has been high over the years because organisations have been cutting costs in order to improve profitability (ibid). Poor safety performance in Saudi construction industry and the Middle East in general, is compounded by the general influx of migrant workers who speak many languages, and have communication challenges (Loney et al., 2012). More specifically, however, safety performance in Saudi Arabia relates to the specific number of accidents that can be categorised in accordance with the area of interest for the research project. Wu (2005) carried out his research in Saudi Arabia, where accidents in the construction industry and how these are being mitigated with various safety policies were studied. The approach to data collection on safety risks was used of injury frequency rate, which was calculated as the number of lost-time injuries per 1,000,000 man-hours of exposure. In a study, Fishback and Kantor (2010) noted that three major categories of construction companies were labelled, which are small firms, medium firms and large firms. The classification was made based on results of injury frequency rate. At the end of the study in Saudi Arabia, it was noticed that 33% of companies come under small firms and have less than 5.0 lost time injuries. Furthermore, Cox and Cox (2011) mentioned that 35% of construction companies are in the medium category and have from 5.1 to 10.0 lost time injuries on an average. 32% of construction companies are classified as large companies and have more than 10.1 lost time injuries on average basis. It would be noted that the study used equation 2-1.

$$\frac{Number\ of\ lost\ time\ injuries\ in\ accounting\ period}{Total\ Hours\ worked\ in\ accounting\ perior} \times 1{,}000{,}000$$

Equation 2-1: Average rate of lost time injuries

Based on the Saudi Gazette (2014), in 2012 alone, there were about 70,000 injuries that took place in the construction workplace. This number already includes those emanating from traffic accidents while workers are in commute (Ali, 2013). Death has been seen in 0.4% of these construction injuries. Riyadh, Makkah, and the Eastern Province reported the most injuries because of their numerous construction activities being conducted (Saudi Gazette, 2014). Asaad Saud, from the Health Affairs Directorate in the Eastern Province indicate that usual injuries reported include fractures, spinal injuries, as well as head injuries (Saudi Gazette, 2014). Where injuries occur, reports are electronically submitted to the company and the health agency concerned (Ali, 2013). An investigation is usually carried out and companies without any safety standards are often penalised (Saudi Gazette, 2014). In visits or inspections, the authorities often explain to workers the injuries they are likely to suffer in the workplace and how such injuries can be avoided.

Based on the data presented above, statistics on work safety indicate that workplace accidents and incidents are all too common and at varying rates depending on the work and the country concerned. For the construction industry, it ranks as one of the top sources of injuries or accidents in the workplace. In Saudi Arabia, there are limited statistics available in terms of workplace safety and accidents. Nevertheless, available data indicates that there have been numerous construction accidents and fatalities in the country. This implies that there is a need to improve the country's occupational health and safety, especially for the

construction industry. Based on the current status of the country's safety policies for the construction industry, the discussion below shall endeavour to present more details.

According to Ivensky (2008) and Williams (2002), a reason for the increased consideration on the safety culture in Saudi Arabia's construction industry may be attributed to the fact that such consideration not only allows for the safety of the workers, but it would also enable project leaders to ensure that they would maintain the safety of the property and other assets within the project premise. Once this is done, it will be possible to reduce the number of injuries that are recorded in the projects as indicated in previous researches and as summarised in the table below. The table below presents the different studies related to the safety performance in the Saudi Arabian construction industry. It includes a description of these companies in terms of elements related to safety and safety assessment.

Table 2-2 Summary of earlier studies of safety performance in Saudi Arabia (Source: Alasamri, Chrisp and Bowles 2012, p. 3)

Author and Year	**Company Size**								
	Construction firms participated	Small			Medium			Large		
		Safety assessment methods			Safety assessment methods			Safety assessment methods		
		Mean injury frequency rate	Mean attitude score	Mean checklist score	Mean injury frequency rate	Mean attitude score	Mean checklist score	Mean injury frequency rate	Mean attitude score	Mean checklist score
Jannadi and Al-	16	43	-	-	19	-	-	11	-	-

Sudairi (1995)										
Al-Utaibi (1996)	45	35.78	-	66.78 %	29.74	-	68.05 %	10.06	-	88.62%
Al-Amoudi (1997)	122	-	16%	-	-	37%	-	-	45%	-
Jannadi and Assaf (1998)	14	-	-	65.21 %	-	-	-	-	84.55 %	-
Baig (2001)	28	89.43	-	0.47 on a scale of 1	34.83	-	0.61 on a scale of 1	13.79	-	0.8 on a scale of 1
Alasmari (2010)	38	-	45.36 %	-	-	-	-	-	75.23 %	-

Table 2-2 presents the summary of earlier studies on the safety performance in Saudi Arabia. The data from each study was presented based on the size of the company, from small, medium or large-scale, with their safety assessment methods established. The mean injury frequency rates were evaluated along with the mean attitude score, the mean checklist score. The mean injury frequency rates measures the rates of injury per mean computation for the companies studied. The mean attitude score as well as the checklist score is also measured depending on the company's attitudes towards safety and their compliance with the

checklist for safety in the construction workplace. In general, the Jannadi study evaluated 16 construction firms and the mean injury frequency rates for the small construction firms was at 43%, 19% for medium sized firms, and 11% for the large-scale firms. The Jannadi study did not provide data on mean attitude score and mean checklist score. This means that the rate of accidents seems to be highest for the small-scale construction firms. For the Al-Utaibi study, there were 45 construction firms studied. The mean frequency injury rates for the small firms were at 35.78% with mean checklist score at 66.78%. For the medium-sized firms, the mean frequency rates were at 29.74% and 68.05% for their checklist score; and for the large-scale firms, the mean injury rates were at 10.06% and 88.62% for their checklist score. There was no data from the studies on the mean attitude score. This means that the rates of injury are also higher for the small-scale firms based on the results of the Al-Utaibi study. The checklist score seems to be higher for the larger scale firms, which may explain why they have lower rates on injury as compared to small and medium scale construction firms. In the Al-Amoudi study, there were 122 construction firms covered and mostly the assessment undertaken in the papers were on the mean attitude score on safety. The mean attitude score seemed to register the lowest for the small-scale firms, which may also partly explain why small-scale firms are more prone to injury in the construction setting. In the Jannadi and Assaf study, there were 14 construction firms included in their study and the assessment was mostly on the mean checklist score, which seemed to be higher for the large-construction firms. This may also explain why these large firms report less mean frequency in accidents as compared to the small and medium-scale firms. In the Baig study (2001), there were 28 construction firms studied and in terms of mean frequency of injury rates, once again, the small-scale firms registered with higher rates in injury as compared to the

large and medium-scale firms. The study did not measure mean attitude scores, but they measured mean checklist scores based on a scale of 1. Mean checklist scores seemed to be higher for the large-scale firms. This is consistent with other studies. Finally in the study by Alasma, the author covered 38 construction firms, mostly on mean attitude score in relation to safety. The results indicate that the mean attitude score is much higher for the large-scale construction firms. This implies a better attitude in relation to safety in the workplace for the large-scale firms.

2.12 Impact of Organisational Culture on Safety in the Construction Industry

According to Bergersen (2003) the main impact of organisational culture on safety manifests in areas such as how safety is conducted in the workplace (Denison and Mishra, 2005). This could include a gradual development of safety from "knowing enough for the job" – here in referred to as pathological stage – see Figure 2-7. Leaders of the organisation have the potential to nurture safety at organisational level of the attitudes could influence a positive outlook for safety (Burton et al., 2004; Fernandez-Muniz et al., 2007). Ideally, Figure 2-7 abstracts the natural progression of maturing safety in an organisation if management can realise that a positive organisational culture creates a positive outlook for safety (Bergersen, 2003).The maturity model depicts a situation where an incremental improvement can be made in order to improve safety culture, and eventually safety performance.

Stage 1: Pathological Stage: This is a stage that is concerned with the assessment of the level of awareness of safety (ibid) and is largely influenced by the experiences, natural

inclination that people have towards safety and their willingness to abide by the guidelines. This stage reflects two major issues for the theoretical framework in Figure 2-8, section "Saudi culture and the way an individual can adhere to Saudi traditional values" governing construction. It also affects the level of awareness of "international and national safety protection guidelines".

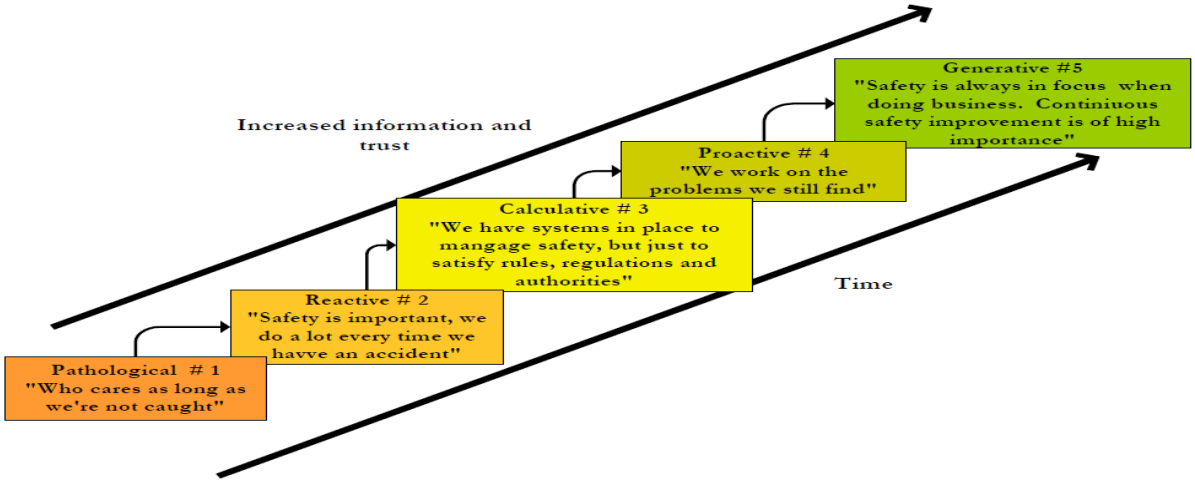

Figure 2-7: Different Levels of Safety Culture in Construction Organisations (Source: Bergersen 2003, p. 14).

If the workers believe that they can get away with breach of guidelines, it implies that there could be something influencing them to take such stance. It could be the belief that their fate is in God or that they are not afraid of danger. It could also mean that they are not aware of the international guidelines on how to work safety; hence part one of the maturity model on Figure 2.7 relates to the strategic issue of setting the scene about the theoretical model.

For organisations at the reactive levels, they are deemed reactive rather than proactive because these organisations hardly implement any safety standards or policies to prevent injuries or accidents. Instead, they only choose to deal with the safety issue or

accident/injury and when it happens or occurs in the workplace. However, Coble and Haupt (2010) debated that once there is a health and safety risk, they will put in reactive measures aimed at controlling or curbing the risk. Glendon and Litherland (2001) noted that such companies are not effective in the safety assurance game because they can never guarantee that there will be no accidents or any health and safety risks. Ideally, the understanding that is built is that in the safety culture, the focus and emphasis should not be on reactivity to accidents and risks but on prevention. Burton, Lauridsen and Obel (2004) stated that health and safety risks are not things that can be predicted in terms of the magnitude or impact on individuals, the job or the organisation. It is for this reason that the approach to safety must always be a preventive one rather than a reactive one.

Stage 2: Reactive Stage – where two the workers are reactively responsive to safety (Bergersen, 2003). The reactive stage of the maturity model (Figure 2-7) links with the second tier of factors on the theoretical framework (Figure 2-8) where there could be a particular type of involvement through supervisors that involve employees in safety related decision-making; based on construction worker's protection guidelines or regulations. There is an argument that if an organisation concentrates on this level alone, it ends up being reactive to safety breaches, such as accidents (Bergersen, 2003); and there can be a gradual development of a reactive safety culture which in turn leads do less improvement on safety performance.

In relation to the safety policy practices, Cameron and Quinn (2009) criticised the reactive level as one which only focuses on policies that stop the impact of occurring risks from spreading. Because of the emphasis on immediately occurring risks, hardly is anything being

done about pre-risk assessment or post-safety evaluation. Invariably, Robinson and Robinson (2005) were emphatic that these organisations lack forecasting policies that determine what possible risks could occur in the future and once the safety situations are contained. In other words, there is no evaluation process to examine the effectiveness of the interventions to be used to contain safety issues and concerns.

Flin, Mearns, O'Connor and Bryden (2000) noted that there are several construction companies, which after existing for many years and gaining some level of brand equity, have seen the need to have all their necessary safety systems, rules and regulations in place. However, these companies have these systems, rules and regulations not because they are particularly focused on safety because they are known by the law enforcement agencies and they know that they will be tracked down if they are found to lack these safety provisions. Lee and Harrison (2010) explained further that it is not as if these companies do not implement the safety rules, regulations and systems. The core problem however has to do with the fact that safety culture is not part of the core organisational culture of these organisations and that even if it is; it is not part of their commitment. In the opinion of Fowler (2002), the temptation with this attitude towards the safety culture in relation to the safety policy practice is that once any opportunity arises for the organisation to forfeit their safety policies and practices. They will do so because the need to ensure safety a good they feel they are doing to the enforcement agencies rather than a responsibility they have to fulfil. Ngo, Foley and Loi (2009) on the other hand said that the end justifies the means, and so as long as the law enforcement agencies are going to be made to do their work, the calculative level of safety culture can be very productive because it would end up with safety standards, systems, rules, and regulations followed to the letter.

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Stage 3: Calculative stage - the maturity model (Figure 2-7) shows that the organisation would create systems that can link safety with other elements of the business (Bergersen, 2003); but those systems are just meant to do the bare minimum, in accordance with safety rules, regulations and authorities. The link between the maturity model for safety on Figure 2-7 and the theoretical framework for this research (Figure 2-8) is the level of management attitude – whereby management should embrace a positive attitude towards safety culture or be able to follow the industrial culture of maintaining high safety standards. This shows that there could be a case of weighing the options with regards to resourcing the safety programmes hence they decide to do the barest minimum they can so that they are within the law.

Fowler (2002) mentioned that companies who, for the sake of surviving the stiff competition, would overlook the importance of having a well-regulated safety culture often use the pathological levels to calculative levels of maturity for safery. These companies are likely to disregard safety standards because they find it costly and distracting to their core organisational ambitions. Relating the impact of the pathological level of safety culture to safety policies within the organisation, Burton, Lauridsen and Obel (2004) said that there is a likelihood that such organisations will have documented safety standards but will not have any form of enforcement motivations to carry out the safety standards given on the paper.

Richter and Koch (2004) saw that these organisations hide behind the fact that there are safety documents and safety gadgets needed in the workplace, and that these organisation may sometimes not enforce their usage and their policies. This point highlights the importance of enforcement when it comes to the safety policy practice. From a pathological level, it would be noted that having rules and safety gadgets are not enough to ensure safety but that these rules and gadgets ought to be enforced as part of the organisational processing.

Stage 4: Proactive stage – The proactive level is the direct opposite of the reactive level. At this stage, the link with the theoretical framework on Figure 2-8 is the management involvement and the use of industrial standards in a proactive manner, as opposed to reactive manner. The organisation can envisage the potential issues, then they deal with them proactively. This is because at the proactive level, Flin, Mearns, O'Connor and Bryden (2010) explained that there is a more proactive approach to safety, which includes several aspects of preventive risk. Within these organisations, there are a series of safety research programmes that are put in place to identify common industry-based health and safety risks

associated with particular events and tasks. Once these are known, there is preventive risk aversion strategies put in place to ensure that the health and safety risks do not show up at all. Another component of the proactive safety culture is that the control of occurring health and safety risks is approached in a manner that is supported by a dedicated call to duty (Robinson and Robinson, 2005).

As such, the management sees safety as a responsibility they have to deliver to individuals, jobs and the organisation as a whole. Because of this attitude towards safety, O'Toole (2012) indicated that there are always safety policies that are well monitored, evaluated and regulated, even by external quality assurance parties. In an industry-based research conducted by Ngo, Foley and Loi (2009), it was noted that most organisations at the proactive safety culture levels have in-house quality assurance teams whose core responsibility is to ensure that safety standards, systems, rules, and regulations that are provided are followed to the letter. The advantage of the proactive safety culture has been considered tremendous for both the organisation and its people because their safety is always guaranteed.

Stage 5: Generative stage - take a proactive approach to ensuring safety can be embedded in production lines (Bergersen, 2003); and incorporates all other levels but in a strategic view of safety. The link between the safety maturity model in Figure 2-7 and the theoretical framework in figure 2-8 is that application of "safety policy" and the adherence to safety regulations in such a way that the organisation can be made to feel that safety is always in focus when doing business and continuous safety improvement is of high importance (Bergersen, 2003).

The generative safety culture is one that has been described by Flin, Mearns, O'Connor and Bryden (2010) as being change oriented. Cameron and Quinn (2009) also added that this is due to a very constant and regular basis, stakeholders responsible for safety ensure that there is another new effective approach to safety that the organisation is adopting. Such organisations can thus be said to be safety hungry and that even when they have a good safety standard, they are looking for an excellent and effective standards for safety they can adopt. Another descriptive identity that Bergersen (2003) gave to the generative safety culture level is that it is a level where safety is not treated as a separate issue for discourse. In this case, safety is directly integrated as part of the organisational business. By implication, the generative level does not differentiate safety from business and so when there is failure with safety, it is considered a failure with the overall business. In this light, safety policies are always designed to relate to the overall vision and mission of the organisation. In effect, Dillon (2007) indicated that issues in the feedback system and quality control are guaranteed to be in place. What is more, Kotter and Heskett (2012) observed that in such organisations, the flow or resources towards the fulfilment of safety ambitions will not be rigid and bureaucratic, especially with the outcomes that leaders of these organisations would want to achieve. These outcomes are further discussed below, especially in relation to the context of safety outcomes in the construction setting.

2.12.1 Safety Outcome Variables

Variables for safety outcome assess different measures related to safety performance seeking to determine how safety outcome elements were chosen. It helps to support the

objectives on the development a framework on safety culture leading to better construction safety performance in Saudi Arabia. The variables for safety outcomes help in the clear development of a framework for the safety culture. By establishing these variables, possible determinants can be used in order to determine if a specific company is following safety standards that it has set or that the country has set. The fields of management, occupational health and safety, as well as engineering present conflicted perspectives on measurable safety performance which can be applied to determine whether or not an organisation presents with a safety culture (Fernandez-Muniz, et.al., 2007). Authors indicate how the decline in accident and incident statistics indicate sufficient measures in the safety culture (Fernandez-Muniz, et.al., 2007). Nevertheless, employees may not always report that they nearly experienced risky incidents because they fear that they may miss out on incentives. In the US, the OSHA indicates that the private industries have to keep records of all their work-related injuries as well as illnesses (DeJoy, et.al., 2004; Eisenberg and McDonald, 1988). This is assuming that employees would be honest in reporting incidents and illnesses. However, it is admitted that there are incidents and illnesses, which are not actually reported. Rates of injuries are also not reported because of insufficient knowledge on procedures (Eisenberg and McDonald, 1988; Probst and Brubaker, 2001). Also, illnesses that are related to work may be difficult to monitor because of working conditions changing. The OSHA discusses how safety performance parameters may be good or insufficient indicators in determining safety performance with good indicators being proactive tools in determining safety behaviours, which indicate employee participation within the workplace. Insufficient indicators include the reactive measures for incidents which are indicated as determinants of safety performance (Cheyne, et.al., 1998).

This research aim to consider various measures in measuring safety, including the Saudi Arabia safety measures, and international standards of safety including OSHA recommended safety measures. Choudhry, Dongping, and Mohamed (2007) have recommended a model in measuring safety performance in the construction industry. Their outcome variables were summarised in terms of the increase in safety behaviour and a decrease in the rates of injury or accidents (Zohar, 2000). This model is appropriate for organisations where a behavioural-based safety standard is in place, allowing for specific definitions for safety and unsafe behaviour in relation to policies and risk parameters (Choudhry, et.al., 2007). It has also not been established whether the specific independent variables can be considered as possible predictors for the OSHA safety performance.

2.13 Safety Policies

Safety policies in general are those policies, which set out the general approach of an organisation in relation to safety, including their objectives and practices in order to manage the health and safety of their people (Direct Services, 2014). Safety policies would include policies on the commitment of the organisation to ensuring the safety of the employees, the consumers, and of other people. It would also include the party who shall be considered ultimately responsible for the health and safety of the organisation (Direct Services, 2014). Such safety policies would include specific responsibilities of staff and of other employees. The safety policies would also include the commitment of the firm towards consultations with employees on health and safety conditions in the workplace (Direct Services, 2014). From these general safety practices, the safety practices in the construction industry shall then be discussed.

2.13.1 Safety Policies in Construction Industry

Within the context of the construction industry, Zohar and Luria (2003) define safety as a state of wellbeing and a guarantee that health of workers are secured before, during and after the completion of a particular piece of construction work. Different countries also have different safety policies that they use. Stranks (2005) saw that the UK for example has been known to use regulations made under the Health and Safety at Work Act 1974 and the Six Pack Regulations, which spell out almost the same set of regulations for all organised construction firms. Holt (2005) also indicate that in the US, the Occupational Safety and Health Administration spells out Health and safety standards that must be followed by all organisations, both public and private. The different policies can be grouped into government-induced policies and privately induced policies. On the part of government induced policies, Cameron and Quinn (2009) noted that the General Environmental Law (GEL), which was enacted in 2001 and the Environmental Protection Standards (EPS), which was enacted in 1982 have been used to govern activities that could have any impact on the environment, including construction works.

There are existing researches on how safety has been applied at various levels within the construction industry across the globe, particularly in the Middle East. Two researches were conducted in this regard. Zhu, Di, Gui and Clissold (2010) argued for the enactment of a uniformly accepted international safety and health standard and Yule, Flin and Murdy (2011) said that the existing system where safety and health standards are limited to individual countries is the best. In the first study, Cooper (2000) saw that the phenomena of trade liberalisation, globalisation and internationalisation have increasingly proved that an

international standard on safety and health practice within the construction industry is the way forward. In a like manner, Yule, Flin and Murdy (2011) indicated that the merit with this school of thought is that it would consolidate the ideal of a global village and ensure that the enforcement of safety regulations are better backed by stronger institutions which are currently missing. On the other side of the argument, it is said that each country is particular in its own ways and thus has its own safety and health issues within the construction industry. For this reason, Fishback and Kantor (2010) advised that instead of standardising a global principle on health and safety, it is better to allow countries to regulate their own industries according to their history, specialised needs and projections.

As discussed by Flin and colleagues (2000), common qualities on safety climate covered reports from the 1980s to the late 1990s and based on these reports, common themes related to the safety climate included management, safety risks, competence, procedures, and work pressure. In the study by Guldenmund (2000), similar reports revealed issues on safety in terms of management, risk, procedures, work pressure, as well as training. In the study by Glendon and Litherland (2001), they were able to indicate some elements of safety relating to work pressure, relationships, the use of PPEs, communication, as well as rules on safety. Related elements on safety were also pointed out by Mohamed (2002) where the author was able to identify the value of communication, commitment, safety rules, supervisory environments, personal appreciation of risk, as well as work pressure and competence in ensuring worker safety in the construction workplace.

Cox and Flin (1998) indicated in the study that, the safety climate was considered a manifestation of the safety culture. Sawacha and colleagues (1999) discussed how the safety

climate has a favourable impact on worker safety as well as behaviour. In the study by Neal and colleagues (2000), the authors were able to present an understanding of the organisational culture and safety climate while applying the structural equation on modelling. While the study by Glendon and Litherland (2000) was able to present a link between individual safety behaviour and road construction safety, the study did not establish a link between the safety climate and a worker's individual actions and behaviour. The study by Mohamed (2002) was able to establish a link between the safety climate and safe work behaviour. Different researches were able to correlate safety climate assessments with safety practices and injury prevention policies (Cox and Cox, 2001; Clarke, 2006). There was also a significant link made between personal qualities and personal safety actions and behaviour (Fang, et.al., 2004). In the study by Ali (2006), he was also able to evaluate the relationship of worker attitudes, perceptions, and their actual internal beliefs and actions. There seems to be a statistically significant link between the perception of the workers and their actual preferences in actions and behaviour (Ibrahim, et.al., 2012).

In carrying out studies on the safety climate in the construction industry, variables like age, gender, educational attainment and work experience have been considered important elements (Ibrahim, et.al., 2012). Such factors seem to have an effect on the safety climate, thereby impacting and influencing the safety behaviour (Ministry of Labour, 2003). In the study by Lee and Harrison (2000) where they evaluated the risk perceptions on safety in nuclear power stations in the UK. They were able to note how significant differences were observed when considering the variables like age, gender, shift, workdays and work areas for the respondents (Ibrahim, et.al., 2012).

Glendon and Litherland (2001) were able to establish and compare construction and maintenance workers in relation to the applied safety climate. The authors were able to note differences on the safety climate in terms of subgroups including safety rules and relations. In the study by Siu and colleagues (2003), the authors evaluated safety attitudes and performance among Hong Kong construction workers comparing these with Chinese construction workers. They established that the older workers seemed to show more favourable attitudes in relation to safety. In the study by Fang, et.al., (2006), they identified age, marital status, educational attainment, alcohol drinking, and the violation of safety policies as part of the safety climate. Cooper and Philips (2004) also indicate how various kinds of work activities including site conditions seem to be more crucial in studies related to climate as compared to demographic variables. Such results seem to be understandable with the safety climate often gravitating towards the management of employee perceptions on site safety (Cooper and Philips, 2004). The climate of safety does not assess the general safety climate impact in terms of individuals and their work experiences or their age (Ibrahim, et.al., 2012). Still, personal qualities are needed in order to ensure that the safety climate studies would progress further (Ismail, et.al., 2012). The safety climate, including related demographic elements have been assessed above and now provide structure for this study in terms of the safety culture in the construction industry in Saudi Arabia (Ibrahim, et.al., 2012).

It was mentioned earlier, the 2001 General Environmental Law (GEL) with its 2003 Implementing Regulations and the 1982 Environmental Protection Standards serve as the governing policies to the different activities in the construction industry of Saudi Arabia. (Husein, 2013) These policies indicate activities, which are not safe for the environment

based on different related terms. The policies highlight the fact that all of the people of Saudi Arabia have a firm duty to also observe reasonable care (Hussain, et.al., 2014). Based on environmental policies including other parties undertaking construction activities, the duty is for the parties to apply the most appropriate technology, especially with materials which would not cause much contamination (Hussain, et.al., 2014). Another duty is to consider the sufficient steps in order to reduce the effect of the activity on the environment (Husein, 2013).

The construction site and workplace is a workplace fraught with dangers and hazards. In western countries, safety has been set forth as a priority for the construction sites with different agencies regulating the workplace (Jannadi and Assaf, 1998). In fact, the US Occupational Safety and Health Administration (OSHA) agency has indicated different rules and policies in order to ensure the safety and health of workers on site (Jannadi and Al-Sudairi, 1995; Goetsch, 2013). In Saudi Arabia, however, their safety in the construction industry is not under management by a clear government agency (Fullman, 1984; Hinze, et.al., 2013). Accident prevention seems to fall on the managers of the organisation. Construction companies have understood the value of decreasing rates of accident mostly for humanitarian reasons as well as to secure financial benefits (Jannadi and Al-Sudairi, 1995). Some companies also do not have clear guidelines in terms of expectations on safety behaviour. As such, major repercussions and unfortunate accidents have been observed in the construction workplace (Jannadi and Assaf, 1998; Hinze, et.al., 2013).

In general, safety expectations seem to require that all supervisors, engineers, and labourers must be familiarized with different aspects of safety and related practices in order to prevent

accidents and injuries (Jannadi and Bu-Khamsin, 2002; Zhou, et.al., 2012). The requirements for safety on most construction projects also have to be embraced by the different individuals involved, including the architects, the owner of the site or project, the contractor, and most especially the labourers (Jannadi and Bu-Khamsin, 2002; Bansal, 2011). The owner has to check on the designs for the safety of the project and implement such safety plans during the conduct of the project. The architect can help design safety by designing both temporary and permanent safety procedures within the site (Jannadi and Assaf, 1998; Ismail, et.al., 2012). Temporary safety translates to access in an out of the construction site and permanent safety relates to the stability of the project for the users. Contractors also have to ensure worker safety by complying with all the safety requirements on the site, from the start to the end of the project (Jannadi and Bu-Khamsin, 2002). Safety performance has to be assessed based on failure of safety in the workplace. There are some methods in assessment safety in the workplace, mostly with the safety audit with issues identified providing clues on what improvements can be made on site (Kavianan and Wentz, 1990). Profiling can also improve safety in the construction workplace, especially in terms of the general safety performance of the company (Jannadi and Al-Sudairi, 1995; Cheng and Teizer, 2013).

2.13.2 Policies in Saudi Arabian Construction Industry

Saudi Arabia, and for that matter the Middle East, is becoming highly noted as a leader in the construction industry, especially when it comes to the construction of high-rise buildings. According to Yule and Flin (2002), most of the changes in the construction industry in the KSA, which has made it the envy of the world, are due to trade liberalization,

globalization and internationalism. However, it is important not to lose sight of the fact that the increasing scope of work in the construction industry is directly proportional to the increasing demand for safety within the industry. Stranks (2005) explained that given the very nature and paradigm approach to the construction in Saudi Arabia, the best way to define safety is as a consensus commitment among all stakeholders in the construction industry. This is in order to ensure that no one will suffer in terms of health, wellbeing or security at any point in time while being immersed in the construction work. Having noted the need for safety, there have been many different policies and regulations that have been used and those that continue to be used in the construction industry of Saudi Arabia. As part of provisions under Article 48 and 49 of the Government Tenders and Procurement Law of Saudi Arabia, Yule and Flin (2002) made mention of the fact that there are liabilities spelt out against construction companies in the areas of death, personal injury, and property damage. As a result, most of the existing policies on safety have been focused on the need to keep death, personal injury and property damage to the barest minimum.

Reviewing existing safety policies in the current construction industry in Saudi Arabia, Wu (2005) mentions that there may not be a universal national safety policy that all construction companies are expected to abide by. However, Cox and Cox (2011) observed that each company must have its own safety policy that it can apply in order to ensure the health and safety of all its employees and other stakeholders involved in construction activities. In a study that looked into the trend of safety policies available for most of these companies, Varonen and Mattila (2000) noted that several companies in Saudi Arabia relate their safety policies to the Occupational Safety and Health Administration (OSHA) and Health Standards 1926 and 1910. As part of these two policies, the emphasis about safety is placed

on accident prevention rather than the control of accidents occurrence. In the opinion of Van Vuuren (2010), safety prevention is thus made to cover all employees, subcontractors and customers. According to Varonen and Mattila (2000), apart from the people, there are also safety provisions that cover prevention of wasteful, inefficient operations and all forms of damages to property and equipment.

In the study by Jannadi and Al-Sudairi (1995), the authors evaluated the safety performance of Saudi Arabia in terms of their injuries in the construction workplace, and the authors established that the safety in the larger construction firms seem to be highest. Saudi Aramco (1988) also points out how safety performance can be assessed by applying a standard checklist in the different work activities. This approach seems to help reduce risks on safety (Jannadi and Al-Sudairi, 1995; Cheng and Teizer, 2013). In general, these elements of safety and the safety practice have not been sufficiently established in Saudi Arabia. More efforts have to be made to ensure safety. The discussion below presents statistics on safety issues to demonstrate gaps in the workplace safety in Saudi.

In relation to the preventive safety approach taken by companies by way of safety policy, there are various practices within construction companies in Saudi Arabia that aim to bring about the realisation of the said safety policies. In a recent study, Van Vuuren (2010) investigated some of the safety practices and made mention of the use of personal protective equipment and employee health scheme (EHS) as two practices that are common among majority of Saudi Arabian construction companies. By the use of personal protective equipment (PPE), Isla and Díaz, (2007) discuss that site managers ensure that all stakeholders at every level including employees, subcontractors and employees use

equipment and clothing that adequately protect them from possible harm. Some of these protective equipment and clothing include gloves, goggles, helmet, and safety boots. To encourage workers to use PPE, Friedman (2010) advise site managers to place much emphasis on comfort, style and suitability of the equipment so that they will not be rejected by workers. Employee health scheme (EHS) has also been used to guarantee the health of stakeholders within various construction sites. With the EHS, Tashakkori and Teddlie (2008) indicated that the emphasis has been on issues that affect the inner wellbeing of employees such as noise regulation which can affect hearing against those that affect their external wellbeing, such as accidents.

According to Taylor and Bowers (2012), keeping health and safety records is one important means by which construction companies can have a very good view of the state of health and safety standards within their premises. Based on the existing state of health and safety standards, Ngo, Foley and Loi (2009) posited that site managers are better placed to make decisions that border on the way forward for them in terms of health and safety policies and practices. For most construction companies, studies show that the type of record system they have used over the years is the standardised accident report form. With this standardised accident report, it is possible to keep records on all injuries, accidents and other forms of health and safety events that take place at the site. According to Tashakkori and Teddlie (2008), the effect of these events such as the amount of man-hours that these make the organisations loss and the amount of money spent on cases of accidents are also adequately recorded. Based on the outcome of the records, Taylor and Bowers (2012) advised that decisions are made on the way forward for the company referring to how health and safety risks at the workplace can be reduced. As a way of enforcing all these policies, the

organisations resort to the use of safety training and oversight committees that ensure that the company and its workers adhere to safety standards at work, including the use of protective equipment and the wearing of safety outfits.

In summarising the discussion above, it is apparent to note that the Saudi Arabian construction industry's safety standards are not up to date, with their policies being reactive rather than proactive. There are inadequate policies in place in order to ensure their worker's safety and there are also inadequate means and resources, which can be used by the workers to ensure their safety. Inadequate policies on safety are therefore an issue for the Saudi Arabian construction industry. Clearer details on the safety culture and the construction industry shall be presented below in order to further establish better safety policies for Saudi Arabia.

2.14 Implementation Challenges in ensuring a culture of safety in the Saudi Arabian construction industry

Limiting the discussion to Saudi Arabia and more specifically to issues, the researcher is seeking to address two major factors, which are affecting the implementation of a safety culture in the workplace. On the issue of personal concern for safety, Suliman (2007) mentioned that personal responsibility is a factor that is very influential in the implementation of safety in any construction company. Murphy and Cleveland (1995) has been explained the personal responsibility where the individual employees and other people concerned with the day to day running of the organisation are knowledgeable enough to know how to take care of their own safety and health wellbeing. Smith-Crowe, Burke and

Landis (2003) further explained that there are several modalities of measuring or achieving safety and that personal responsibility is a relatively qualitative term in securing such safety.

By implication, different people assume a state of personal responsibility in different ways. According to Coble and Haupt (2010), whereas some people use their academic knowledge on what to do to ensure safety, others use practical field experience to determine what to do to ensure safety. In effect, where employees lack the academic competence or professional knowhow on safety, the likelihood of an increased risk to health and safety issues is also expected. On the part of Friedman (2010) however, it is not a measure of what one knows but how experienced one is. Rather, personal responsibility is about the commitment that individual employees have in implementing safety culture modules that exist in their workplace. By this, Rao (2007) was certain that personal responsibility also affects the degree to which employees will personally enforce safety culture principles at their workplace.

On the personal support for safety, Metcalfe (2007) noted earlier in the review that creative cultures are practiced. There is a major emphasis on shared responsibility in Saudi Arabia, where each person within the organisation sees himself or herself as part of the collective responsibility in bringing about safety. The importance of shared responsibility in ensuring efficiency, where so much is done within a very short time frame was also outlined. When it comes to the implementation of a safety culture also, Murphy and Cleveland (1995) indicated that there are several factors within this context that affect the implementation of a safety culture. In the opinion of Rao (2007), in Saudi Arabia, there are two lines of effect, the positive and the negative effects. This is because in organisations where there is a very

elaborate peer support and where each person in the workplace is ready to share in the responsibilities of others to ensure collective safety, Holbrook (2002) indicated that the implementation of a safety culture will be very easy and simple. In the quest to achieve total safety within Saudi organisations, Richter and Koch (2004) were concerned that all parties had to ensure that they have adequately played their parts before the agenda on safety can be totally achieved. This is because where one person on the field is concerned about safety but the other person is not, there is a likelihood that those who are concerned about safety will suffer from the inadequacies of those who are negligent with their safety (Stare, 2012). This notwithstanding, Narcisse and Harcourt (2008) indicated that there are instances in organisations where some employees are passive to the safety agenda because they feel their inadequacies will be covered by others. This can cause problems in how the safety culture can be secured for the organisation as a whole. In summary, implementation challenges encountered in establishing a culture of safety in the Saudi Arabia construction industry seems to be based on organisational-shared goals. Where these goals are not shared by its members and the leaders fail to implement such goals and safety policies, a culture of safety in the construction industry cannot be established. The discussion below shall then consider the factors that are affecting the implementation of safety policies in the Saudi Arabian construction industry.

2.15 Factors Affecting Implementation of Safety Policy

A review of past scholarly journals and revised books reveal various factors affecting the implementation of safety policies in Saudi Arabia. These are pool factors important to the study, which are not only a challenge to the country's construction industry but also to the world at large (Ruwanpura, Mohamed and Lee, 2010, pp. 14). A safety policy is a written

statement or declaration by an employer showing a commitment for the protection and safety of the public and most importantly, the employees (Easterby-Smith, Thorpe and Lowe, 2002, pp. 68). Conceivably, different institutions have been formed to promote the implementation of safety policies. In the USA, Occupational Safety and Health Administration (OSHA) and the National Institute for Occupational Safety and Health (NIOSH) are accountable to researchers and policy follow up. Nonetheless, in the United Kingdom, National Examination Board in Occupational Safety and Health (NEBOSH), Institution of Occupational Safety (IOSH) and the International Institute of Risk and Safety Management (IISSM) watches over the safety in work places from different angles. Additionally, the Safety Institute of Australia (SIA) oversees safety policies in Australia while Asia Pacific Occupational Safety and Health Organisation (APOSH) reign in the Asia Pacific Region (Geller, 2010, pp. 31**)**. Despite the formulation of powerful safety institutions, the implementation of safety policies has remained a dominant problem, even with recorded improvements in the safety and health dockets (Ringbom, 2008, pp. 61). Arguably, several factors seem to contribute to the stagnating trend in policy implementation. These factors are detailed below in the form of management strategy and commitment, training and technical competence, commitment to best practice, as well as proficiency and planning.

2.15.1 Management Strategy and Commitment

Al-Haadir and Panuwatwanich (2011) mentioned that the "reciprocal safety culture model" gives priority to a safety climate, management systems and behaviour to promote a friendly workplace environment. In this light, a good management system, therefore, plays a leading

role in transforming any work environment. Construction companies have safety as a priority considering the substantial indirect and direct costs associated with the solutions (Ringbom, 2008, pp. 71). Evidently, in some countries, the rate of workplace injuries exceeds 50%, which is worrying in the technological global arena (Geller, 2010, pp. 31**)**. Clarke (2010) reiterates that while different management levels concentrate on creating a safety environment through the prediction of occupational injuries or accidents, an overlap exists, creating a gap between the management strategy and the commitment to enhancing safety policies. Policy implementation is generally a management issue that is occasionally transferred to the moral adjudication of different employees (Griffin and Neal, 2000, pp. 349**)**. In as much as focus on safety behaviour and motivation remain key antecedents of safety policy implementation, many safety policies have failed right from the initiation stage due to wrong strategies and limited commitment. Al-Haadir and Panuwatwanich (2011) says contemporary construction managers have a disregarding strategy of leaving policy systems to junior officers. However, this has proven to be a fatal mistake as the junior managers often apply short-term initiatives rather than long-term safety plans. According to Kniesner and Leeth (1995), top management has a positive culture, with a greater ability to initiate a strong and effective safety culture. From this perspective, the problem of strategy and commitment derails implementation of policies on the management sector. The next factor relating to stagnation in policy implementation is training and technical competence.

2.15.2 Training, Adjustment and Technical Competence

According to the Saudi Arabian General Organisation for Social Insurance (2010, 2011), the total number of serious injuries in construction sites has risen significantly from 261,076

people at a yearly growth rate of 3413.9 per 100,000 employees from 2004 to 2010. Under the same period, 2176 deaths at a rate of 28.3 per 100,000 employees were recorded. Interestingly, 95% of the deaths and accidents rose from migrant workers in search of daily work. Whether foreign or local, when construction expatriates change work environments, an effective cross-cultural adjustment is essential. Ineffective adjustments greased with different cultures create a mismatch between the available skills and work environment; as a result, safety policies can be stalled (Sawacha, Naoum and Fong, 1999, pp. 311**)**. Notably, cross-cultural adjustment refers to the ability of an employee to be physically, psychologically and emotionally comfortable in a work environment in a level that guarantees safety of co-workers and work equipment. It is the process of learning local behaviours and it also entails different initiatives. Interaction adjustment involves gaining comfort in interacting and dealing with local work and non-work situations (Geller, 2010, pp. 31**)**. The process is principal for any safety policy implementation step as it allows consistent communication and information across different employees. Above all, interaction adjustment is a technique of limiting any information gap that in many occasions delineate safety to a given group while other remains vulnerable to danger (Griffin and Neal, 2000, pp. 350**)**.

Apart from the interaction adjustment, it is also worth mentioning the work adjustments that play a crucial role in implementing safety policies. Generally, comfort levels in new roles, tasks or expectations at times prove disappointing to many employees. This is because of varied requirements and procedures that can cause a mismatch between expectations and policies. Any employee found in this scenario often adopts general adjustment initiatives and not work specifications (Sawacha, Naoum and Fong, 1999, pp. 309**)**. As a result, not

only safety policies are undermined but also poor performance reins within such work environments. The tagging relationship between employees and the limited time for adjustment, therefore, remains a significant problem in the implementation of safety policies. In this regard, it is vital to bring on board anticipatory adjustment systems that give priority to organisation factors (Geller, 2010, pp. 31**)**. According to Walsh (2011) safety policies promote adequate expatriate selection and appropriate cross-cultural training with the degree and mode of adjustment necessary. The next factor relating to stagnation in policy implementation is commitment to best practice and the safety culture.

2.15.3 Commitment to Best practice and Safety Culture

A safety culture according to Groenleer, Kaeding and Versluis (2010), is a group of observations and arrangements that reduce the risk of performing any activity while protecting employees from illnesses or injuries. Best practice, on the hand refers to competency, attitude, commitment and value for a free accident site by prioritizing critical decisions that do not undermine the quality of safety (Geller, 2010, pp. 31**)**. Evidently, the two factors play a leading role in organising, executing and eventual implementing safety policies (Fares and Rouviere, 2010, pp. 21). According to the National Safety Council (NSC) of Saudi Arabia, the construction industry employees' total 6% of the industrial workforce. Interestingly, it is responsible for 21% of the entire industrial deaths representing the highest rate of accidents (Geller, 2010, pp. 31**)**. However, not only Saudi Arabian construction sites have high rates of disabling fatalities and injuries. In Japan, for instance, up to 40% of accidents arise from construction activities, 25% in the United Kingdom and 50% in Ireland (Griffin and Neal, 2000, pp. 349**)**. According to Clarke (2010) the high rate

of accidents in the presence of safety policies has raised many questions and yielded limited answers. In as much as, numerous scholars have revolved around several problems to be responsible for the derailing safety in construction setups, non-commitment to best practices and safety cultures appear prominent (Sawacha, Naoum and Fong, 1999, pp. 310**)**. It is an undeniable fact that any organisation that maintains best practice would rarely suffer from safety problems. In addition, any construction system that aligns operations to a safety culture can open gates to success. Based on assessment, different countries have developed succinct safety policy initiatives, but have failed in the initial stages of implementation (Laharnar, Glass, Perrin, Hanson and Anger, 2013, pp. 168). This is due to a non-commitment to best practices, specifically to either cut cost or ensure fast production (Geller, 2010, pp. 31**)**. The strategies have not only led to failure in implementation of safety policies but have also heightened risk to injuries and other work related illnesses. The next factor relating to stagnation in policy implementation is proficient and timely planning

2.15.4 Proficient and Timely Planning

Sawacha, Naoum and Fong, (1999) observe that safety policies significantly contribute to the success of a business. It, therefore, is necessary to ensure continuous improvement and commitment during implementation. Despite having proficient working environments, many policies fail due to improper planning. Geller (2010) notes that poor arrangement and structure prevents the achievement of targets and objectives. Most importantly, a planning technique must incorporate both employees and managers. Thompson and Scicchitano (1985) reiterate that any policy implementation process should encourage smooth implementation and operation and it should allow the measurement of performance.

In summary, various factors, affect the implementation of safety policies in Saudi Arabia. The factors spread right from the field of management to that of the employees. These factors act as important facets in the implementation of safety policies. They include:

- Management strategy and commitment. Management strategy is based on how well the managers and leaders are able to secure and use appropriate strategies and how well they are able to sustain their commitment to implementing the safety policies of the organisation. Where an organisation is poor in these strategies and fails in its commitment, the organisation commitment to safety is also compromised.

- Training, adjustment and technical competence. Where the training and technical competence of the organisation members in terms of safety is poor, their execution and their safety practice is also poor. They would not be equipped with the right knowledge and tools for workplace safety.

- Commitment to best practice and safety culture. Where the commitment of the members of the organisation to the best practices in safety is inadequate, the organisation would not be able to develop to its peak in terms of workplace safety. It would also not be able to reach the best standards in workplace safety.

- Proficient and timely planning. Where the organisation is able to plan proficiently for its workplace and organisation safety, it would also be able to reach better standards of safety where and when it is needed by its people. In other words, the policies and practices would match the changes and demands of the workplace setting.

The researcher acknowledges that culture is a very broad concept, so focus will specifically be on the safety culture. This means that this study is useful in helping contractors in the construction industry understand better the correlation between the safety and organisational culture, and to make a connection with the overall improvements in the productivity of the industry when both of these factors have been considered into a collective concept known as safety culture. Carrillo (2012) said that by showing the significance of culture and safety, the overall role that safety plays in improving worker productivity and in reducing losses will be better understood. Once this understanding is established, the need to factor safety for the workers and the industry at large will be adopted. Part of this study examines the importance of involving the employees at the grassroots level in the decision-making as well as the formulation of relevant safety policies. Shash and Al-Abdullatif, (1993) explained that, if the leaders in the construction industry were to appreciate the need for collective involvement in the safety culture, this would result in more comprehensive policies where those who are directly involved can be consulted in open communication. This would ultimately result in more refined and workable safety culture and practices.

However, while many studies have been conducted concerning safety cultural factors (Anderson and Terp, 2006; Young et al, 2010), which encourage construction workers in Saudi Arabia to remain motivated in their work, there is a need for an effective and an acceptable framework for safety in the construction industry (Molenaar, Brown, Caile and Smith, 2002; Williamsen, 2007; Vrijling, Hengel and Houben, 2005). There is a need for this research to evaluate the overlapping influence that the safety culture has on safety performance, and thus there is a need to stick with the implementation process and the use of the safety culture in the industry.

Furthermore, it has been suggested that when management is involved in decision-making, they are able to make a positive contribution not only in the formulation of policy, but also in the setting of rules (Shash and Al-Abdullatif, 1993). The relevance of management and leaders is as initiators of reform and change and as the implementers of safety policies. Additionally, Shash and Al-Abdullatif (1993) indicated that efforts by management to safeguard the workers by implementing and observing safety standards instils in the employees a sense of self-worth which increases their motivation by making them feel cared for. Furthermore, Almohawis and Al-Sultan (1994) said this is because in those companies, which are not directly influenced by the local culture in matters of safety on safety performance, the motivation of workers to perform is often quite low and this can create a situation where there is a general loss of productivity.

2.16 A Theoretical Framework on Safety Culture for this Research

Figure 2-8 summarises the issues raised in this chapter starting with the understanding of culture (section 2.2) until section 2.15. From top of the Figure 2.8 going downwards, the most critical sections of the theoretical framework on Figure 2-8 start with the first tier of dichotomous relationship between perceptions of safety culture in the Kingdom of Saudi Arabia compared with perceptions of safety culture at the international level. This issue has been examined using the Hofstede model of classification of culture and how this has been translated in organisations around the world. As a result it is vital to assess the perception of safety culture in the Kingdom of Saudi Arabia, hence this research.

The second tier of the most important issues from Figure 2-8 is to examine the safety culture at organisational level thereby examining the theory of shared participation as well as the

theory of power distance, masculinity and responding to uncertainty (as alluded to under section 2.2. For example, Suliman (2007) argued that once various construction companies want to implement various forms of safety practices, there are expected challenges in the implementation process.

The third tier of the framework depicted in Figure 2—8 require an assessment of how human capital is being nurtured in order to promote a positive safety culture. The third tier also refers to other forms of resources such technology; growth and performance; however, development take different routes, with some routes leading to conflicts between safety and culture. Geller (2010) cites the construction industry as one of the industries guiding the growth and development of the country. This sector is responsible for the expansion of infrastructure in the country. It also has a major share in the employment of human labour, both skilled and unskilled (Kniesner and Leeth, 1995). It is therefore crucial that the research examines the perceptions of all sorts of workers regardless of their management position.

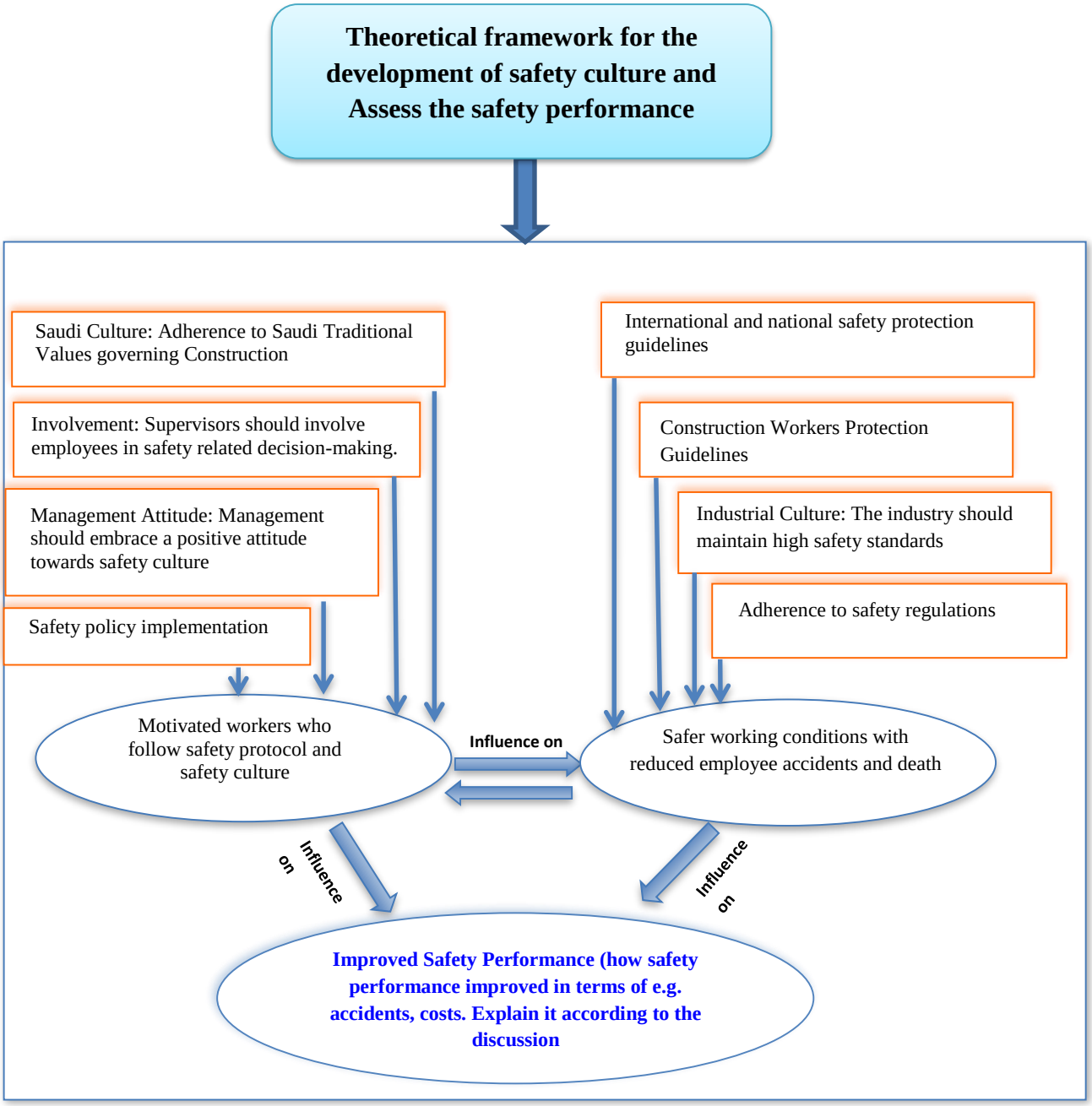

Figure 2-8: A theoretical framework for this Research

The fourth tier of the theoretical framework is aimed at examining the influence of management decisions on safety policies and how they are implemented. Safety policy is

linked to the way managers or leaders establish the safety climate using policies or regulatory framework in order to stimulate safety performance.

Based on the four tiers of the theoretical framework it could be argued that the research could potentially assess how safety culture impacts safety performance in the Kingdom of Saudi Arabia because the framework encompasses a holistic view of safety culture at organisational and industrial level.

Even though the framework encompasses several areas and aspects of culture and safety, it is argued that if implemented within any given organisation it has the potential to translate into improved safety performance (Robson et al. (2007). The focus of the theoretical framework would be centred on behavioural elements as well as supervisory and managerial behaviour.

2.16.1 Behavioural-Based Safety

Based on the behaviourist theory to change, Stare (2012) identifies safety to be a behavioural issue, which can best be approached using a behavioural approach. In the framework however, the use of the behavioural approach to safety is not differentiated as an independent intervention but can be used in connection with others. Petersen (2004) notes that a typical behavioural approach to safety is focused on responsibility. This means that behavioural-based safety takes into consideration the need for all stakeholders concerned with safety to have a culture of responsiveness to the roles they are supposed to play in bringing about safety. Using the results of a field survey, Sarkus (1996) indicated that almost all stakeholders within typical construction companies, including employees, managers,

supervisors and even customers are well aware of the roles they need to play to ensure that there is safety. With this argument validated, it means that the core problem in the absence of safety is the fact that stakeholders have not had a behavioural attitude that motivates them to implement what they know. Once behavioural changes related to safety will be recorded in construction companies, Narcisse and Harcourt (2008) have said that safety performance will be enhanced almost immediately. This is because, times that are wasted in ensuring that each person is doing what is expected will be transferred into direct productivity time, and stakeholders will implement safety by themselves. Another area covered by the framework is the supervisory and managerial behaviours.

2.16.2 Supervisory and Managerial Behaviours

As much as the behavioural-based safety calls for stakeholder base that is concerned about its own safety and takes safety issues into its own hands, O'Toole (2002) had also observed that adding supervisory roles to this helps in consolidating the idea and making it more formalised. Petersen (2004) actually indicated that the modification of supervisory and managerial behaviours could be considered a component of behavioural based safety. In this instance however, supervisors and managers are seen as independent stakeholders; whose behavioural change must be towards the need to ensure that there is adequate application of behavioural change modules. Elaborating on the importance of supervision and management in the safety culture, Sarkus (1996) noted that the safety agenda forever remains short lived until such a time those supervisors are critical with their duties. This is because through supervision and management, Smith-Crowe, Burke and Landis (2003) mention that feedback information necessary for decision-making is acquired. This means

that supervision and management roles can double as evaluation processes for the organisation's culture and safety agenda. Meanwhile, Sarkus (1996) outlined the merits that come with evaluation in ensuring safety performance when it was stated that evaluation simply points to managers, how well or how badly they are doing with project outcomes. Robson et al., (2007) mentioned that this way, managers are empowered to change their course to directions that are focused on improved performance.

2.16. Summary

Having established the meaning of culture, in general, and how it can influence organisational behaviour, this chapter has demonstrated that societal culture is intertwined with the organisations that operate in every part of the world. The chapter argued that organisational culture at all levels of the organisations and or the industry has a significant influence on the daily operations of a business or the work environment. Therefore it can be summarised that safety culture for the construction industry in general is a function of how leadership and motivation have been applied; how people operate in teams and how the organisations are structured. There is potential to assess how an organisation could perform if the safety culture has been nurtured. It can therefore be concluded that the safety culture has a significant role in the wellbeing of its workforce; but it does not necessarily guarantee safety unless the industry and the regulatory framework thereof could proactively support the decision makers on safety so as to enhance the responsiveness of culture could be embedded in the dealings of an industry. Literature on safety and the Saudi culture has indicated that there exists a 'cooperate or clan culture' in Saudi Arabia where the atmosphere is generally welcoming to families. The work atmosphere is very conducive for working,

however, not very strict in terms of safety policies. Violations on safety are not dealt with strictly often opening the doors to possible accidents in the work place. The organisational culture on safety therefore has a significant impact on the safety of workers in the construction industry, there is no clear evidence that such is the case in the Saudi Arabian construction industry; hence the need for further research to establish how the performance in terms of safety can be established at industrial level. There is also a need to assess the safety standards in the Saudi Arabian construction industry in order to establish how safety policies have been implemented with a view to establish safety performance. This chapter demonstrated that if an industry and or organisations have inadequate safety policies in place worker's safety could be compromised. In addition, an industry would also need to resources safety programmes for it to benefit from working environment that is safety risk free. However, to achieve all that the industry would have to understand the importance of societal culture and how it transcends to organisational culture. This chapter has established a clear link between the two issues such that any deficiencies in safety performance could be attributable to ma y factors amongst which could be the policy issues or leadership issues, to mention but a few.

3. CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

Whenever an issue has been raised it cannot easily be explained without undertaking a detailed and disciplined attempt that can address the issue or question by ensuring that there is a systematic way to gather the information, analyse it and present it in such a way that the results can be used to answer the issues that may have arose (Anderson, 1990; Shuttleworth, 2008). Without the systematic procedure for gathering data that can be used in answering questions it can be difficult to generalise, explain or predict what the outcome of the issues could be (Anderson, 1990). For this reason, it can be argued that research is the process through which the questions about any issue can be raised; the procedures of collecting data that is needed to answer the issues can be planned and then analysed in order to provide reliable outcomes (Shuttleworth, 2008; Saunders et al., 2009). When a researcher raises questions for research, they do so with the philosophical backing (Creswell, 2009) that would have a tremendous influence – knowingly or otherwise – on their research process (Easterby-Smith et al., 2002; Blaikie, 2000). It is for this reason that a detailed design for research methodology has been included in this dissertation; it helps to facilitate the dissemination of the research philosophy, strategy, methodology and methods that have been considered as cardinal for this research at hand. Section 1.4 lists research objectives that state that there was a need to "critically evaluate the safety policies practiced in the construction industry of Saudi Arabia and how they influence safety performance" and "critically assess the factors affecting the implementation of safety policies in the construction industry of Saudi Arabia". This chapter, therefore, discusses the research

philosophy and strategy used; it also examines and justifies the research methodology that was adopted in order to undertake the research methodically and produce reliable information about safety culture in the Saudi Construction industry. The chapter examines the research philosophies in general and justifies how the research philosophy has influenced the choice of the methodology well as the design for research methods. The chapter concludes that the nature of the research issue would be served well by adopting interpretivism philosophy implemented through a mixed methodology, and a use of both case studies and questionnaire survey to collect primary information. Adopting such as research process increases the reliability and validity of the results.

3.2 Methodological Frameworks

According to Saunders et al., (2009) many researchers rush to decision making with regards to the data collection methods to make and how to analyse it; forgetting that the whole process of research is a function of the philosophical standing that they take. Creswell (2007, p.15) opined that philosophical assumptions are embedded in the researchers' decision making; in fact, researchers bring forth their worldviews, or sets of beliefs to any research project (ibid). As a result, essentials of good research practice requires that a researcher makes their assumptions or worldviews explicitly clear, argued Creswell (2007, p.15); so that readers can be aware of the potential sources of influence to the researcher. In order to guide researchers on the best approach to designing a research project, Saunders et al., (2009), developed the "research onion concept" here in explained in Figure 3-1; where they recommend a stepwise clarification of what the research process has been; hence clearly establishing a transparent manner to make decisions for a research project. Saunders et al

(2009) outlines ten research philosophies that generally determine the construct of knowledge from the perspective of the researcher. It became confusing as to the ideal philosophy that one could use if they relied on Figure 3-1 alone or the explanation from Creswell (2007).

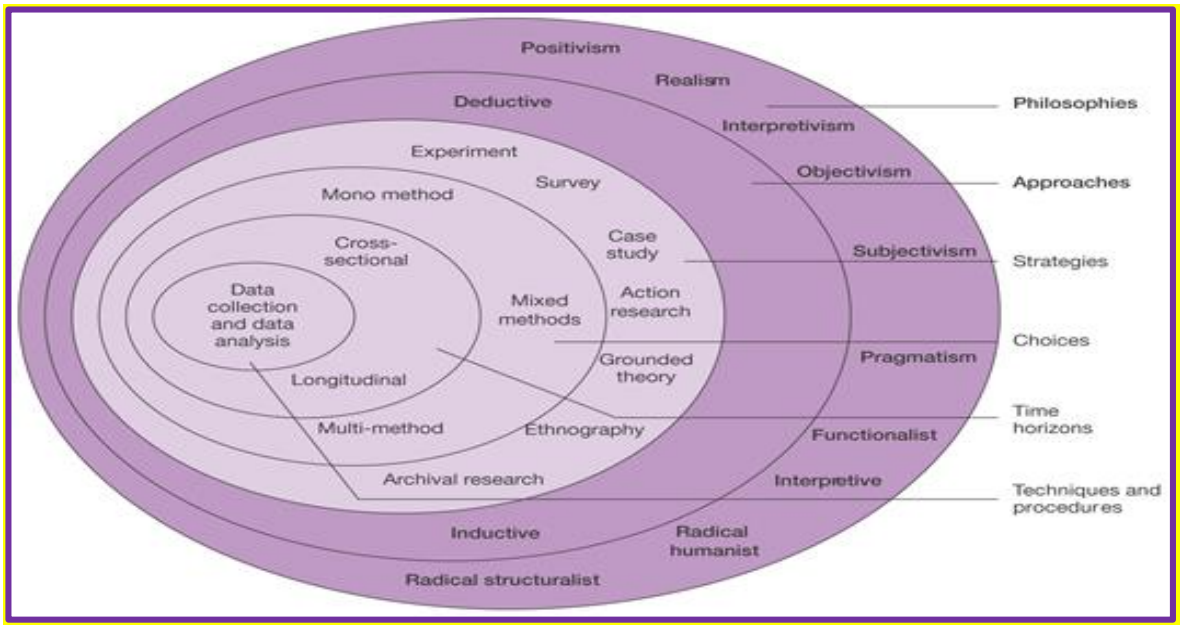

Figure 3-1: Research Framework based on the onion concept (Saunders et al, 2009)

Over the years, however, the clarity of the onion concept in research has been crucially improved (Saunders and Tosey, 2012). The improvement has been shown in Figure 3-2; it shows that a researcher's understanding and associated decisions in relation to the procedures taken for a research methodology, research methods, data collection and analysis forms the core issue for which understanding of the philosophy (Saunders and Tosey, 2012; Saunders et al., 2012). Using the argument from Saunders and Tosey (2012) (Figure 3-1) it

was justifiable to consider positivism, realism, interpretivism, and pragmatism as the philosophical perspective of this research prior to deciding the philosophical stance to take.

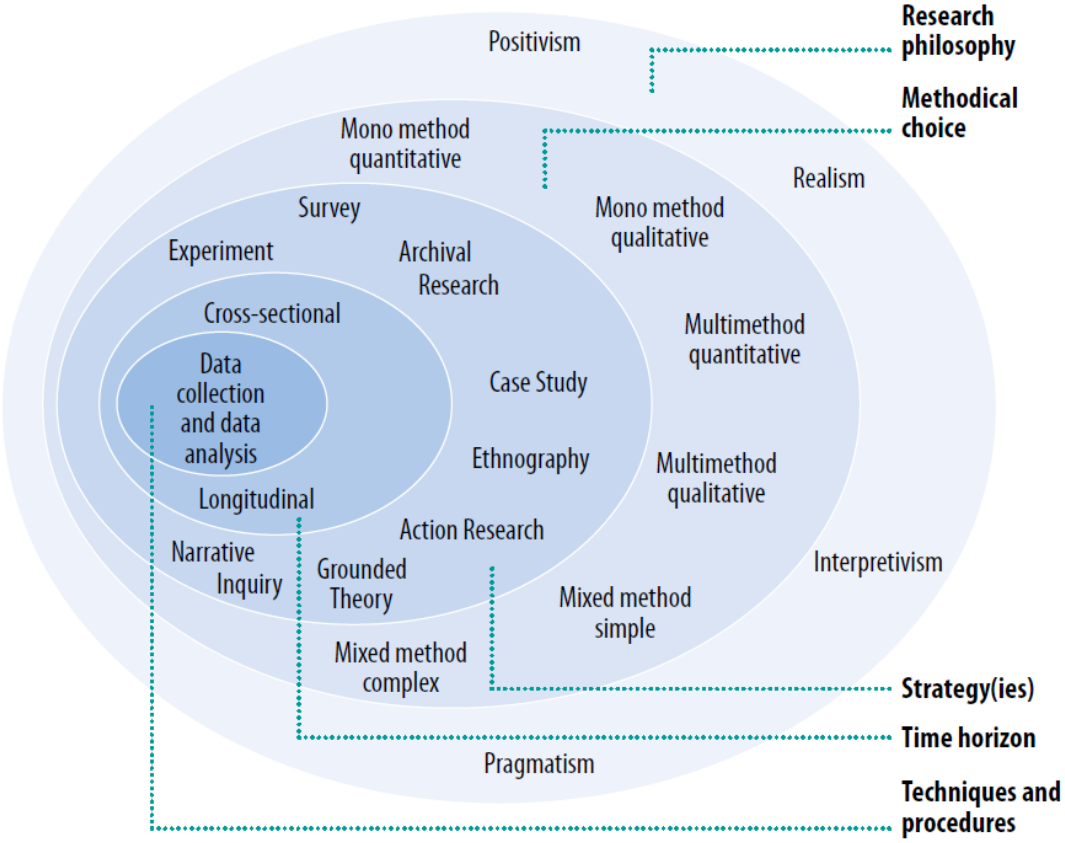

Figure 3-2: Research Onion (Saunders et al., 2012, pp. 143–9)

3.3 Research Philosophy

Research philosophy refers to the establishment of knowledge as well as the specific qualities of knowledge (Saunders, et.al., 2009). Such perspective may be too general, however Saunders et.al, (2009) further explains that the general concept of research philosophy is also the reason why research is being carried out by the researcher. In research

philosophy, Easterby-Smith et.al., (2002) also point out the value of understanding general philosophy as far as research methodology is concerned. Understanding philosophy can help the researcher understand and clarify the method being used in the research and also help the researchers gain information as well as answer related research questions. Also, knowledge associated with research philosophy would help researchers with various issues and methods in their study, filtering the unrelated studies. In understanding research philosophy, including its benefits, the researcher can be more creative in their study (Creswell, 2009; Saunders and Tosey, 2012).

3.3.1 Positivism

The positivism philosophy is a philosophy which is associated with scientific reasoning as well as conclusions from a legal perspective which are also eventually able to support knowledge. As far as positivism is concerned, the observations can be quantified and can therefore be supported by statistical results. Collins (2010, p. 38) discusses that positivism relates to the empirical perspective that knowledge emanates from the experiences of man. He also goes on to discuss that positivism has an atomistic as well as an ontological perspective of the world in general, one which covers observable aspects which then relate to each other directly and regularly (Collins, 2010). Also, the researcher in the positivism philosophy is not a part of the study and his personal perspectives on the matter is not considered. In general, positivist researches usually use the deductive method and inductive approach usually applies the phenomenology philosophy (Crowther and Lancaster, 2008). It is also important to emphasize that positivism relates to the perception that the researcher has to highlight facts and phenomenology is associated with meaning, while providing accommodations for human interests. Even though the use of scientific reasoning would be

ideal for this research the issue of safety culture borders much more on social-cultural perspective; hence it could be inappropriate to rely on positivism as the main philosophy for this research.

3.3.2 Realism

Saunders and colleagues (2007) point out that the goal of realism research philosophy is to assess the social goals which can affect the interactions of individuals with each other. It also applies associated elements to secure information. Phillips (1987) points out that realism is the belief in entities having an independent of other entities or that these entities have varying related theories. As pointed out by Schwandt (1997), scientific realism is the belief that there are different theories which can be used to understand the world. As such, reality evaluates related matters in the global setting, matters which can create the results viewed and believed by the people. Such philosophy highlights the actual beliefs which are already existent and in this philosophy, there are different realisms, which may either be direct or critical (McMurray, et.al., 2004). Miller (2010) mentioned that, realism generally has been a very much significant philosophy for close to 30 years (Baert, 1998, pp. 189–190; Hammersley, 1998, p. 3; Suppe, 1977, p. 618). It can therefore be stated that realism aims at addressing two major issues: the first is that it strives to promote reality as being the truth; such that once the reality has been shown it is independent of the way the human mind thinks about it (Saunders et al., 2009). The second issue is that realism strives to develop the understanding of human behaviour (Bryman, 2012). It can be difficult to use such a philosophical standing on this research because culture and the way people perceive it would be difficult to be delinked from human thinking in an objective way, as Saunders et al., (2012) reasoned. Therefore, this philosophy was considered unfit for this research.

3.3.3 Interpretivism

Interpretivism is a philosophy that articulates the way researchers differentiates the perceptions people have about issues of research and the way natural science would look at the same issues (Saunders et al., 2009; May, 2011). The ideal is that researching an issue objectively would lead to different interpretations of the social roles of the actors on the issue under research (May, 2011). Interpretivism aims at analysing the gap between people and objects that have traditionally been examined using natural science philosophy such as positivism (Bryman, 2012). To this effect, interpretivism relies heavily on social scientist perspective which strives to model the subjective element of the research process in order to understand the meaning behind any social action (Crotty, 1998). This philosophy has attributes that can allow the researcher to evaluate safety culture and examine the social related data in order to understand the meaning behind the issues under research; hence it was considered as a vital philosophy for this research (Burrel and Morgan, 2005).

3.3.4 Pragmatism

According to Saunders et al., (2009, p109) the philosophy of pragmatism presumes that the best approach to research for any person who has questions to inquire is to use research questions; from the research question the value that researcher attaches to knowledge and how it should be processed can fall in place. This implies that pragmatism goes against the argument that a researcher would need to state, explicitly, that which they feel would influence their research (Creswell 2007, p15). For a pragmatist to undertake their research effectively they would need clear research questions that can deliver the issues without any ambiguity (Saunders et al., 2009). In the case of the research on safety culture is would be impossible to guarantee such a question without limiting the quality of the primary data;

hence the argument that pragmatism works well for a positivist research environment that can rely on quantitative data in order to avoid ambiguity (ibid; Bryman, 2012). For this reason, it could be difficult to apply the philosophy of pragmatism on this research because of the nature of the research subject.

3.3.5 Adopted Interpretivism philosophy with justification

Interpretivism, in this research, has been explained to be a philosophy that posits that knowledge is a complex phenomenon and for this reason cannot be generalised in a value-free and detached manner (Remenyi et al., 1998). Interpretivism can be referred as the Social Constructionism in the field of management research. According to this philosophical approach research gives importance to their beliefs and value to give adequate justification for a research problem (Easterby- Smith et al. 2006). Gray (2004) stated that, for interpretivists, the world is too complex to be reduced to a set of observable laws and generalizability is a less important issue than understanding the real conditions behind the reality (Gray, 2004). With the help of this philosophical, researchers focus to highlight the real facts and figures according to the research problem. In this study, the interpretivism philosophy is chosen over the others with the rationale and justification that study needed to be approached from a philosophical framework where the researcher sees knowledge as a complex phenomenon that cannot be generalised in a value-free and detached manner (Saunders et al, 2007). Because of the absence of generalisation of knowledge, the researcher shall be committed to the systematic analysis of information on the research topic as a way of building a consensus parameter of conclusion of knowledge. Again, as part of the interpretivism philosophy, the establishment of any conclusions would be based on widespread interpretation of available information, largely collected through the use of

various data collection exercises. An interpretivism paradigm was adopted, to enter the social world of construction industry public and private sector stakeholders and other key informants to engage with them and collect in-depth information regarding considered factors as well as strategies and commitment issues on policies redirecting focus on the main issue on safety and the safety culture. The interpretations collected data were made to serve the overall purpose of the research which was intended to help significant changes in safety standards in the Saudi Arabian construction industry therefore have to be considered by the policy-makers in the country, including the major businesses and corporations in the region.

3.4 Research Approaches

Research approach refers to the plans to be applied for the research, covering the development of the study from the broader assumptions, into more details for the study, specifically on data collection, analysis, and interpretation of data. Such plan also covers different decisions, and these have to be carried out following a specific order where they would be logical for the researcher and the research process. The decision often includes the approach, which must be applied for the topic. Supporting the decision would be the philosophical elements discussed above, the research design, as well as the data collection methods, and the interpretation of data. Choosing the approach would have to consider the qualities of the issue being discussed, the experiences of the researcher, and, also the audience. According to Creswell (2012) all the effort that a researcher can make in organising the research process can easily be summarises as either inductive or deductive. In other words, there are two broad classifications in approaching research that is the inductive and the deductive approaches (Trochim, 2006; Debois and Gadde, 2002). There is no way a researcher can be forced to use one of them approaches to reasoning, Saunders

et al., (2009), argued. The issue that dictates the approach to reasoning largely depends on how the research project is born (Creswell, 2007; Saunders et al., 2009). Below is the explanation of how the approach to reasoning can be implemented, before justifying the reasoning adopted for this research on Saudi Arabian safety culture.

3.4.1 Inductive Approach

Gill and Johnson (2010) illustrated inductive reasoning based on Figure 3-4; where the research is born from an exploration by the researcher. Creswell (2012) added that when the researcher focuses on any information so that they can develop their interest they may not really be focussed on anything until they gather data. The data gathered is not predetermined; hence the data itself can lead the researcher to developing a theory (Saunders et al., 2009; Gill and Johnson, 2010). It may take a long time for the researcher to gather the information that can lead to a development of a theory (Saunders et al, 2009); but the steps are clear as Gill and Johnson (2010) reasoned. The initial step of observing the world is followed by collecting data that can eventually lead to clear building blocks for a theory. The last phase is when the researcher finds a link which would create a theory (Creswell, 2012) – see Figure 3-4.

For this research inductive reasoning was not applicable because the researcher did design the research in such a way that they would search without direction and be able to stumble across vast amounts of data that could eventually lead to developing a theory of safety culture in Saudi Arabian construction industry.

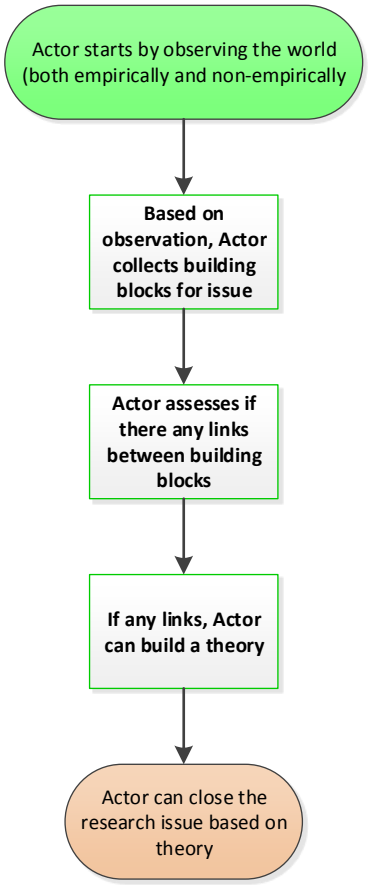

Figure 3-3: Example of how inductive reasoning is applied to a research process (Source: Gill and Johnson, 2010)

3.4.2 Deductive Approach

Deductive reasoning, according to Gill and Johnson (2010) is a situation where the researcher designs their reasoning to starting with explaining the real problem for research and develops a theory or hypothesises about it. In the process of setting the research problem and the hypothesis, the researcher could stablish their standing on the issue which they can set out to approve or disapprove after they have collected data, tested and analysed it (Creswell, 2012) – see Figure 3-5. The views about the research issue, as expressed by the researcher, could have been developed or deduced from the information that they could have

experienced or read (Denscombe, 2007). However, the researcher would need to design the process of research in order to gather the data in a reliable way so as to prove or disapprove the theory of the research problem that they would have theorised over in the first place (Saunders et al., 2009). The mechanism of testing the theory, as shown on Figure 3-5, implies things like aims and objectives, research hypotheses or research questions that form a critical part of the research to test the theory and arrive at evidence based results (Denscombe, 2007; Creswell, 2009).

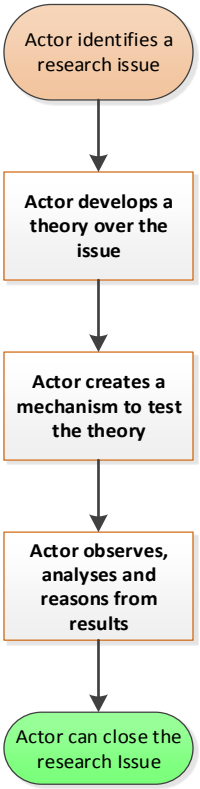

Figure 3-4: Example of how deductive reasoning is applied to a research process (Source: Gill and Johnson, 2010)

This research adopted the deductive reasoning because it was the natural way to develop the argument for safety culture from the work place to a research project.

3.4.3 Qualitative Approach

Depending on the philosophy adopted by the researcher, there is a possibility of adopting a qualitative research approach when it has been envisaged that the dana required will largely be centred on social networks and the informal ways to gather information (Saunders et al., 2009; Creswell, 2012). The design to gather qualitative data would be accompanied by measures that can test it as objectively as possible even though the qualitative approach is inherently subjective (Soiferman, 2010; Howe and Eisenhart, 1990) because of the social and contextual influences it exerts on researches (Dawson, 2007).

3.4.4 Quantitative Approach

A quantitative approach to research is one that adopts quantitative means of gathering data and analyse it in such a way that the researcher can apply statistical testing in order to establish any patterns if any (Soiferman, 2010). The design of the data collection procedure is as objective as possible and can be useful in creating a causal relationship between variables; this could lead to making inferences based on the data obtained (Trochim, 2006).

3.4.5 Justification for Using Deductive Reasoning on this research

The justification for adopting deductive reasoning was to develop the research in stepwise phase from problem identification to the development of aims and objectives as recommended by Fellows and Liu (2008). Creswell and Clark (2007) and Shaffer (1989) opined that because deductive research moves has a top-down approach or from the theoretical to the hypothesis onto the data in order to support or oppose theory, it offered a more measure approach. Deductive reasoning offered a prudent way to develop the research proposal and be able to seek funding for it as well as supervision because it was vital to

establish how the research was to develop; this has been the standard approach (Denscombe, 2007).

3.5 Philosophy of Knowledge

According to Durrant-Law (2005, p16) there are three main philosophies that define knowledge from the point of view of researchers, these are "epistemology, ontology and axiology", also called the philosophical trinity for knowledge (Durrant-Law, 2016). The issue, according to Durrant-Law (2005) has been that a researcher need to state how they feel about knowledge is to them; how that knowledge becomes, and the value of the knowledge. Meaning that each research need to state their way of looking at knowledge (Durrant-Law, 2016); thereafter, it can become easier to explain how the philosophies of knowledge can interact or be aligned so that the research can be implemented. Figure 3-3 abstracts the separate the philosophies of epistemology, ontology and axiology; but it brings them together for the sake of a research project because they are crucially vital to a research (Fellows and Liu, 2008). It shows that the three knowledge philosophies may seem to be separate when they are being examined; but in reality they impact the research in different ways hence they need to be evaluated with this reasoning in mind (Durrant-Law, 2005).

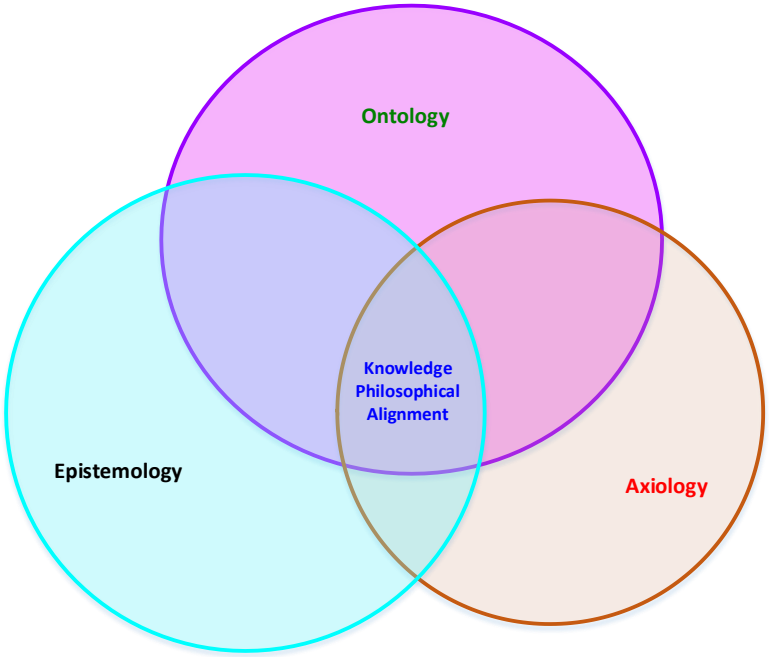

Figure 3-5: Knowledge philosophical trinity and alignment (Adapted: Durrant-Law, 2005, p16)

3.5.1 Epistemology

Saunders et al., (2009, p109) opined that the philosophy of epistemology refers to the way people, as researchers, undertake the study of how we come to know things. The "how" we know things forms the core philosophy of epistemology (Cambridge University, 2016). It means that the origin, structuring and strategies of acquiring knowledge become crucial for a researcher because s/he would be able to demonstrate "what exists" in terms of knowledge (Durrant-Law, 2005; 2016). It implies that the procedure of getting information can validate the type knowledge that can be obtained through what means so that there can be no dispute about the reliability thereof (Cruise 1997, p.343). The importance of epistemology for this research relies in the way the research is designed; if it was all positivists it could have demonstrated that the research process was reliable (Saunders et al., 2009). In other words

it can be argued that ppistemology relates to the study of methods in gaining information. It seeks to establish how people know what they know (Landauer and Rowlands, 2001). It covers different concepts, including the construction of concepts, logical reasoning, including related memories, ideas, and memories (Landauer and Rowlands, 2001). It also relates to the fact that the mind is concerned with reality and seeks to establish the validity or lack thereof of such relationships (Landauer and Rowlands, 2001). Epistemology is significant because it is needed in order to establish what is true and not true by establishing the best means of evaluating (Landauer and Rowlands, 2001). It is important in establishing and gaining information about the world.

However, the concern is not about the ease with which one can demonstrate that the process of getting knowledge was clear and valid; rather the issue is how to use them most ideal philosophy as was justified under interpretivism. However, it was vital to clearly state the importance of the philosophy of epistemology for this research in order to demonstrate that procedure was not the only concern for the research on safety culture in Saudi Arabia.

3.5.2 Ontology

Cambridge University (2016a) defines ontology as a philosophy whose focus is on how knowledge exists. This is a social philosophy of being (Bryman, 2012); highlighting the issue of what is there and how that which is there – in terms of knowledge – actually exists (Crotty, 1998). In other worlds, ontology is a philosophy that demonstrates the insulated view of a researcher's as a worldview of the issue they researching hence forming their own reality and how it exists (Durrant-Law, 2005; 2016). It has been defined by Baikie (1993) as "the science or study of being" and it deals with the nature of reality. Ontology is a system

of belief that reflects an interpretation of an individual about what constitutes a fact. In simple terms, ontology is associated with a central question of whether social entities need to be perceived as objective or subjective. Accordingly, objectivism (or positivism) and subjectivism can be specified as two important aspects of ontology. To this effect a researcher would be finding ontology as a useful philosophy when it comes to how to consider the reality because they can choose to take it as purely objective (Saunders et al., 2009). On the other hand ontology can make researchers choose the subjective part of the research (ibid); in either way, they may not be discounted because the researcher's reality has been expressed in the way they feel it can represent the scenario (Healy and Perry, 2000). The philosophy of ontology is extremely vital to the research because it assures the reasoning that the choice made for how the research has been conducted has been implemented in the best possible way after a deep consideration of safety culture in the construction industry generally.

3.5.3 Axiology

Axiology refers to the study of values. Values often impact on the process of research and the value indicated in the established results (Hogue, 2011). Given (2008), said that, there is a direct focus on the purported value of matters such as human life, knowledge, wisdom, freedom, love, justice, self-fulfilment, and well-being. Axiology has relevance to the field of qualitative research inasmuch as it has a direct bearing on the ethical context of research, offers an important basis for making explicit the assumptions of different paradigms of research, and provides the foundation for understanding. In axiology, the purpose of research is being established (Hogue, 2011). In some cases, research relates to the establishment of a better understanding of how things work, how people usually function

and behave (Hogue, 2011). It seeks to understand phenomenon. According to Heron (1996), axiology is a branch of philosophy that studies judgments about value; and it applies to this research in many ways because without the safety of the people that work in the Saudi industry as well as those that use the built environment the sector would not be thriving. Therefore the philosophy of axiology is extremely vital to the generation of information that can enhance the safety of the Saudi Arabian construction industry.

3.5.4 Influence of knowledge Philosophy on the Research Process

The integration of epistemology, ontology and axiology philosophies is essential for the alignment of the reasoning on a research project, argued Durrant-Law (2005); hence it can be state that the value of the trinity of knowledge philosophy has been considered as crucial for the chosen overarching philosophy of interpretivism. The next section explores the research strategy that emanates from aligned philosophies in sections 3.3 and 3.4 of the thesis.

3.6 Research Strategy

A research strategy or design is simply a grand plan of how to approach the research from the topic to the processes, as designed by the researcher to avoid ambiguity and false leads (Gill and Johnson, 2010). Six research strategies have been identified by Saunders et al (2007) and (Key, 1997), as examined under this section.

3.6.1. Action Research

According to Lingard and colleagues (2008), action researches or Participatory Action Researches (PARs) are studies carried out in order to better the different practices in the healthcare setting. In this case, health practitioners carry out a systematic investigation to assist in their practice, which can then improve the work conditions and setting of users and patients (Koshy, et.al., 2010). The goal for action research is to implement change in the practice (Parkin, 2009). By communicating with different parties and individuals in the healthcare industry, workers can effectively set forth judgments on their actions and decisions in the healthcare setting (Koshy, et.al., 2010). In the action research setting, the researcher has to establish different skills in order to meet their goals. These skills cover improved observation skills, careful planning, and critical reflection (Koshy, et.al., 2010). Meyer (2000; Koshy, et.al., 2010) claims that action researches are advantageous because they specifically want to establish solutions to practical issues; these studies also help empower the practitioners by helping them participate in the research process and to participate in the implementation process. Meyer (2000) has discussed that practitioners are able to evaluate their own field of practice; in some cases, outside researchers can also help identify the issues in the practice, and develop solutions to these issues.

As discussed by Whitehead and colleagues (2003; Koshy, et.al., 2010), action research helps in promoting health, but these types of research are often not acknowledged in terms of their value to health promotion. Healthcare teams are carrying out majority of studies on action research. This may include health practitioners within their specific locality (Koshy, et.al., 2010). Healthcare teams are also involved. Action research projects may also be undertaken

by institutional members (Koshy, et.al., 2010). Some of the researchers would generally take part in the data gathering process, implementation and planning.

Koshy (2010) stated that, action researches are being undertaken in order to establish ways by which improvements in the quality of services, especially in healthcare can be established. Action researches can help improve practice, as it would cover evaluation and critical reflection based on evidence or information gathered.

3.6.2. Grounded Theory Research

Another type of research strategy is the grounded theory research. Phenomenology focuses on the essence of experiences for different individuals. On the other hand, grounded theory seeks to develop theories or analytical processes (Strauss and Corbin, 1998; Creswell, 2006). In this type of study, the participants would have gone through the experiences, having established theory that would have helped them explain their practice and develop a framework for more studies. Primary ideas in the development of theory is not drawn out of nowhere, but is based on data from participants who have gone through relative processes in research (Strauss and Corbin, 1998; Creswell, 2006). In effect, grounded theory is based on a qualitative research design where the person conducting wants to develop a theory on processes or actions, based on the perceptions of different participants (Strauss and Corbin, 1998; Creswell, 2006).

Creswell (2006) who believed that theories being applied in research were sometimes not fit for the respondents being studied. Grounded theorists support the notion that theories must be grounded on information from the field, mostly on actions and different social

processes (Creswell, 2006). In effect, grounded theory has generated theory on actions and processes by collaborating different types of data gained from various respondents. Even through the collaborative actions of Glaser and Strauss (1968; Verd, 2004), these authors still did not agree on the processes and concepts associated with grounded theory. Glaser has also taken issue with the approach applied by Strauss on grounded theory defining the approach as too structured (Glaser 1992). Charmaz (2006; Creswell, 2006) has recently come up with a more constructivist grounded theory, in effect developing another conceptualisation related procedures. Based on these conceptualisations, grounded theory has gained more application in various fields of interest including sociology, nursing, psychology, as well as education. Clarke (2005) has also presented another perspective on grounded theory that suggests further that social conditions must become an aspect of assessment in relation to grounded theory.

Usual approaches to grounded theory include the systematic procedures for Strauss and Corbin (1990) and the constructivist application by Charmaz (2005). Within the more systematic setting (Strauss and Corbin, 1990), authors seek to establish theory, which would help explain actions and interactions on a specific action. Researchers may carry out numerous interviews as he is immersed in the field in order to collect data. Specific categories match units of data made up of incidents and happenings (Strauss and Corbin, 1990). The researcher also seeks to assess data, however, such data are sometimes not applied. The researcher would gather data and they would also initiate analysis. Respondents are usually theoretically selected to assist researchers in developing theory.

Strauss and Corbin (1990) have indicated different categories based on core events. They include causal conditions, intervening elements, and consequences (Creswell, 2006). Grounded theory is often indicated at the end of a study and can take on different forms, including narrative statements (Strauss and Corbin, 1990). Within this grounded theory, Strauss and Corbin have developed the model to cover a conditional matrix. In this type of research, the researcher wants to understand that the main results of the study relates to theories which portray central phenomena, causes, conditions, consequences, and strategies (Creswell, 2006). These specific elements provide structure to the study and any studied phenomena, allowing for an in-depth understanding of any topic or related framework.

3.6.3. Ethnographic Research

In the case of ethnographic research, while grounded theories present theories based on individuals who present similar actions and processes, participants may not be seen in the same setting as frequently, to the point where they secure similar beliefs and language (Creswell, 2006). Ethnographers are focused on assessing shared variables, with the unit for analysis being more than 20 respondents (Creswell and Miller, 2000). Ethnography highlights different cultures. Sometimes small groups of culture, however, the respondent population may be large and may interact with each other (Creswell and Miller, 2000). This is a qualitative method where the researcher considers and assesses learned variables, beliefs, and culture (Harris, 1968). Being a process and result in research, ethnography is a means of evaluating groups with common cultures (Hanson, et.al., 2005). As a process, it covers observations, applying Participants in Contributions, where the researchers is confronted with daily activities and considers different interviews among participants

(Hanson, et.al., 2005). Ethnographers consider meanings, languages, and the relations between the parties sharing culture (Creswell and Garrett, 2008). Ethnography started off within the cultural anthropology setting with Boas and Mead. While these individuals considered natural sciences to power their research, they were different from those applying traditional scientific models (Atkinson and Hammersley, 1994). In recent years, the scientific methods to ethnography have now covered schools or different kinds of ethnography applying theories and aims, including functionalism, feminism, cultural studies, and postmodernism (Creswell and Garrett, 2008). In the current setting, ethnography applies the more critical model (Madison, 2005). Ethnography is also a kind of research where the authors support the emancipation of groups who are oppressed or ignored by society (Thomas, 1993). Researchers who have been politically oriented have set out to object against inequality (Carspecken and Apple, 1992; Creswell, 2006).

Ethnography is applicable where the needs would specify the workings of cultural groups and when they would assess beliefs, behaviour, and language including issues relating to dominance (Creswell and Garrett, 2008). Studies may fail in terms of how they apply to groups especially where some groups would not be mainstream. It is also important to identify the group being studied (Creswell and Tashakkori, 2007). Sometimes this group would have been with each other for a prolonged period of time, to the point where they would share language, behaviour, and attitudes (Creswell and Tashakkori, 2007). Some groups may be marginalized.

3.6.4. Experimental Method

In this method, the goal of the researcher is to secure changes in the environment using treatments and specific procedures in order to make different conditions constant, except for the independent variables (Ross and Morrison, 2004). Such standard elements have allowed for a high level of internal validity. Where internal validity has been high, gaps between the groups may be sufficiently associated to treatment, in effect cancelling out other hypotheses (Ross and Morrison, 2004). In general, researchers have not focused much on external validity. In the previous century, the experimental method has stayed consistent despite changes in the paradigm in terms of learning and constructivism (Ross and Morrison, 2004). It is clear that the positivism associated with the behaviouristic theory has established a fertile setting in terms of the establishment of causal links in relation to variables. The use of the cognitive learning theory did not change such perspective. At present, more influence from the constructivist theories was observed.

3.6.5. Survey Method

In the survey method, different data is collected from sample respondents based on their answers to questions posed to them (SagePub, n.d). This type of method is efficient in gathering data from different individuals within the educational setting. Different researchers use this method in gathering data. Surveys have also become an important tool in measuring aspects of society which cannot be reported through newspapers or TV news. This method credits its application to its ability to apply to a generalized population (Krosnick, 1999). Firstly, this method is known for its versatility. This method has been used to assess different aspects of education and learning, including leadership and teaching

(SagePub, n.d; Okoli and Pawlowski, 2004). While surveys are not considered ideal tools for learning in most educational settings, a sufficiently designed survey can help improve the people's conceptualisation of educational issues (SagePub, n.d). Different topics can be covered by surveys and they can be efficiently applied in different variables without incurring costs or time. Survey data can also be gathered from individuals at low costs and fairly quickly. These methods support even large populations (Forza, et.al., 2002). This method is therefore appealing where large populations are being evaluated. This type of research is often applied to establish a clear image of the population, with its related qualities.

3.6.6. Case Studies

In case studies, an issue is evaluated using different cases within the context of a bound system. Stake (2005) mentioned that this type of research is not a method, but is actually the topic being studied. In other instances, it is considered a comprehensive method of research (Denzin and Lincoln, 2005). As a method, it is a considered a qualitative design where the researcher would evaluate the case or cases using specific strategies of data gathering (Ivankova, et.al., 2006). Programs are also possible subjects of study. This approach is often used by social scientists especially in the field of psychology, law, political science, and medicine (Ivankova, et.al., 2006).

Different approaches have also been made available, in both qualitative and quantitative approaches in case study development (Yin, 2003). Merriam (1998) has also established the more general perspective to qualitative case studies. Different kinds of qualitative case studies are differentiated based on the size for the bounded case (single, multi-parties,

groups, or activities) (Ivankova, et.al., 2006; Creswell, 2006). They may also be differentiated based on the intent for the case study.

a. Single Case Studies

These studies usually involve single subjects studied in the duration of the study. Most times, there is only one opportunity to carry out the observations and the study (Yin, 2003). As such, specific and clear methods of research during the case study have to be carried out in order to prevent any issues in the course of the research. Case study research excels at bringing us to an understanding of a complex issue or object and can extend experience or add strength to what is already known through previous research. Case studies emphasize detailed contextual analysis of a limited number of events or conditions and their relationships. Researchers have used the case study research method for many years across a variety of disciplines. Social scientists, in particular, have made wide use of this qualitative research method to examine contemporary real-life situations and provide the basis for the application of ideas and extension of methods. Researcher Yin (2003) defined the case study research method as an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used (Yin, 1984, p. 23).

Stake (1995) Critics of the case study method believe that the study of a small number of cases can offer no grounds for establishing reliability or generality of findings. Others feel that the intense exposure to study of the case biases the findings. Some dismiss case study research as useful only as an exploratory tool. Yet researchers continue to use the case study research method with success in carefully planned and crafted studies of real-life situations,

issues, and problems. Reports on case studies from many disciplines are widely available in the literature.

b. Multiple Case Studies

Yin (2003) has promoted the use of multiple case studies where the researcher repeats procedures for the different cases. In general, qualitative studies do not want to make generalisations in their cases (Creswell and Fetters, 2004). The researcher has to consider sufficient cases to include in the qualitative study. Another design is the use of the intrinsic study where the focus would be the actual case (Creswell and Fetters, 2004). The actual case would usually present unusual scenarios. This approach is appropriate where the researcher has sufficiently identified cases and has set out to ensure a clear understanding of the cases (Tsui, 2002). Such cases would include individuals, groups of individuals, activities, programs or events.

Baucus (1994) stated that, the strength of conclusions from case studies is not very high, and it is claimed that the use of multiple cases yields more robustness to the conclusions from the study. The reason for this is not, as the quantitatively oriented researcher might assume, that the sample is bigger. Instead, the reasons lie in other important aspects. Multiple case studies distinguish themselves from, for example, surveying many persons about something instead of one, or, increasing the number of subjects within an experiment. Lee (1997) said that, instead the usage of multiple cases should be regarded similar to the replication of an experiment or study. This means that the conclusions from one case should be compared and contrasted with the results from the other case(s).

Bengtsson (1999) mentioned that, the number of cases needed to be performed to increase the sample and also increase the statistical strength, would require more cases than what is probably afforded or even available. Instead the selection of the cases for multiple case study is categorized into two types of selection. Lois (1995) stated that, the literal replication means that the cases selected are similar and the predicted results are similar too. The theoretical replication means that the cases are selected based on the assumption that they will produce contradicting results.

3.6.1.1 Case Study Design to Facilitate Interviews

Thomas (2011) defines a case study as an opportunity that allows for the analyses of persons, events, decisions, periods, projects, policies, institutions, or other systems that are studied holistically by one or more method. As part of the qualitative data collection approach, the researcher used managers from the three construction companies earlier alluded to in section 3.6.6. The rationale for selecting managers was to seek key performance information with regards to safety culture and safety performance. It was envisaged that because managers are entrusted to implement various operational elements of construction, there was a high likelihood of obtaining clarified information about safety culture and safety performance in the work place.

The request to undertake case study on the 3 organisations led to an estimation of 15 different managers; these were requested to participate in the research process. Only 8 of them responded positively to the request and were able to provide information about their view of safety culture and safety performance. However, there was an advantage in using the 8 managers because they brought experiences from various projects that they have

worked on. It turned out that information from multiple case studies was collected from the 8 managers, whose three organisations.

The main design for the case study was to structure the process of getting information in a streamlined manner in order to maintain consistency. For instance, questions for discussions were raised in a similar manner; subject – specific (Depoy and Gitlin, 2015). This method was preferred because it facilitated the uniformity in of analysis (Depoy and Gitlin, 2015). In effect, if a case study is conducted in one work place, the single case design would apply, but where the case study is carried out in different workplaces, the case study design was transferred to other cases (Depoy and Gitlin, 2015). The type of design chosen was also based on various elements.

In testing the consistency of an event or phenomena over various settings, the multiple case study design would be the best approach (Depoy and Gitlin, 2015). In considering the holistic and embedded qualities of these case studies, where the workplace for instance would be treated as one unit of analysis with the end goal of establishing one single plan of action, the unit of analysis would be considered holistic (Depoy and Gitlin, 2015). However, if the workplace would be considered as segmented or made up of different parts, the workplace would still be treated as a case, but one which is also embedded with different parts (Depoy and Gitlin, 2015). In relation to the holistic single case study, this process unfolds only once within a single case. For holistic multiple case studies, there is an evaluation of global units of assessment carried out several times (Depoy and Gitlin, 2015). In the embedded single case study, there is a focus on the different parts of the single case and in the embedded multiple case study, the focus is on more than one case with its related

parts (Depoy and Gitlin, 2015). For this research, the multiple case studies were applied because the research has studied one phenomenon or problem under different work settings. It was also applied the embedded approach because the different aspects of assessment or evaluation have naturally different parts which would actually provide relevant information. In understanding the different aspects of the workplace and the organisational culture in the construction industry of Saudi Arabia, it is possible to actually establish relevant information which can be useful for this research.

3.6.7. Justification or using multiple Research Strategies

The main justification for adopting multiple research strategies has been the decision to adopt mixed methodology, which works well with the philosophy of interpretivism (section 3.3.3). It implies that this research has been designed to adopt these strategies: multiple case studies, interview survey and questionnaire survey strategies. The other reason for doing multiple strategies was to facilitate the process of choosing varied participants - individuals and organisations a like – and increase the chances of improving the response rate. To this effect, three construction companies in Saudi Arabia accepted to participate in the case study process; two of which are private companies and the other a government company. The case studied within the research had to do with an analysis of factors affecting implementation, the impact of culture on safety, and the organisational culture in place at the various organisations and how these cultures impacted on safety culture. Similar issues were examined in the survey (interview and questionnaire); which meant that the survey was conducted in a manner that establishes the influence of safety culture. This study adopted the survey design because it is a methodology that is used to explore a single phenomenon

(the case) in a natural setting using a variety of methods to obtain in-depth knowledge (Collis and Hussey, 2009. p.82). Because safety culture has the ability to determine performance output, the influence of safety culture was further expanded to include the safety performance. The theory that had to be developed as part of the inductive approach therefore impacted on the culture of safety and safety performance.

3.7 Methodological Choices

After explicitly selecting the philosophy of interpretivism for the research, as stated in section 3.2.5, the natural progression is to examine the research methodology that could be aligned with the philosophy (Creswell, 2012). By definition, research methodology is the theory of how research should be undertaken (Saunders et al, 2009, p.3) in order for the process to be recognised as a true reflection of the key principles in research (Gill and Johnson, 2010). In reality, though, many people misplace this meaning by stating that research methodology refers to data collection techniques; and this is a real issue that needs to be clearly avoided (Saunders et al, 2009, p.3). The theory of research has established that methodology can only take three forms – these are quantitative, qualitative and or a mixed methodology – which is a hybrid of both qualitative and quantitative methodology (Dawson, 2007). The driver for the choice of a particular methodology has been the research philosophy, argued Dawson (2007); meaning that the researcher can decide to be objective or to allow elements of subjectivity in the research process, for as long as the philosophy demands elements such as empirical evidence and the like (ibid; Woodside 2010). If, however, the research needs other forms of data, the research methodology can be useful to

determine how best design the process (Woodside 2010). Sections 3.4.1 to 3.4.3 explore the three research methodology that Dawson (2007) and Woodside (2010) referred to.

3.7.1 Quantitative Research

Quantitative research is associated with the application of statistical analysis to establish a link between the known and what still can be known about a specific research topic (Soiferman, 2010; Neuman, 2005). The methodological theory of quantitative research, if implemented could allow for the collection and analysis of data in quantitative methods; including the conceptualisation of relationships within variables applying descriptive or inferential statistical methods (Adcock, 2001). With quantitative research methodology is it possible to use descriptive statistics in order to establish inferences on a specific group of people and to determine the limitations for such population (Trochim, 2006; Winter, 2000); while inferential statistics use descriptive statistics including the assumptions made for the population based on a specific sample (Trochim, 2006l Hammersley, 2002). Based on quantitative research methodology, it may be possible to secure some physical representation of the data by using tables, charts, resulting in conclusions that are logical, and are based on evidence (Trochim, 2006). The philosophy that can allow such a research methodology would need to design their work under the positivism philosophy; therefore, it become inadequate for a research issue that is non quantitative or has its premise on social-cultural tendencies of people's behaviour and practice.

3.7.2 Qualitative Methodology

According to Saunders et al., (2009), qualitative research methodology is a theory that uses the qualitative based data that is obtainable from the detailed analysis of the information from participants in the research; including the way the information is connecting the participants, their social networks, and many other informal ways to gain the information (Creswell, 2012). With qualitative research methodology, the researcher would consider the perspective of the participants by presenting general questions, gathering data from respondents, analysing answers and grouping them into themes, carrying out research using both subjective means (Soiferman, 2010; Howe and Eisenhart, 1990) and objective means for as long as the situation allows. Qualitative research methodology is not rigid in terms of securing answers to different questions in the research; it also allocates much time in the field in order to establish data analysis, and implementing social and human centric information s (Bernard, 2011); hence obtaining deeper views and analyses from the participants. This implies that there are times when the data that is collected is numbers; but used in categorisation of qualitative data so as to ensure the theory of qualitative research methodology is maintained (Dawson, 2007). This methodology lends itself well to the philosophy of interpretivism because it allows the researcher to deal with the contextual as well as situational circumstances when collecting the information as well as when analysing it (Woodside, 2010; Saunders et al., 2009; Creswell, 2007). For this reasons it is justified that qualitative research methodology has been considered to be cardinal to this research because it aligns well with the philosophy of interpretivism. It also shows great value to the knowledge of the participants, hence supporting the trinity of epistemology, ontology and axiology.

3.7.3 Mixed Research Methodology

Considering that the issue of safety culture has elements that can be researched, measured or assessed using both quantitative and qualitative research methodology, it was vital to assess if there was a possibility of using a hybrid of the two methodologies, as promoted by Dawson (2007). Therefore, mixed research methodology is a theory that articulates that a researcher could find situations where they would need to use both quantitative research methodology and the qualitative one in order to implement a robust research process for their project (Creswell, 2012). On one hand the research can implement the quantitative centric research process that could fit the scientific based data; and on the other they can add or use social based data that can articulate the way people feel and the way they relate to the information they are giving (Gill and Johnson, 2010).

3.7.4 Justification for using Mixed Methodology

The issue of safety culture in the Saudi Arabia construction industry cannot be addressed using a single research methodology because there is a need to benefit from the possibility of gathering both qualitative and quantitative based data; hence it can be justified to use a mixed methodology (Dawson, 2007). The other reason to use mixed methodology is that there are is a possibility to use both quantitative and qualitative data to supplement the analysis and explanation of the research; for instance the results would be explained using descriptive statistics while the rationale for how participants respond could be added because of the social side of the arguments (George and Bennett, 2005). Therefore it was envisaged that qualitative and quantitative research methodology would complement each other (Creswell, 2007); even if the research philosophy is interpretivism (Saunders et al., 2009).

3.8 Time Horizons

Saunders and Tosey (2012, p59) define time horizon as the overall time period taken for the research to be conducted. Even though the driver for time horizon have not been examined, the availability of financial resources for research is highly ranked (Dawson, 2007).

3.8.1 Cross Sectional

Saunders and Tosey (2012, p59) explained that when a researcher addresses an issue at a particular time, they adopt a snapshot view of the issue, hence they are presumed to take a cross-sectional view because they do not stick to the same issue over a long period of time. A good example is a survey or a case study (ibid). This research adopted a cross-sectional time horizon because if used cross section and a survey.

3.8.2 Longitudinal

According to Saunders and Tosey (2012, p59) longitudinal time horizon is a situation where the researcher takes a very long time period to address a research issue; the long time period is necessitated by the long time it takes to collect data. Examples include experiments, action research and the like (ibid). This time horizon was not used for this research because of time it takes to collect data and how prohibitively expensive research has been.

3.9 Research Technique (Methods)

The term research methods, according to Saunders et al (2009, p.3) refers to "techniques and procedures used to obtain data that is needed to analyse" before conclusions can be made. Good examples include questionnaire, observation and interviews, among others. The techniques used in the data collection process were very much fundamental in the research

process. These techniques were used to serve the research as it is concerned with various aspects of implementation of the culture of safety in the construction industry. Primary data entailed data gathering by the researcher from respondents through questionnaires and interviews. Secondary data involved all the information from secondary sources such as publications (books, journals, newspapers and magazines), online sources and published researches on the topic.

3.9.1 Interviews

Interviews are more flexible and dynamic methods when compared to questionnaires in terms of gathering data (Seale, 2011; Verd, 2004). These interviews are also able to gather data with much more detail and depth. It can also be a more sensitive and friendly method of data gathering and an easier means for drawing constructs from answers (Seale, 2011; Talmy, et.al., 2010). Changes in responses can therefore be credited to participants. By conceptualising questions in the way for all respondents, a standardization of questions can be set forth (Seale, 2011; Silverman, 1973). However, this is not usually the case for interviews as questions may be phrased differently for different respondents. In general interviews, are used to gather qualitative information, and coding can then apply to the responses (Seale, 2011; Bryman, 2006). Surveys apply questionnaires, which are usually distributed to a large population. This is seen in quantitative studies. Benefits for interviews include the possibility of asking complicated but explainable questions (because the interviewer is present); interviews are usually longer because there is more time to ask follow-up questions; there is also more coverage in terms of questions asked (open

questions); visual aids can also be used to clarify; interviewer can also manage the context and the setting where the interview would unfold (Seale, 2011; Britten, 1995).

However, issues have also been noted in interviews, especially in terms of costs, which can limit the conduct of the survey and the size or coverage (Seale, 2011; Britten, 1995). There may also be bias during the research process that can impact on how reliable answers may be. Biases may also be seen in terms of how the questions are presented, or in terms of the personal opinions of the interviewer (Seale, 2011; Flaherty, et.al., 1988). Telephone interviews and computer-assisted interviews have become the newer means of carrying out interviews (Seale, 2011; Flaherty, et.al., 1988). These systems have become more convenient for both researcher and interviewee because of time convenience, and because it costs less. Responses may also be entered directly into the computer (Seale, 2011; Reich, 2000). As such, these methods of conducting interviews have become the cheaper and the quicker means of carrying out surveys. There are also fewer effects observed in relation to the interviewer (Seale, 2011; McLellan, et.al., 1980). In effect, the interviewer's personal qualities would have less of an impact on the responses (Seale, 2011; Straub, 1989). These methods are also not as intrusive as face-to-face interviews.

The advantages and disadvantages of questionnaires also have to be presented (Seale, 2011). Surveys are usually presented through these questionnaires; as such, the questions have to be simple and must be easily understood (Seale, 2011; Vaughn and Leff, 1976). They also have to be complete and clear because there is no interviewer who can clarify the questions. Surveys administered using these questionnaires can be beneficial where the respondents would want more time to consider or gather data (Seale, 2011; Wilkinson and Birmingham,

2003). Surveys applying self-completion questionnaires enjoy some advantages as compared to face-to-face interviews. For one, they are very cheap and they support more geographical coverage as compared to the face-to-face interviews (Seale, 2011; Horner, et.al., 2004). They are valuable in implementing research where the respondents are not found in one location. In applying self-completion questionnaires, the bias error is decreased and the interviewer can be anonymous for the interviewee (Seale, 2011; Esposito, 2001). Self-completion questionnaires are nevertheless welcomed because they are usually short and simple (Seale, 2011; Voss, et.al., 2002). Unfortunately, there is also less control over who actually answers the questionnaire.

The interviews are collection methods where prepared questions are asked of the respondents in order to gain their insight on the subject matter of research (Harrell and Bradley, 2009). These interviews usually involve personal face-to-face meeting between interviewer and respondent (Harrell and Bradley, 2009). In some cases phone or video interviews are also conducted (Harrell and Bradley, 2009). There were fifteen interviews done with five respondents each from the three construction companies chosen for this study. Appendix one shows the ethical approval for the interview template and questionnaire template that were used in the survey.

Selection criteria used were the following with specific details on experience and position in the company presented in the table below.

- Worked with the company at least three years. These represent years of being in the construction company having experienced its issues and having experienced the different implementation of policies.

- Worked in the construction setting/site at least 2 years. On-field or on-site experience is important in order to get an idea of how these workers felt being exposed in the site with or without safety policies/resources.

- With experience in a management position in the construction industry for at least 1 year. Managerial position would help establish insight on whether or not policies are being implemented on-site and how these policies are being implemented on the field.

Table 3-1 summarises the research participants used in collecting interview data. There was no position preserved for managers; except any participant who had been allocated management responsibilities was found to be ideal for the research.

Table 3-1 Characteristics of interviewees

Interviewees	Position	Experience
1	Foreman	7 (3 years on-site; 4 as foreman)
2	Foreman	10 (4 years on-site; 6 as foreman)
3	Safety officer	7 years on site as safety officer
4	Safety officer	9 years on site as safety officer
5	Safety Engineer	12 years on site as safety Engineer
6	Safety Engineer	16 (7 as foreman; 9 years on site as safety Engineer)
7	Architectural Engineer	10 years as Architectural Engineer

8	Architectural Engineer	20 years as Architectural Engineer
9	Mechanical Engineer	19 years as Mechanical Engineer
10	Electrical Engineer	24 years as Electrical Engineer
11	Civil Engineer	17 years as Civil Engineer
12	Site supervisor	22 (8 years as Engineer, 14 years as site supervisor)
13	Project Manager	33 (10 as Civil Engineer, 23 as project manager)
14	Project manager	35 (11 as Civil Engineer, 24 as project manager)
15	Project Manager	27 (10 years as Civil Engineer, 20 years as project manager)

Management responsibility, therefore, did not focus the hierarchical structure of the organisation; rather on the role they played projects so as to obtain their view on safety culture and safety performance.

3.9.2 Questionnaire Survey

For the survey data collection, self-administered questionnaire were used to gather raw data on safety culture in the construction industry. A total population (N) for the survey was impossible to determine because it included all participants with management responsibilities. This meant that population was unknown at the time of the survey. However, using the register of organisations in the industry, the questionnaire survey was

sent out. A sample (n) of 250 requests of questionnaires (Please refer to Appendix two) were distributed to participants that fell under the following characteristics: high level "directors", medium level "supervisors and managers" and operational level "foremen and leaders for operatives".

After this, a minimum of 135 completed questionnaire responses were expected to be received from the participants. With 135 completed questionnaires expected, a total of 250 questionnaires would be reasonable for distribution in order to expect minimum return rates. As a result of this, more than 20% return rate was expected, which is practical for obtaining research findings. This ensured and promoted fairness and validity in the data collection, as issues of preferences for responses were done away with. Some of the data to be collected referred to how the safety culture overlaps with organisational culture and safety in the construction industry. This was expected to help in the generation of important data and information, which were then analysed with the help of the graphs and tables, using excel. The questionnaire on the other hand was administered to 250 employees. The questionnaire was selected for this sample size mainly because of their number, which is considered very large for any data collection exercise that requires a one-on-one data collection approach. Easterby-Smith et al., (2002) mentioned that, questionnaires have been noted to be very ideal for quantitative studies as they enhance the systematic collection of data that can easily be analysed with a quantitative strategy. The table 3-2 summarises the research methods used in this research.

Table 3-2: Describes the research method which was used

Objective	Strategy	Techniques	Type of Data
1. To investigate the type of organisational culture prevailing in the construction industry in Saudi Arabia.	• Literature Review • Primary Data: ▪ Case Study ▪ Documents Review "findings"	Interviews	Qualitative
2. To explore the impact of the safety culture on safety performance;	Survey/ Case Study	Questionnaire survey Interviews	Quantitative & Qualitative
3. To discuss the safety policies practiced in the construction industry of Saudi Arabia.	Case study/ 3 multiple	Interviews	Qualitative
4. To explore factors affecting implementation of safety culture in construction industry of Saudi Arabia	Case study/ 3 Multiple	Interviews	Qualitative
5. To develop a framework on safety culture leading to better construction safety performance in Saudi Arabia	• Primary data • Secondary Data	• Questionnaire survey • Interviews	Qualitative and Quantitative

The research process was started by exploring and collecting the data from different sources and by using multiple sources of evidence: survey, semi-structured interviews, direct observation and document analysis in an attempt to develop a best practice model for safety culture in Saudi Arabia construction industry. The secondary sources of data used in this

research, involving: critically reviewing previous research, reports, records and documents on safety culture from different perspectives, while primary data entailed data gathering by the researcher from respondents through questionnaires and interviews; executives of the public and private sector in KSA. The research approach for this study will be presented and summarised in chapter 6 based on the outcomes of the primary data and secondary data as well.

3.10 Data Analysis

The data analysis techniques refer to the techniques or methods applied in analysing, presenting, and understanding the research results. According to Collis and Hussey (2009) research has two types: quantitative and qualitative. Quantitative involves steps that start with theory and end with conclusion, also it focuses on number and its strategy is deductive and objective. Qualitative research emphasises on words rather than quantification; it is inductive and subjective (Bryman and Bell, 2007). This research adopts both qualitative and quantitative approaches, also known as the mixed-method approach. Tashakkori and Teddlie (2003) argue that multiple methods are useful as they provide better opportunities to answer research questions (Please refer Appendix three and four) and allow better evaluation of the research extent. In addition, the quantitative data gathered from questionnaires, were analysed using SPSS software, and the qualitative data, collected from interviews, were analysed using Thematic Analysis to generate an understanding of the interviews.

3.10.1 Qualitative Data Analysis

This type of analysis seeks to narrow down significant information from a variety of sources, thereby gaining data on the research question. Descriptive data helps provide data to be interpreted and it can include transcripts from the interview, survey data, videos, and pictures. It usually focuses on impressions and interpretations by the researchers. Themes are analysed based on data gathered.

Each of the participants was asked about the safety policies and safety culture in their organisation while explaining the challenges facing the implementation of safety policies. The following sections summarise their opinions based on the questions they were asked. Data collected from the respondents included their work experience with the company and with the construction industry in general, their experiences in the field, their experiences in terms of safety, and their experiences in implementing safety in the construction industry. These questions were all related to answering the objective on the factors affecting the implementation of the safety policies in the Saudi construction industry, safety policies practiced in construction industry of Saudi Arabia, and the impact of safety culture on safety performance.

The researcher used themes from interviews in order to generate an understanding of the interviews. The interviews were analysed based on each question separately. All interviews were transcribed, and then carefully and repeatedly read to generate codes that are relevant to the questions asked. Each interview was analysed separately. Following the generation of codes (ideas), the researcher formed themes that are directly linked to the questions asked.

Along with that, the researcher states the number of participants who agreed or mentioned similar answers in reference to the different themes.

3.10.2 Quantitative Data Analysis

This type of analysis is generally numerical and can be gathered from different forms with related forms and data. SPSS a statistical analysis software is often applied to summarise and define the quantitative information using graphs and tables to visualize raw data gathered. This analysis is also quantifiable based on statistical results and outcomes. This data analysis presents evidence based on the numerous data gathered. The analysis process helps simplify the data and establish the meaning behind such bulk of information. This type of analysis also uses numbers in order to discover and describe the patterns in the data.

The questionnaire measured the safety culture using 135 participants and the safety culture was measured using 56 items. Factor analysis allows the researcher to standardise the questionnaire and discover latent uncorrelated variables (components/factors). Each variable includes a number of correlated items/observations. The maximum number of components equal the number of items included. Principal component analysis arranges components in a way that the first component usually measures for most variances i.e. counting for most of the variability in a given data, followed by the consecutive component and the last component usually counts for the least variance. Furthermore the researcher used Varimax Rotation (assuming items are not correlated) to establish the loadings of each item on the extracted factors; items are then arranged and sorted by the loading on each factor, by size, i.e. items that load highly on one factor come first and arranged by order of loading size. Only components that have an Eigenvalue above 1 will be included. To

conduct principal component analysis, the sample has to be adequate. Factor analysis is sensitive to the sample size and generally needs a big sample to enable reliable outcomes. To test the sample adequacy for this analysis a KMO (Kaiser-Meyer-Olkin measure) test of sampling adequacy was conducted.

3.8.3. Mixed Methods Analysis

This combines both the features of qualitative and quantitative data analysis. This type of analysis includes the observational and thematic elements of analysis in qualitative research and also the numeric and statistical tools of quantitative data analysis. The data collected during the secondary and primary data collection exercises were subjected to a mixed approach analysis procedure, made up both qualitative and quantitative data analysis procedures. The emphasis however was on quantitative analysis, where various forms of statistical procedures were employed to find the correlation between key variables of the study. Specifically, culture and safety was used as independent variables, which were correlated against safety performance to find the relationship that exists between these. It is only based on such data analysis approach that the aim of the study in terms of the culture and the safety of the project were best visualised.

There were two sets of participants for this research, with one set for the interviews (qualitative) and another set answering the survey questions (quantitative). There were fifteen participants all in all for the interview, all managers from three chosen construction companies. The interview, with the permission and written consent of the respondents was voice recorded. The tapes later sent back to the participants at the conclusion of the study for their disposal. The interview was conducted at a pre-scheduled time and set at the

respondent's convenience. The interview took about 10-15 minutes at the latter's office during his/her free time. The respondents for the questionnaire included 250 respondents chosen through purposive sampling from the rank of managers, engineers, foremen and labourers from different construction companies chosen for this research. Those consenting to be respondents were given a copy of the questionnaire to be answered at their convenient time. There was more than 20% rate of return expected so about 135 questionnaires were expected in the data collection process.

The field test for this study relates to the pre-test as explained above and also the field test in terms of the timeline for the conduct of this research. This was also undertaken in conjunction with the pre-test survey questionnaires and interview in order to evaluate which questions needed to be changed, explained further, eliminated, or improved. The field test revealed that some questions had to be modified in order to improve clarity and some questions were removed for being redundant while new questions were added in order to support the objectives of the research. The length of time allotted for the conduct of the research, the distribution of the questionnaires, the retrieval of the questionnaires, the tabulation of the results, and the analysis of the data was also tested. It revealed that more time had to be allotted to the data collection process including the analysis of the data. Additional research assistants have also to be recruited in order to help in the data collection process including the tabulation of data, the transcription of the interviews, and the statistical analysis.

3.11 Reliability

The reliability of this research has been ensured through a re-test where a pre-test population was given the same survey and interviews on two separate occasions. The pre-test population was also another construction companies and the sample population covered 135 managers, engineers, foremen and labourers. The pre-tests were undertaken one month apart in order to avoid the memory effect from the respondents. With the results of the survey being highly similar to each other, the study and survey test was deemed to be highly reliable. As for the interview, a pre-test was also undertaken with 15 interviewee managers from three construction firms. Themes from the interview were drawn by three other researchers and similar themes were noted from the interviews which were then used to guide the current research.

Reliability is generally about assessing how free from errors the results are. Through a pre-test conducted, it was possible to anticipate and revise the conduct of the research, especially the use of the data gathering tools. Where the tool used to measure accurately applies similar scores to individuals or participants; instruments or measures are considered reliable. The data gathering tools (questionnaires) measured different respondents in a similar manner. Reliability covers consistency or the possibility to replicate. The different tools and processes described specifically in this research allowed for replication of the research process. Reliability seeks to consider changes in the respondent population. It considers the instrument used, its subject/respondent population, test samples, which may not be similar across related scenarios or settings. It is important also to note that reliability considers functions and scores in test from instruments, but not the actual test (Thompson, 1999). In

general, reliability considers sources and measurement issues which may be seen in the administration of tests (Crocker and Algina, 1986). Zikmund (2003) discusses two elements cover the concept of reliability, including replicability as well as internal consistency.

Homogeneity in groups is also considered influential where considering the test samples. Under these conditions, issues on the coverage of test groups cover a small part of the population. Gregory (1992) discussed that it is important to consider the actual application of the instrument when assessing related circumstances and in considering the application of related instruments.

Related time issues present with different issues. Test takers who consider related rates have differences in terms of correspondence, often exaggerating the reliability of testing processes. Such situation is at issue where the application which the tool wants to assess is not consistent (Gregory, 1992). The association between reliability and issues in difficulty seeks to consider variability. The link between reliability and difficulty in the item considers variabilities in issues. In general, where the instrument for testing does not have any variability in its questions, scores in reliability would often be affected. Also, reliability considerations may also be affected where the test has difficult items. Uneducated guesses are propagated in this case. In the end, the length of the test also considers reliable estimates. Also, longer tests can lead to more estimates made on reliability. Still, it is important to evaluate the gains in reliability which can be drawn from related circumstances, especially with long tests not being ideal.

3.12 Internal Validity

The internal validity of this study was established by evaluating whether any possible changes in the safety of the construction industry in the KSA can only be directly attributed to the introduction of a safety culture in the said industry. A single-group test was carried out also during the pre-test in order to detect any other factors impacting on the respondent behaviour. Some open-ended questions were also used in order to detect any factors affecting respondent behaviour in matters relating to their safety and their safety behaviour. There were no other threats or factors noted to have any impact on the respondent answers and safety behaviour.

Internal validity is also applied in relation to causal reasoning or causal outcomes and for the sufficiency of the measurement applications (McKay, 2007). In this study, this validity is applied broadly in relation to the validity of the target population or sample.

3.13 External Validity

The randomization process conducted during the selection of the respondents helped to improve the external validity of the research results. The construction industries chosen for this research were also randomly chosen from a list of construction companies in the KSA. As a result, the generalizability of the results was improved. External validity considers how the results can be generalized including the extent the findings can apply to different settings, and different populations (McKay, 2007). Threats to external validity are based on the extent by which generalizations based on people and places, including times and

statistical variables can be made (Cook and Campbell, 1979; McKay, 2007). Threats also cover related interactions in relation to the settings where participants are seen.

3.14 Ethical Considerations

Participants to research have to take part through a voluntary process, without coercion (Economic and Social Research Council, 2011; Kimmel, 2009). In all instances, researchers have to notify their subjects that they can refuse if they want or refuse to further cooperate should they wish to withdraw participation. There must be no coercion of research participants in order to promote valid results (Economic and Social Research Council, 2011; Kimmel, 2009). This is associated with covert studies and deception in research.

There are specific ethical guidelines that guide the conduct of academic and professional research of this nature. In this study, all these ethical guidelines were followed fully. Particularly with the primary data collection process, the researcher ensured that all necessary permissions that ought to be granted were sought from the companies from whom data was gathered (Rossi, et.al., 2009). This was done by preparing a consent form and presenting it to the managers in charge of the companies. If the mangers identified operatives (labourers) to participate in the research, their opinion was channelled to the researcher like any other research participant. This implies that labourers did not need to channel their opinion through managers; they were treated like any other research participant.

The consent form spelled out all the aims and objectives of the study, as well as rationale for the study and the reason the companies were being requested to be part of the study

(Emanuel, et.al., 2000). The roles that the researcher was expecting the companies to play were also outlined in the consent form. Even more, the consent form was to give assurances to the effect that data collection was undertaken anonymously and confidentially (Munhall, 1988). As part of the need to ensure confidentiality and anonymity, no respondent was identified by name. Portney and Watkins (2000) also discuss that after the main data collection exercise and all data analysis have been performed, the researcher returned the completed instruments to the companies to be discarded.

There are different principles related to the research ethics model. One is that research has to be assessed and carried out in such a way as to promote quality (Economic and Social Research Council, 2011; Jacobsen and Landau, 2003). This is at the very core of research and does not need much explanation. It would imply that researchers have to guarantee that at the onset, the development of proposals is based on a commitment to researcher which accounts for the best quality in research (Economic and Social Research Council, 2011; Flewitt, 2005). Accountability covers different principles and quality is based on an effective scientific design, the possibility of expected issues and how these issues would be managed, as well as the different ways objectives would be met (Economic and Social Research Council, 2011; Smythe and Murray, 2000).

Research respondents and staff have to be taught about the goals, processes, applications, and participation in research, including possible risks (Economic and Social Research Council, 2011; Greene and Hogan, 2005). Differentiations are allowed in various research conceptualisations. This principle reinforces the foundation of informed consent (Economic and Social Research Council, 2011; Morrow and Smith, 2000). Informed consent includes

the process of providing as much data as possible on research in order to allow participants to develop a good decision on involvement expected (Economic and Social Research Council, 2011; Hill, 2005). In general, such data have to be written and be supported by the research subjects. In instances where consent does not have to be gained, it must be fully and justifiably supported.

The researcher independence must therefore be very clear and any issues on interest must also be indicated (Economic and Social Research Council, 2011; Meade and Slesnick, 2002). The research has to be carried out in the sense that it helps promote professional validity in its design; the direct and indirect participation of colleagues and related collaborators have to be recognised (Economic and Social Research Council, 2011; Harris and Atkinson, 2013). The Economic and Social Research Council (2011) discusses that investigators have to guarantee that no conflict of interest is seen and the relationship of funding and researcher impact on results is also specific, especially as far as the application of subsequent data is concerned.

Researchers also have to consider in general result publication, where they are seen by the media to relate to sufficient publication in the work (Economic and Social Research Council, 2011; Berry, et.al., 1994). Media coverage should not affect the participation of respondents, nor should it breach their confidentiality (Economic and Social Research Council, 2011; Harris and Atkinson, 2013). It is important for the link with the media to be based on the actions of the research team including the researcher.

3.14.1 Considerations for Confidentiality

The main considerations for confidentiality of the data collection process for this research formed a core issue in the ethical approval as well as the design without compromising on the quality of responses (Economic and Social Research Council, 2011; Casarett, 2005). This meant that anonymity was paramount; therefore no one was asked to put their personal details; only official positions were necessary to the survey because they indicated the level of responsibility that respondents had (Casarett, 2005) – see ethical approval section of appendix one. This step was a necessary part of the data collection process, and it sufficed for this research because it allowed for free expression of opinions without fear of the reprisals or reprimands from authorities. In addition, sufficient plans also had to be undertaken in order to properly store the research data. The researcher ensured that the confidentiality of the respondents would be protected at all times by assigning numbers to both questionnaire survey respondents and interviewees. No names appeared on the answer sheets or interviewee transcripts; only the name of the researcher with the corresponding numbers for the respondent appeared on any paper. Only the researcher could access these names and information that respondents filled because all files were stored on a password protected document and password protected personal computer. The ethical committee of the university was also informed of the proposition that all the raw data will be destroyed two years after the defence of the PhD examination; to which they agree.

3.15 Chapter Summary

This whole research work has been conducted by focusing mainly on the relationship between culture and safety with safety performance. In this study, it was envisaged that

using interpretivism philosophy was the most appropriate worldview to take (Creswell, 2009)' hence interpretivism was chosen over the other forms of philosophies. The rationale and justification for adopting the philosophy lies in the nature of the research – safety culture – which meant that more social and interpersonal approach was necessary. In addition, adopting this philosophy from the philosophical framework developed by Saunders et al., (2009) – (Figure 3-6) allowed the researcher to view knowledge as a complex phenomenon that cannot be generalised in a value-free and detached manner (Saunders et al, 2007). Figure 3-6 shows that the research approach applied in this case was the deductive reasoning because the research process started from specific issues of research questions and theories about safety culture and safety performance issues at the Kingdom of Saudi Arabia; and then it went to search for general information from different studies and literature, including data gathered from respondents consolidated in order to establish a specific answer.

Two research strategies were adopted, and these are case study and survey, as shown on Figure 3-6.

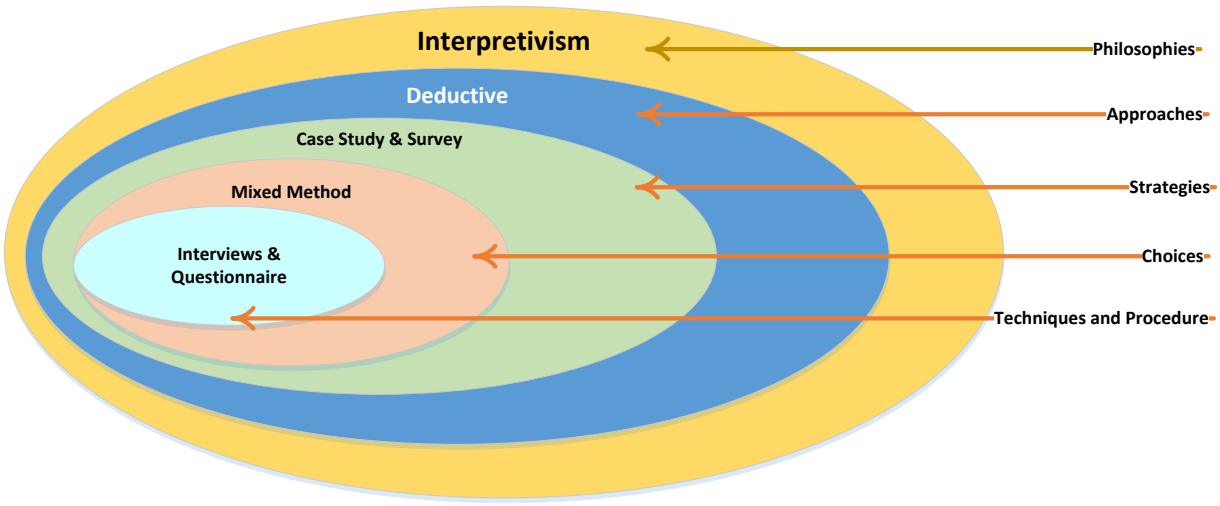

Figure 3-6: A summary of the key steps taken for the research process (Adapted: Saunders et al., 2009)

As far as choices are concerned, the mixed methods approach had been chosen because it had been seen to be the most ideal way of achieving research objectives. This study has been conducted following multiple case study, interview and questionnaire survey. The multiple case studies were used for the qualitative data collection and thus on the 15 managers from the three companies as the population for the study. Survey strategy included semi-structured interviews and questionnaire as techniques. For the questionnaire survey, 135 responses were received from the rank of managers, engineers, foremen, and labourers in Saudi Arabian construction companies. In addition, the quantitative data gathered from questionnaires, were analysed using SPSS software, and the qualitative data, collected from interviews, were analysed using themes from the interview data to generate an understanding of the interviews. The reliability of this research has been ensured through a re-test where a pre-test population was given the same survey and interviews on two separate occasions. The pre-test population was also another construction company and the sample population covered 135 managers, engineers, foremen and labourers. The pre-tests were undertaken one month apart in order to avoid the memory effect from the respondents. The internal validity of this study was established by evaluating whether any possible changes in the safety of the construction industry in the KSA can only be directly attributed to the introduction of a safety culture in the said industry. The randomization process conducted during the selection of the respondents helped to improve the external validity of the research results. The construction industries chosen for this research were also randomly chosen from a list of construction companies in the KSA. There are specific ethical guidelines that guide the conduct of academic and professional research of this nature. In

this study, all these ethical guidelines were followed fully according to the University of Salford regulations.

4. CHAPTER FOUR: RESULTS

4.1 Introduction

The results represent the outcome of the study after statistical treatment, SPSS, and Thematic analysis, to generate an understanding of the interviews. These results are associated with the different objectives as itemised in the questionnaires used during the conduct of the study. Under the mixed methods approach, both qualitative and quantitative tools were applied; both interviews and surveys were carried out in order to establish the outcomes for this study.

By using mixed methods, this study set out to examine (using suitable statistical analysis) the implementation of safety culture within Saudi Arabia Construction Industry. It set out to understand the challenges faced by implementing safety culture and the factors hindering its observance.

The results have been generated from 135 participants within the construction industry. The results have been reported as follows:

1) Firstly on the quantitative approach to this research, mostly with the use of the questionnaire in the survey of respondents. The Principal Component Analysis was applied in this case which seeks to present an assessment of components and group questionnaire items under a specific number of factors. This would help enable the researcher to look at a number of factors rather than all items in the questionnaire; and also help standardise the questionnaire.

2) Secondly, measure reliability (consistency in answers) in order to evaluate items within each resulting factor.
3) Thirdly, the qualitative method of research is presented with the use of the interview and the case study. Descriptive statistics were presented in terms of the factors and each of the items included; this would help the researcher identify the most important and the least important items in the safety culture in Saudi Arabia. Inferential statistics was also used in order to establish an understanding of whether there is a significance of demographic variables (e.g. job title, experience, position) on participants' evaluation of the factors i.e. whether the answers differ based on background information.

4.2 Questionnaire Analysis based on research objectives

The researcher has adopted a mixed methods approach, with the use of interviews and questionnaires as data gathering tools. This section focuses on the examination of questionnaire data using Principal Component Analysis. The questionnaires mostly focus on exploring factors.

4.2.1 Factors Affecting Implementation of Safety Culture within the Construction Industry of Saudi Arabia

The questionnaire measured the safety culture using 135 participants and the safety culture was measured using 56 items. Factor analysis allowed the researcher to standardise the questionnaire and discover latent uncorrelated variables (components/factors). Each variable includes a number of correlated items/observations. The maximum number of components equal the number of items included. Principal component analysis arranges

components in a way that the first component usually measures for most variances i.e. counting for most of the variability in a given data, followed by the consecutive component and the last component usually counts for the least variance. Furthermore the researcher used Varimax Rotation (assuming that items are not correlated) to establish the loadings of each item on the extracted factors; items are then arranged and sorted by the loading on each factor, by size, i.e. items that load highly on one factor come first and arranged by order of loading size. Only components that have an Eigenvalue above 1 will be included. To conduct principal component analysis, the sample has to be adequate. Factor analysis is sensitive to the sample size and generally needs a big sample to enable reliable outcomes. To test the sample adequacy for this analysis a KMO (Kaiser-Meyer-Olkin measure) test of sampling adequacy was conducted (Table 4.1). The result (KMO=0.94) indicated that the sample size is sufficient and adequate for use in the principal component analysis.

Table 4-1: Sampling adequacy

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.940
Bartlett's Test of Sphericity	Approx. Chi-Square	6510.183
	*df	1540
	Sig.	.000

* df: It stands for Degrees of Freedom. It involves the sample size and the variables.

The results indicated that there are 8 Factors with an Eigenvalue (column 2, Table 4-2) above 1, each of the factors accounted for different variances before and after Varimax rotation (as can be seen in Table 4.2).

Table 4-2: The total variances explained by each of the components before and after rotation along with the Eigenvalue for each.

Total Variance Explained									
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	27.437	48.994	48.994	27.437	48.994	48.994	16.471	29.413	29.413
2	3.224	5.758	54.752	3.224	5.758	54.752	4.672	8.343	37.756
3	1.865	3.330	58.082	1.865	3.330	58.082	4.402	7.861	45.617
4	1.709	3.051	61.133	1.709	3.051	61.133	3.240	5.785	51.403
5	1.311	2.341	63.474	1.311	2.341	63.474	3.081	5.502	56.905
6	1.222	2.182	65.656	1.222	2.182	65.656	2.990	5.340	62.245
7	1.117	1.995	67.651	1.117	1.995	67.651	2.705	4.830	67.075
8	1.028	1.836	69.486	1.028	1.836	69.486	1.351	2.412	69.486
9	.956	1.707	71.193						
10	.947	1.692	72.885						
11	.854	1.526	74.411						
12	.811	1.448	75.859						
13	.788	1.408	77.267						
14	.745	1.331	78.598						
15	.740	1.322	79.919						
16	.684	1.221	81.140						
17	.640	1.142	82.282						
18	.606	1.082	83.364						
19	.591	1.055	84.419						
20	.556	.993	85.412						
21	.531	.948	86.361						
22	.490	.875	87.236						
23	.477	.851	88.087						
24	.435	.777	88.864						
25	.400	.714	89.578						
26	.387	.692	90.269						
27	.359	.642	90.911						
28	.342	.610	91.522						
29	.339	.605	92.127						
30	.310	.553	92.680						
31	.291	.520	93.201						
32	.283	.505	93.706						
33	.276	.494	94.199						
34	.263	.470	94.669						
35	.250	.446	95.116						
36	.237	.422	95.538						
37	.221	.395	95.934						
38	.208	.371	96.305						
39	.184	.328	96.633						
40	.180	.321	96.954						
41	.165	.294	97.248						
42	.160	.285	97.533						
43	.148	.264	97.797						
44	.145	.258	98.055						
45	.134	.239	98.294						

46	.122	.218	98.512						
47	.118	.211	98.722						
48	.108	.193	98.915						
49	.102	.182	99.097						
50	.095	.170	99.266						
51	.087	.156	99.422						
52	.081	.144	99.566						
53	.076	.136	99.702						
54	.059	.105	99.807						
55	.057	.102	99.909						
56	.051	.091	100.000						
Extraction Method: Principal Component Analysis.									

4.2.2 Extracted Factors Affecting the Implementation of Safety Culture

The next step was to look at the rotated component matrix and examine item loading under each of the 8 components. Based on the content of each component (items included the researcher will name based on the load component or factor).

Factor 1: This factor was called **"Commitment to Safety Procedure, Training and Practices"** as it includes items that relate to the general commitment to safety, its training and practices. Four items will be deleted as they do not contribute to this, i.e. they do not share similarities.

Table 4-3: Rrotated component matrix for factor 1 with items' loading

		Component							
		1	2	3	4	5	6	7	8
B15	The company's safety culture forces us to wear personal protective equipment.	.827							
B3	The advantages of safety culture is to make people receive the necessary training to avoid accidents and maintain safety.	.777							
A1	Management commitment is needed for safety Policy implementation.	.769							
A5	One of the Safety procedures is to use ergonomic and suitable machinery and equipment in the projects.	.766							
D1	Implementing the right safety policies significantly contribute to the success of a safety performance	.758							

B14	The company's safety culture is training us how to respect the instructions given by our guide.	.755							
A12	Stable safety culture gives Managers a full understanding of what they and we should do regarding safety.	.745							
A2	In management meetings Feedback on safety is very important.	.736	.402						
A4	Project leadership consider that Safety has to be constantly implemented every time and everywhere.	.727							
C1	Strong safety culture gives the company to maintain best practice that cannot fall into safety problems.	.726							
B8	The company's safety culture has to assign someone that makes us aware of safety issues.	.716							
B16	The company's safety culture gives penalty to people who not wearing protective gear at the workplace.	.712							
B13	Effective Safety culture requires the employee to be trained for the safety of co-workers and work equipment.	.710							
B1	The company trains all employees that the words "SAFETY FIRST" have a significant meaning.	.685	.401						
B4	One of the company's safety culture procedures is to train people on first aid and emergency procedures.	.675							
B7	The company's safety culture makes our manager/supervisor checks that we can do the job safely.	.666							
B6	The company's safety culture is that all employees get trained in safe work procedures* for their jobs.	.650	.420						
A13	A strong safety culture gives management how to get involved in safety issues.	.646							
A14	Safety culture means that Managers/Supervisors know what to say and to do regarding safety matters.	.646	.423						
A11	A positive and strong safety culture has given top management greater ability to initiate effective safety policies.	.637							
C4	Poor safety culture strategies have led to failure in implementation of safety policies.	.624							
B2	The company's safety culture is to train people by their Leaders/Supervisors.	.593							
A9	Management systems and behaviour has priority in Safety culture model.	.581							
A10	Non-commitment to safety culture procedure has caused a failure in safety policies.	.569			.446				
C9	The impact of safety culture gives best practice in competence, attitude,	.566			.436				

	commitment and value for a free accident site.								
A15	The company's safety culture procedure that there is notice board has a poster about injury management	.564	.415						
D9	A sign of the important of safety within organisation is that If we report a serious problem where someone could get hurt, they take an urgent action.	.554	.432						
C10	Poor safety culture implementation makes no one would really care if I didn't follow a safety instruction.	.496			.				
B12	Due to the strength of safety culture, we always get feedback (e.g. minutes, tool box talks) on what's happening with our safety issues within seven days.	.437						.	

Factor 2: The second factor is called **"Importance of Safety Culture within Organisation"** as it refers to items that discuss the safety culture within an organisation. In total there are 3 items within this scale.

Table 4-4: Rotated component matrix for factor 2 showing items' loading

		1	2	3	4	5	6	7	8
C5	People do understand how safety culture impacts on safety performance.		.744						
D10	The importance of safety culture makes the company resources/money are mostly focus on safety within projects.		.631						
A3	During management meetings' agenda, safety discussion comes first.		.601						

Factor 3: The third factor was called **"The influence of poor knowledge about Safety Culture at Workplace"**. It includes items that are concerned with the poor knowledge with an organisation about the safety. One item was deleted, as it does not contribute to the overall theme of this factor.

Table 4-5: Rotated component matrix for factor 3 showing items' loading

		1	2	3	4	5	6	7	8
D11	The clashes in management responsibilities have made some managers/supervisors not get involved in safety culture.			.769					
B11	Due to the poor safety culture procedures, we don't do risk assessments when we start a new process or when a process is changed.			.597					
D12	Lack of knowledge in the workplace toward safety culture indicated that Managers/supervisors don't mean what they say or do what they say, in safety matters.			.536	.432				
C3	Poor safety culture intends to non-commitment to best practices to either cut cost or ensures fast production.	.414		.521					

Factor 4: The fourth factor was named **"Safety Culture value for employees in the organisation"**; the two items included in this factor looked at the safety culture and its value to employees within an organisation.

Table 4-6: Rotated component matrix for factor 4 showing items' loading

		1	2	3	4	5	6	7	8
C12	Non-commitment to best practice gives feeling like safety culture does not matter or influence on safety performance.				.619				
D3	Our poor safety culture makes us not caring to communicate with managers about health and safety.				.500				

Factor 5: The fifth factor relates to the **"rewards system and employee performance towards safety culture".** It includes three items looking at the reward aspect and its relation to performance in the safety culture.

Table 4-7: Rotated component matrix for factor 5 showing items' loading

		1	2	3	4	5	6	7	8
A6	One of the safety cultures within an organisation that there is a reward system based on observation of safety.					.698			
A7	Management encourages by giving a reward based on observation of safety.					.678			
A8	One of safety culture that there is a system in place for appraisal regarding safety.	.494				.529			

Factor 6: The sixth factor looks at the **"Poor implementation of safety culture within an organisation"**. All items consider the poor implementation of the safety culture.

Table 4-8: Rotated component matrix for factor 6 showing items' loading

		1	2	3	4	5	6	7	8
D8	No one of Health & Safety department reviews safe work procedures after an incident report to try to find out why an incident happened and how to fix it.						.757		
C8	The company's safety culture does not give us enough time to learn our safe work procedures.						.745		
D5	The clashes in Management rules toward safety make us not always report safety incidents.			.437			.497		
D4	There is a safety-reporting procedure, but poor implementation of safety culture makes us sometimes use them.				.411		.459		
B5	One of the company's safety culture disadvantages isn't everyone getting induction training when they start.						.443		
C6	Poor safety culture has led company management not to work out all the jobs/tasks in the area that have safety risks.						.428		

Using the descending order for Eigen values on table 4-2, two other factors **(7 & 8)** were extracted but were deemed unsuitable for the researcher, as they do not reflect any use and meaning (items loaded are very low). Furthermore, factor **7** only included two items and the eighth variable included one.

Following the Principal Component Analysis, the researcher came up with six factors all were named based on the items which were highly loaded within each. Following that it was also important to establish whether such items within each factor (scale) are reliable, i.e. the extent to which they are measured for the same thing. This is often referred to as internal 'reliability/consistency' where higher reliability, means items are inter-correlated. The reliability ranges between 0% to 100%, often reliabilities near or above 70% are considered sufficient. This correlation is reflected using the Cronbach's Alpha reliability test. In this study the reliability for all factors were relatively high. Factor 1 generated the highest reliability rate of 92% for 29 items followed by factor 3 which generated a reliability of 81% for 4 items and equally factor 6 but for 6 items. Factor 2 had a reliability of 79% (3 items), then for factor 5 (3 items) gave 78%, and the least was factor 4 (2items) which had a reliability score of 65%.

Table 4-9: Results of Cronbach's alpha reliability test for each factor

Factor	Items	Cronbach's alpha
Factor 1: Commitment to Safety Procedure, Training & Practices.	29	0.92
Factor 2: Importance of Safety Culture within Organisation	3	0.79
Factor 3: The influence of poor knowledge about Safety Culture at Workplace	4	0.81
Factor 4: Safety Culture value for employees in the organisation	2	0.65
Factor 5: The reward management system applications and employee performance toward safety culture	3	0.78
Factor 6: Poor implementation of safety culture within an organisation	6	0.81

4.2.3. Descriptive Statistics Factors Affecting the Implementation of Safety Culture

Factor 1: Commitment to Safety Procedure, Training and Practices.

This section includes 29 items describing the commitment to safety procedure, its training and practices. All items generated gave more agreeable rather than disagreeable outcome. However, when reviewing all items and by looking at the descriptive statistics (see table 4.10), it was evident that the highest ranked item was the one stating that the advantages of safety culture is to make people receive the necessary training to avoid accidents and maintain safety (*M=3.81). Clearly the second ranked item was on the significance the safety culture, where the company trains all employees about "SAFETY FIRST" (M=3.80). Rounding up the top three ranked items is the use of ergonometric and suitable machinery. This item describes that one of the safety procedures in the construction industry is the use ergonomic and suitable machinery and equipment in the projects (M=3.79).

***M:** Mean/average score

At the other end of the ranking, it was shown that with the existence of an injury poster participants showed that the company's safety culture was not affected much. It is also acknowledged that there is actually a notice board with a poster about injury management (M=3.44). Also it was noted that the poor safety culture implementation in the construction industry had not made any-one care if the respondents did not follow a safety instruction (M=3.42), and the least ranked item was the one explaining feedback in the safety culture. Participants showed that due to the strength of the safety culture, they always got feedback (e.g. minutes, tool box talks) on what was happening with safety issues within seven days from any expressed complaints on safety (M=3.21). It should be noted that most of the items in this scale displayed more agreements as compared to disagreements; however, some items were ranked higher than others (i.e. generating more agreement). Table 4.10 below shows the frequency, percentages, mean, standard deviation and ranking for each of the 29 items.

Table 4-10: Descriptive statistics for factor 1

	S.D	D.	N	A	SA	M	SD	Rank
The company's safety culture forces us to wear personal protective equipment.	14	15	15	41	50	3.7259	1.34069	4
	10.4%	11.1%	11.1%	30.4%	37.0%			
The advantages of safety culture is to make people receive the necessary training to avoid accidents and maintain safety.	16	8	19	34	58	3.8148	1.36144	1
	11.9%	5.9%	14.1%	25.2%	43.0%			
Management commitment is needed for safety Policy implementation.	21	11	8	38	57	3.7333	1.46705	4
	15.6%	8.1%	5.9%	28.1%	42.2%			
One of the Safety procedures is to use ergonomic and suitable machinery and equipment in the projects.	11	15	18	38	53	3.7926	1.29348	3
	8.1%	11.1%	13.3%	28.1%	39.3%			
Implementing the right safety policies significantly contribute to the success of a safety performance	12	13	16	58	36	3.6889	1.21843	6
	8.9%	9.6%	11.9%	43.0%	26.7%			
The company's safety culture is training us how to respect the instructions given by our guide.	11	13	21	46	44	3.7333	1.24109	4
	8.1%	9.6%	15.6%	34.1%	32.6%			

Stable safety culture gives Managers a full understanding of what they and we should do regarding safety.	18	7	22	51	37	3.6074	1.30496	9
	13.3%	5.2%	16.3%	37.8%	27.4%			
In management meetings Feedback on safety is very important.	14	15	18	47	41	3.6370	1.30216	8
	10.4%	11.1%	13.3%	34.8%	30.4%			
Project leadership consider that Safety has to be constantly implemented every time and everywhere.	16	13	19	37	50	3.6815	1.36945	7
	11.9%	9.6%	14.1%	27.4%	37.0%			
Strong safety culture gives the company to maintain best practice that cannot fall into safety problems.	12	10	24	47	42	3.7185	1.23174	5
	8.9%	7.4%	17.8%	34.8%	31.1%			
The company's safety culture has to assign someone that makes us aware of safety issues.	17	9	22	48	39	3.6148	1.31004	9
	12.6%	6.7%	16.3%	35.6%	28.9%			
The company's safety culture gives penalty to people who not wearing protective gear at the workplace.	11	20	30	32	42	3.5481	1.29129	14
	8.1%	14.8%	22.2%	23.7%	31.1%			
Safety culture adjustment is the ability of an employee to be trained for the safety of co-workers and work equipment.	14	11	32	48	30	3.5111	1.22088	18
	10.4%	8.1%	23.7%	35.6%	22.2%			
The company trains all employees that the words “SAFETY FIRST” have a significant meaning.	11	21	14	27	62	3.8000	1.37570	2
	8.1%	15.6%	10.4%	20.0%	45.9%			
One of the company's safety culture procedures is to train people on first aid and emergency procedures.	13	11	22	44	45	3.7185	1.27345	5
	9.6%	8.1%	16.3%	32.6%	33.3%			
The company's safety culture makes our manager/supervisor checks that we can do the job safely.	9	17	31	42	36	3.5852	1.19941	10
	6.7%	12.6%	23.0%	31.1%	26.7%			
The company's safety culture is that all employees get trained in safe work procedures* for their jobs.	15	11	29	43	37	3.5630	1.27904	13
	11.1%	8.1%	21.5%	31.9%	27.4%			
A strong safety culture gives management how to get involved in safety issues.	12	17	24	51	31	3.5333	1.22657	16
	8.9%	12.6%	17.8%	37.8%	23.0%			
Safety culture means that Managers/Supervisors know what to say and to do regarding safety matters.	8	19	18	46	44	3.7333	1.22292	4
	5.9%	14.1%	13.3%	34.1%	32.6%			
A positive and strong safety culture has given top management greater ability to initiate effective safety policies.	15	15	22	48	35	3.5407	1.29155	15
	11.1%	11.1%	16.3%	35.6%	25.9%			
Poor safety culture strategies have led to failure in implementation of safety policies.	13	18	22	43	39	3.5704	1.29604	12
	9.6%	13.3%	16.3%	31.9%	28.9%			
The company's safety culture is to train people by their Leaders/Supervisors.	9	20	25	46	35	3.5778	1.21229	11
	6.7%	14.8%	18.5%	34.1%	25.9%			
Management systems and behaviour has priority in Safety culture model.	10	14	31	46	34	3.5926	1.18634	10

	7.4%	10.4%	23.0%	34.1%	25.2%			
Non-commitment to safety culture procedure has caused a failure in safety policies.	11	19	24	43	37	3.5672	1.25924	12
	8.2%	14.2%	17.9%	32.1%	27.6%			
The impact of safety culture gives best practice in competence, attitude, commitment and value for a free accident site.	17	17	15	51	35	3.5185	1.33747	17
	12.6%	12.6%	11.1%	37.8%	25.9%			
The company's safety culture procedure that there is notice board has a poster about injury management	14	16	32	42	31	3.4444	1.25583	20
	10.4%	11.9%	23.7%	31.1%	23.0%			
A sign of the important of safety within organisation is that If we report a serious problem where someone could get hurt, they take an urgent action.	19	12	23	44	37	3.5037	1.35423	19
	14.1%	8.9%	17.0%	32.6%	27.4%			
Poor safety culture implementation makes no one would really care if I didn't follow a safety instruction.	20	11	26	47	31	3.4296	1.33014	21
	14.8%	8.1%	19.3%	34.8%	23.0%			
Due to the strength of safety culture, we always get feedback (e.g. minutes, tool box talks) on what's happening with our safety issues within seven days.	17	22	34	39	23	3.2148	1.26600	22
	12.6%	16.3%	25.2%	28.9%	17.0%			

Factor 2: Importance of Safety Culture within an Organisation

The importance of the safety culture in an organisation is reflected in three items within the factors enumerated above. It was clearly stated that during management meetings' agenda, safety came first according to participants (M=3.54). This was followed by the rating of people understanding the how safety culture impacts on the safety performance in organisations (M=3.28). Thirdly it was stated that the importance of safety cultures means that money and resources are mainly focused and directed to safety within projects (M=3.20).

Table 4-11: descriptive statistics for factor 2

	S.D	D.	N.	A.	S.A.	M	SD	Rank
People do understand how safety culture impacts on safety performance.	9	33	30	36	27	3.2889	1.22698	2
	6.7%	24.4%	22.2%	26.7%	20.0%			
The importance of safety culture makes the company resources/money are mostly focus on safety within projects.	19	13	42	43	18	3.2074	1.21616	3
	14.1%	9.6%	31.1%	31.9%	13.3%			
During management meetings' agenda, safety discussion comes first.	6	20	39	34	36	3.5481	1.16362	1
	4.4%	14.8%	28.9%	25.2%	26.7%			

Factor 3: The influence of poor knowledge about Safety Culture in the Workplace

In this factor, the items that were considered mostly on the poor knowledge of the safety culture. Most agreement was generated for the items explaining that the poor safety culture intends to non-commitment to best practices to either cut cost or ensure fast production (M=3.35). Secondly, participants referred to lack of knowledge in the workplace of safety culture, leading managers and supervisors to confuse their actions in safety matters (M=3.32). Thirdly, it was shown that there are no risk assessments due to poor safety culture procedures especially when carrying out a new process of making a change (M=3.11). Almost equal to the third item, the last one stated that the clashes in responsibilities among managers and supervisors have prompted some to avoid and not get involved in the safety culture (M=3.10). See table 4.11.

Table 4-12: descriptive statistics for factor 3

	S.D	D.	N.	A.	S.A	Mean	SD.	Rank
The clashes in management responsibilities have made some managers/supervisors not get involved in safety culture.	14	34	26	46	15	3.1037	1.20493	4
	10.4%	25.2%	19.3%	34.1%	11.1%			
Due to the poor safety culture procedures, we don't do risk assessments when we start a new process or when a process is changed.	22	20	36	35	22	3.1111	1.30822	3
	16.3%	14.8%	26.7%	25.9%	16.3%			
Lack of knowledge in the workplace toward safety culture indicated that Managers/supervisors don't mean what they say or do what they say, in safety matters.	13	21	34	43	24	3.3259	1.21452	2
	9.6%	15.6%	25.2%	31.9%	17.8%			
Poor safety culture intends to non-commitment to best practices to either cut cost or ensures fast production.	17	13	37	39	28	3.3582	1.27086	1
	12.7%	9.7%	27.6%	29.1%	20.9%			

Factor 4: Safety Culture value for employees within the organisation

The value of the safety culture to employees was touched upon using two items. More agreement was generated for the item stating that no commitment to the safety practice leads employees to feel that the safety culture is not important or that it does not influence safety performance (M=3.35). Also, the poor safety culture seemed to discourage employees to talk or communicate with managers about health and safety in their work (M=3.20).

Table 4-13: Descriptive statistics for factor 4

	S.D	D	N	A	S.A	Mean	SD	Rank
Non-commitment to best practice gives feeling like safety culture does not matter or influence on safety performance.	13	16	36	50	20	3.3556	1.16200	1
	9.6%	11.9%	26.7%	37.0%	14.8%			
Our poor safety culture makes us not caring to communicate with managers about health and safety.	19	21	34	35	26	3.2074	1.31067	2
	14.1%	15.6%	25.2%	25.9%	19.3%			

Factor 5: The reward management system applications and employee performance toward safety culture

By looking at the items within this factor, it was apparent that a reward system for observation of safety was considered most important (M=3.62). It was observed that management rewards based on observation was also important (M=3.48). Furthermore, by generating, an almost identical mean result, the existence of a system in place for appraisal regarding safety was considered also very important (M=3.44). Table 4.14 below illustrates further descriptive statistics.

Table 4-14: Descriptive statistics for factor 5

	S.D	**D.**	**N.**	**A.**	**S.A**	**Mean**	**SD**	**Rank**
One of the safety cultures within an organisation that there is a reward system based on observation of safety.	10	14	34	36	41	3.6222	1.22698	1
	7.4%	10.4%	25.2%	26.7%	30.4%			
Management encourages by giving a reward based on observation of safety.	10	17	37	40	31	3.4815	1.18983	2
	7.4%	12.6%	27.4%	29.6%	23.0%			
One of safety culture that there is a system in place for appraisal regarding safety.	13	15	33	47	27	3.4444	1.20736	3
	9.6%	11.1%	24.4%	34.8%	20.0%			

Factor 6: Poor implementation of safety culture within an organisation

Descriptive statistics were calculated for each of the six items generated within the factor of "poor implementation of safety culture within an organisation". When looking individually at each item, it can be seen that the main disadvantage is that not every newly recruited member of staff received induction training about safety at the start of their employment or project (M=3.32). This item was followed by the poor safety culture leading management not to work out safety remedies for all the jobs/tasks that have safety risks (M=3.24). Furthermore, it was stated that there is a safety-reporting procedure, but poor

implementation of the safety culture often prompts employees to use such reporting procedure (M=3.22). The least agreement was generated for the items stating that the company's safety culture does not give the respondents enough time to learn safe work procedures (M=2.73). See table 4.15 below for more details.

Table 4-15: Descriptive statistics for factor 6

	S.D	D.	N.	A	S.A	Mean	SD.	Rank
No one of Health & Safety department reviews safe work procedures after an incident report to try to find out why an incident happened and how to fix it.	37	24	31	23	20	2.7407	1.40873	5
	27.4%	17.8%	23.0%	17.0%	14.8%			
The company's safety culture does not give us enough time to learn our safe work procedures.	26	32	40	26	11	2.7333	1.21065	6
	19.3%	23.7%	29.6%	19.3%	8.1%			
The clashes in Management rules toward safety make us not always report safety incidents.	15	29	33	40	18	3.1259	1.21821	4
	11.1%	21.5%	24.4%	29.6%	13.3%			
There is a safety-reporting procedure, but poor implementation of safety culture makes us sometimes use them.	11	21	43	47	13	3.2222	1.08357	3
	8.1%	15.6%	31.9%	34.8%	9.6%			
One of the company's safety culture disadvantages isn't everyone getting induction training when they start.	22	15	27	39	32	3.3259	1.38127	1
	16.3%	11.1%	20.0%	28.9%	23.7%			
Poor safety culture has led company management not to work out all the jobs/tasks in the area that have safety risks.	20	16	36	37	26	3.2444	1.30708	2
	14.8%	11.9%	26.7%	27.4%	19.3%			

4.2.4 Distribution of Factors Affecting the Implementation of Safety Culture

Overall six factors were chosen and investigated earlier. In this section, the average/mean is calculated for each of these factors by adding the scores for all items and dividing the sum by the total number of items. By reviewing all six factors and examining descriptive statistics associated with them, it was shown that factor 1 “Commitment to Safety Procedure, Training and Practices” generated the highest mean score in terms of agreement (M=3.60). As such, it is ranked first. Factor 1 was followed by factor 5 “The reward management system applications and employee performance toward safety culture” which generated a mean of (M=3.51). In third place was factor 2 “Importance of Safety Culture

within Organisation" (M=3.34), then factor 4 "Safety Culture value for employees in the organisation" (M=3.28) and then factor 3 "The influence of poor knowledge about Safety Culture at Workplace" and lastly factor 6 "Poor implementation of safety culture within an organisation" (M=3.06).

It is essential before proceeding with further statistical tests to measure and judge whether these factors (dependent variables) are normally distributed. A normal distribution reflects that the majority of the scores (Means) of participants regarding the factor are around the mean with fewer scores on the extreme sides of a frequency histogram (Bell-Shaped). The skewness (the spread of score on histogram) and Kurtosis (Peak of the Histogram) give an idea of the normality of the data, where scores between +2/-2 reflect normality. Normal distribution is essential in order to justify the inferential tests to be used. Based on the descriptive table below (4.16) and based on the frequency histograms for each of the factors it can be assumed that all factors are considered normally distributed, justifying the choice of parametric inferential tests (to be used in the following section).

Table 4-16: Descriptive statistics of the 6 factors

Descriptive Statistics

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Factor 1: Commitment to Safety Procedure,	135	3.87	1.13	5.00	3.6012	1.00407	-1.074	.209	.144	.414

Training and Practices.										
Factor 2: Importance of Safety Culture within Organisation	135	4.00	1.00	5.00	3.3481	1.00979	-.249	.209	-.770	.414
Factor 3: The influence of poor knowledge about Safety Culture at Workplace	135	4.00	1.00	5.00	3.2241	.99498	-.372	.209	-.696	.414
Factor 4: Safety Culture value for employees in the organisation	135	4.00	1.00	5.00	3.2815	1.06611	-.234	.209	-.605	.414
Factor 5: The reward management system applications and employee performance toward safety culture	135	4.00	1.00	5.00	3.5160	1.00720	-.429	.209	-.585	.414
Factor 6: Poor implementation of safety culture within an organisation	135	4.00	1.00	5.00	3.0654	.91878	-.017	.209	-.489	.414

Below are 6 histograms to illustrate the distribution of participants' scores on each of the six factors. Most of which are considered normally distributed and falling in a normal curve.

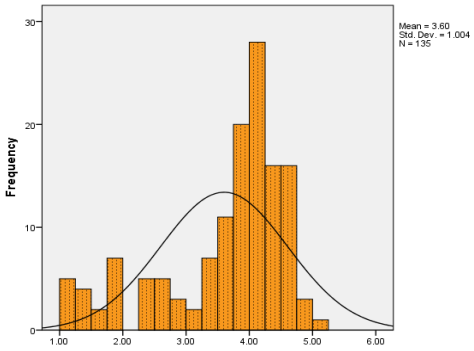

Figure 4-1Distribution for F1

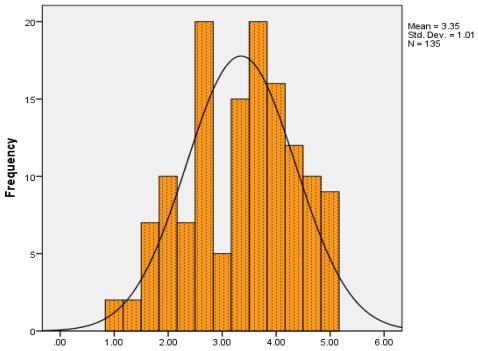

Figure 4-2 Distribution for F2

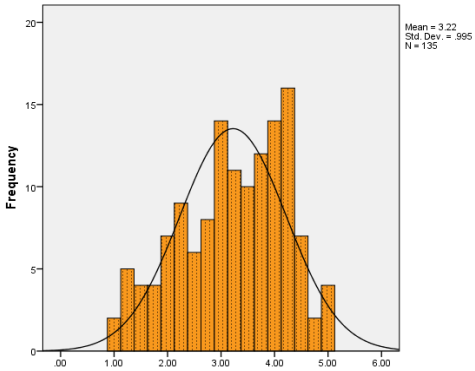

Figure 4-3 Distribution for F3

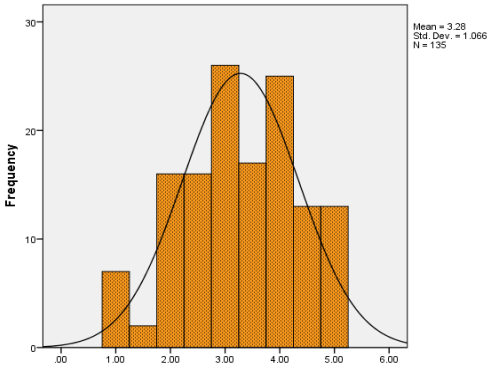

Figure 4-4 Distribution for F4

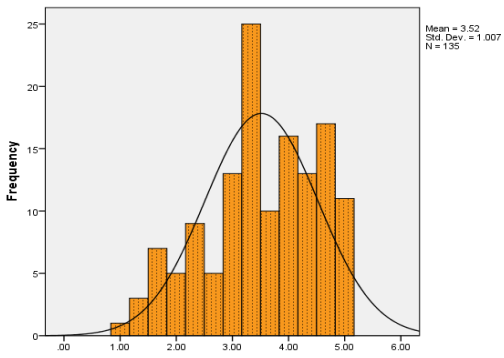

Figure 4-5 Distribution for F5

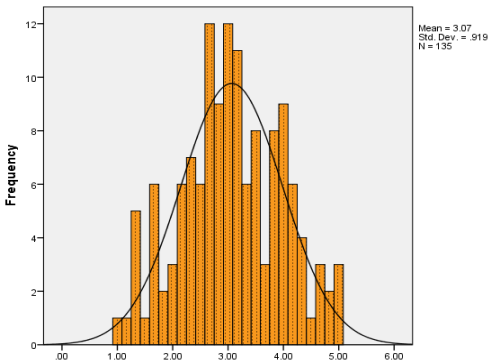

Figure 4-6 Distribution for F6

4.2.5. Inferential Statistics for Questionnaire Survey Results

This section used inferential parametric tests to draw inferences from the results to a bigger population. The two tests that used were:

1. One Way Analysis Of Variance (ANOVA): an independent groups ANOVA test was conducted to measure whether or not an independent variable (of three levels/groups or more) have a significant effect on one or more of the factors tested in this study (Dependent Variables). Significant results refer to significant differences between groups, hence a variable is said to have a significant effect. ANOVA allows for Post-Hoc tests that aim to follow up and measure whether any two given groups within the ANOVA are significantly different from each other. This helps in locating where the differences emerge.
2. Pearson's *r Correlation Coefficient: This is a parametric test that measures the correlation or the relationship between any two variables. The correlation coefficient can range from -1 to +1 reflecting negative and positive correlation (0-100%). Significant positive correlation coefficient explains that if the score of one variable increases then the score in the other increases too. A negative correlation reflects if a score in one variable rises higher than the score of the other. The bigger the correlation coefficient, the stronger the correlation between variables.

*r: Correlation coefficient, it refers to the size of the correlation. It is abbreviation for Pearson's correlation.

Participants' education was measured based on three categories FDA (20) BSC (89) and MSC (26). In this section, an independent sample ANOVA determination was conducted to

measure whether this variable of three levels had a significant impact on each of the 6 factors.

ANOVA showed a significant effect of Education type on F1, *F (2,132) =6.27, *p=0.003. It was clear that the BSC group showed the lowest agreement while the MSC group showed the highest (FAD=3.89, BSC=3.39, MSC=4.08). Bonferonni post-hoc test revealed significant differences between BSC and the MSC groups. The results indicated a significant effect for education on F3 F(2,132)=6.94, p=0.001, where the BSC again generated the lowest agreement mean score as compared to the MSC with the highest mean score (FAD =3.52, BSC=3.00, MSC=3.73). Bonferonni showed a significant difference between BSC and MSC. A significant effect of education on F4: F (2,132) = 9.09, p=0.000, the mean scores varied and the MSC generated the highest (FAD =3.50, BSC=3.03, MSC=3.96) while the benforonni test showed a significant difference between the BSC and MSC groups. A significant effect of education on F5: F (2,132) =4.11, p=0.018 was noted. The MSC group generated the highest mean score (FAD =3.43, BSC=3.38, MSC=4.01) and the benforonni test showed that it is significantly different from the BSC. A significant effect of education on F6: F (2,132) =4.63, p=0.011, higher scores for the MSC group (FAD =3.31, BSC=2.89, MSC=3.44) was seen. Bonefronni showed significant difference between the BSC group and the MSC. No education effect was found on F2, F (2,132) =1.80, p=0.169, although the MSC again showed the highest mean score and the BSC generating the lowest score (FAD =3.33, BSC=3.25, MSC=3.67).

* F=the difference size of the ANOVA.
2=groups minus 1
132=number of participants within.
*P=probability: it is the significance level, this should be lower than 0.05 to be significant.
If not significant then there is no effect of the education.

Table 4-17: An ANOVA table showing the effect of education on the 6 factors

ANOVA						
		Sum of Squares	*df	Mean Square	*F	*Sig.
F1	Between Groups	11.722	2	5.861	6.271	.003
	Within Groups	123.372	132	.935		
	Total	135.093	134			
F2	Between Groups	3.636	2	1.818	1.804	.169
	Within Groups	133.001	132	1.008		
	Total	136.637	134			
F3	Between Groups	12.625	2	6.313	6.942	.001
	Within Groups	120.034	132	.909		
	Total	132.659	134			
F4	Between Groups	18.443	2	9.222	9.093	.000
	Within Groups	133.860	132	1.014		
	Total	152.304	134			
F5	Between Groups	7.978	2	3.989	4.115	.018
	Within Groups	127.959	132	.969		
	Total	135.937	134			
F6	Between Groups	7.424	2	3.712	4.636	.011
	Within Groups	105.692	132	.801		
	Total	113.116	134			

*F: F value for factor one.
*Sig: If smaller than 0.05 then education has a significant effect on how participants rate F1.
*df: These are the values in brackets (2,132).

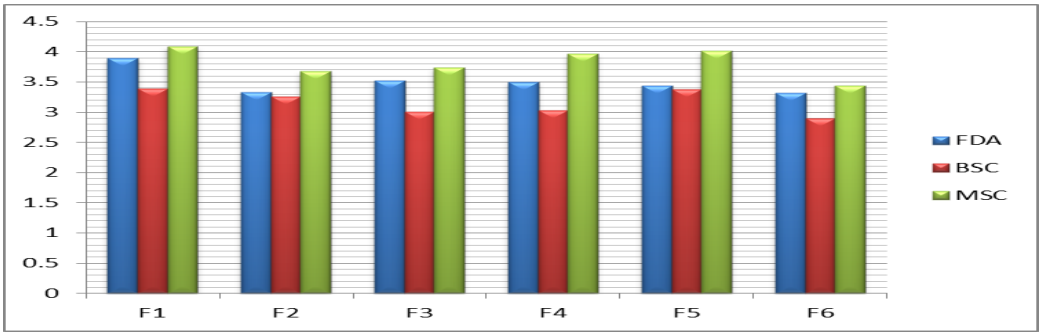

Figure 4-7: Mean scores for reach of the factors based on education type

Participants' jobs were categorised as: manager (26), engineers (78), supervisors (14), technical staff (10) or office workers (7). In this section, an ANOVA test seeks to determine whether or not the job type has a significant effect on the way participants' rate their agreement on each of the six factors. In doing, so it was evident that the only significant effects came on F5, $F(4,130) = 3.05$, $p=0.019$ where managers ($M=4.01$) generated the highest mean score followed by the technical staff ($M=3.60$), office workers ($M=3.47$), engineers ($M=3.44$) and finally supervisors ($M=2.75$). Note that the opinion for labours was represented by their foremen (herein categorised under supervisors).

A Bonferonni post-hoc test showed significant difference between managers and supervisors. Other factors were not significantly affected by the job type namely F1: $F(4,130)=1.06$, $p>0.05$, F2: $F(4,130)=1.15$, $p>0.05$, F3: $F(4,130)=0.47$, $p>0.05$, F4:, $F(4,130)=0.43$, $p>0.05$, F6: $F(4,130)=0.82$, $p>0.05$.

Table 4-18: ANOVA test results for the effect of job type of the six factors

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
F1	Between Groups	4.302	4	1.075	1.069	.375
	Within Groups	130.792	130	1.006		
	Total	135.093	134			
F2	Between Groups	4.677	4	1.169	1.152	.335
	Within Groups	131.960	130	1.015		
	Total	136.637	134			
F3	Between Groups	1.893	4	.473	.471	.757
	Within Groups	130.766	130	1.006		
	Total	132.659	134			
F4	Between Groups	2.013	4	.503	.435	.783
	Within Groups	150.290	130	1.156		
	Total	152.304	134			
F5	Between Groups	11.683	4	2.921	3.056	.019
	Within Groups	124.254	130	.956		
	Total	135.937	134			
F6	Between Groups	2.811	4	.703	.828	.510
	Within Groups	110.306	130	.849		
	Total	113.116	134			

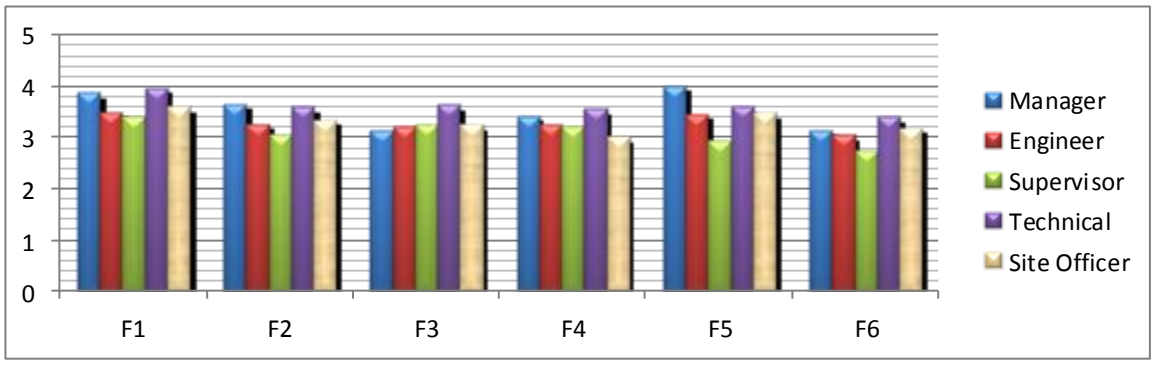

Figure 4-8: Mean scores for each of the job types across all six factors

4.2.6. Relationship between the experience of the respondent and factors affecting safety implementation:

Participants' experience was registered in years ranging from 1 year to 34 years of experience (M=10.90). When measuring the correlation between experience and the rating of the six factors it was found that, using the Pearson correlation test, there is a significant positive correlation between experience and all six factors. Meaning, the more experienced the participants were, the more they agreed with each of the factors: F1: *r(135)= 0.191p=0.027; F2: r(135)=0.202 p=0.019; F3: r(135)=0.205 p=0.017; F4: r(135)=0.172 p=0.042; F5: r(135)=0.222 p=0.010; F6: r(135)=0.245 p=0.004.

When measuring the correlation between the six factors, it was evident that there are significant positive correlations between any two of the six factors. Such positive correlation reflects that the higher participants agree with one factor, the higher they agree on the other factor. There was a significant correlation between F1 and F2 r(135)=0.727, p=0.000; F1 and F3 r(135)=0.635, p=0.000; F1 and F4 r(135)=0.638, p=0.000; F1 and F5 r(135)=0.690, p=0.000; F1 and F6 r(135)=0.584, p=0.000; F2 and F3 r(135)=0.584, p=0.000; F2 and F4

r(135)=0.509, p=0.000; F2 and F5 r(135)=0.538, p=0.000; F2 and F6 r(135)=0.467, p=0.000; F3 and F4 r(135)=0.635, p=0.000; F3 and F5 r(135)=0.484, p=0.000; F3 and F6 r(135)=0.725, p=0.000; F4 and F5 r(135)=0.486, p=0.000; F4 and F6 r(135)=0.665, p=0.000; F5 and F6 r(135)=0.493, p=0.000.

Table 4-19: Pearson's correlation coefficient and significance levels between experience and factors

Correlations								
		Experience	F1	F2	F3	F4	F5	F6
Experience	Pearson Correlation	1	.191*	.202*	.205*	.172*	.222**	.245**
	Sig.(*2-tailed)		.027	.019	.017	.046	.010	.004
	N	135	135	135	135	135	135	135
F1	Pearson Correlation	.191*	1	.727**	.635**	.638**	.690**	.584**
	Sig. (2-tailed)	.027		.000	.000	.000	.000	.000
	N	135	135	135	135	135	135	135
F2	Pearson Correlation	.202*	.727**	1	.584**	.509**	.538**	.467**
	Sig. (2-tailed)	.019	.000		.000	.000	.000	.000
	N	135	135	135	135	135	135	135
F3	Pearson Correlation	.205*	.635**	.584**	1	.635**	.484**	.725**
	Sig. (2-tailed)	.017	.000	.000		.000	.000	.000
	N	135	135	135	135	135	135	135
F4	Pearson Correlation	.172*	.638**	.509**	.635**	1	.486**	.665**
	Sig. (2-tailed)	.046	.000	.000	.000		.000	.000
	N	135	135	135	135	135	135	135
F5	Pearson Correlation	.222**	.690**	.538**	.484**	.486**	1	.493**

	Sig. (2-tailed)	.010	.000	.000	.000	.000		.000
	N	135	135	135	135	135	135	135
F6	Pearson Correlation	.245**	.584**	.467**	.725**	.665**	.493**	1
	Sig. (2-tailed)	.004	.000	.000	.000	.000	.000	
	N	135	135	135	135	135	135	135

*. 2-tailed means that you are not assuming direction of relationship. It could be positive or negative. You are not predicting one or the other, you are just saying that there is a relationship/correlation

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

4.3 Interviews Analysis

This chapter analysis the outcome generated from interviews adopted in this study. The aim was to generate an understanding of the safety policies used and study the factors affecting implementation of safety policies in the Saudi Arabian construction industry; thus development of a framework for safety in the Saudi Arabian construction industry. These challenges relate to the need to provide a healthy and safe environment for workers and clients alike.

4.3.1 Participants

Fifteen (15) participants/interviewees were interviewed in their own convenient time and place. All were from the construction industry representing different fields within construction (e.g. engineers, architects, management etc.).

The researcher will use Thematic Analysis to generate an understanding of the interviews. The interviews are analysed based on each question separately. All interviews were transcribed, and then carefully and repeatedly read to generate codes that are relevant to the questions asked. Each interview was analysed separately. Following the generation of codes (ideas), the researcher formed themes that are directly linked to the questions asked. Along with that, the researcher states the number of participants who agreed or mentioned similar answers in reference to the different themes.

4.3.2. Themes on factors affecting implementation of safety polices

4.3.2.1. Nature of the job being hazardous

Eight participants stated that the construction industry includes hazardous and risk jobs that involve the building of large and small projects. e.g. *"it is a hazardous industry, it involves construction of projects in different sizes, and it is an industry that has higher risk of safety compared to many other industries due to the many variables involved in it"*.

4.3.2.2. Safety Policy

When designing what is the safety policy, participants provided similar answers that could be categorized under a number of themes:

When defining the safety policy the majority (8) of the participants stated that the safety policy is a set of rules and guidelines that determine the safety of an organisation. E.g. *"I see the safety policy as a set of guidelines that ensure that the company works on the ground maintains safe environment for the client, the employees and ultimately the wellbeing of everyone involved"*

Eight participants showed a systematic approach to the described safety policy. According to the participants, the safety policy defines and provides guidelines and approaches to form a safe and productive environment between employer and employees for achieving common targets set and explained in the organisation policy. e.g. *"the safety policy is an approach that the organisation follows to ensure a safe environment for all people involved".*

Other participants (8) explained that the safety policy of a company working in the construction industry might be defined as the understanding of decision makers of the word "safety", and this understanding is mainly formed by their background culture as well as the cost and time factors governing the specific project. e.g. *"the safety policy is simple, it is said in the word safety, and understanding of this word is the safety policy".*

Other participants stated that the safety policy means compliance with the country's safety regulation. It was viewed that the safety policy is themed around three main elements organisation's general safety strategy (4 participants), the organisation's safety management system (OHSAS 18001) as referred to by four participants. They all stated that these come under compliance as per the country's/ client safety regulations and project safety plan, emergency response plan and safe working procedures. e.g. *"I can explain the safety policy as a way to adhere with the national set of safety regulations in the industry sector".*

In addition to earlier explanations, three participants explained that the safety policy is a medium tool. It aims to ensure that safety regulations are set by the management, implemented, and followed by workers on site. Similar to the above explanation, they explained that this medium is formed from a number of rules and regulations. It was quoted by a participant that *"the safety policy as a tool has the potential to provide a medium to translate the organisation's safety policy into a clear set of goals across four perspectives: management, operational, customer, and learning".*

4.3.2.3. International and Local Safety Policies

When asked about the safety policies stipulated in Saudi Arabia, ten (10) participants stated that the country follows international safety regulations and policies such as the OHSAS,

HSE, ISO and the ILO. It was also explained that the regulations are at times tailored to suit the country and can come under local country safety regulations or client safety requirements. e.g. *"we tend to copy other developed countries when it comes to safety, or adjust them a little bit to suit our different demands".*

4.3.2.4. Survey of Safety Procedures

Furthermore, four of the participant's state that the safety procedures on their construction job site in Saudi Arabia has been specified. This means that the safety on the construction site is assessed through a survey of safety practices during construction, and that a standardized checklist has been used to survey such safety practices. It was explained that this checklist includes items, which are perceived to be important from the safety point of view. When providing examples of such items, participants mentioned fire prevention, scaffold/mobile towers, cartridge operated tools, trenching and excavation, housekeeping, sandblasting, power tool machine and equipment, heavy equipment, gas/electric welding, construction formwork, health and welfare, transportation, cranes and lifting devices, compressed gas, air compressors, site safety administration, temporary electricity supplies, and special items.

4.3.2.5. Differentiating Between Sites

Four participants stated that the safety policy in Saudi Arabia depends on the types of sites. The sites were categorised into as large or small sites depending on the area covered by the site and the number of workmen employed on the job site. It was explained that the safety is stipulated *"by testing whether the level of safety on a construction site was a function of the size of a project"*. The size of the site is crucial on how safety was usually tackled. Small

sites were considered less risky in terms of safety as compared with larger sites, hence safety policies stipulated in Saudi Arabia consider the type of sites when implementing safety procedures.

4.3.2.6. Purely an Organisational Decision

One of the participants stated that there is no clear safety policy in their company and that any safety policy is usually decided by the organisation. It was explained the organisation can follow any safety policy as long as it doesn't conflict with the country's guidelines. e.g. *"Policy, that is not conflicting with the state safety requirement and legislations are allowed. It is purely the organisation's decision to design or modify its safety policy according to its scope of business, but that should be under the state order. It should be in line with safety legislation".*

4.3.2.7. Factors Challenging the Safety Policies in the Construction Industries

a. Lack of Commitment

Six participants saw a major challenge as the organisation's management lack of commitment towards safety. e.g. *"you can't see how committed the organisation it in ensuring safety. Safety doesn't seem to be on their agenda when holding frequent meetings".*

b. Safety Regulations do not exist

Six of the participants also stated that Saudi Arabia does not have standard safety regulations and laws. This seems to be the main challenge for the country. E.g. *"Similar to most of the developing countries, Saudi Arabia does not have safety regulations".*

c. Poor Management of Safety Regulations:

In cases where there are safety regulations, the management of such regulations seems poor as claimed by six participants. E.g. *"Even when there are safety regulations, the application of these regulations is poorly managed".*

d. Hazardous Industry

It was mentioned by five participants that the main challenge of the safety policies and their implementation is the hazardous nature of projects in construction, as they are due to unique qualities of the construction project. E.g. *"Due to the high levels of risks, and the many variables associated with construction, the full implementation of a safety policy could be a challenge".*

e. Behaviour of Contractors

It was also stated that the behaviour of contractors on safety management are of grave concern, including the lack of provisions on personnel protective equipment, regular safety meetings, and safety training. e.g. *"It is down to poor contactors' behaviour. They do not really care about the safety policy as much as they care about the profit. Hence the contractors do not supply the needed equipment to ensure the safety of their employees".*

f. Poor Safety Awareness of Top Management

Seven participants stated that there is a poor awareness when it comes to safety in general. It was stated that the higher management and project managers were not fully aware of the risks associated with the construction projects, hence they did not know what to do when it came to safety policies. e.g. *"Top management is not really aware of what goes on onsite. They do not acknowledge the hazards involved, and hence they do not work on safety".*

g. Lack of Training

Five participants stated that the employees and their managers do not receive training when it comes to safety, and the lack of training leads to the poor implementation of safety policies. e.g. *"I have been in the company for a number of years, I have hardly heard of a training course that targets safety".*

h. Reluctance to Input resources to Safety

Five participants stated that construction companies do not dedicate enough resources and budget for the implementation of safety policies. It was claimed by a participant *"when it comes to safety, the company is not willing to invest. Such investments can be in training or in allocating people for the monitoring and follow-up of safety procedures".*

i. Reckless Operations

To add to that, five participants stated that some companies are reckless in their projects, and that they do not put careful planning ahead of executing the project. e.g. *"I have been*

involved in projects that I consider reckless, in which I actually feared for my safety, and nothing is being done about that".

j. Government Role

Three participants stating that the government should play a more prominent role when it comes to ensuring safety measures also highlighted the role of the government. The government should play a more critical role in stricter legal enforcement and organising safety training programs. e.g. *"I think the organisations can be more careful when it comes to safety and that can only be assured by putting forward legislation to criminalise reckless projects, and lack of safety in construction".*

k. Continuous Change in the Management

Other participants (6) saw that one of the main factors affecting the implementation of safety policies is the frequent and continuous change in management at different levels. e.g. *"One manager might want to implement safety to the full, but there is no continuity, he could be shifted to a different position and then the plans are scrapped".*

l. Lack of Implementation of 4C's

According to six participants, there is a lack of implementation of safety policies, and when explaining this further, it was communicated that the implementation is hindered by several factors mainly translated into the C's of coordination between people and departments, communication, control and competence.

m. Lack of Health Interventions

It was reported by four participants that there is a lack of health interventions in their company. It was reported by one participant *"it is important that Saudi employers not separate the important aspects of health interventions, from workplace health and safety. These are central to all stakeholders' group values and should not be over shadowed by the health and safety support agenda".*

4.3.2.8. Safety Policies Implemented in the Construction Industry of Saudi Arabia.

a. No Safety Policies

According to 10 participants in Saudi Arabia, they stated that there were no safety regulations. *e.g. "I cannot say that there are safety regulations in Saudi Arabia, but I would say that organisations take responsibility for that".*

b. International Safety Policies:

When asked of about safety policies used in the Saudi Arabian construction industry, five participants mentioned, international standards such as ISO 9001, 14001, 18001 etc. But all five participants stated that, on the ground, such policies are missing. e.g. *"normally on ground the presence of standardization is not seen due to missing legal gaps in the kingdom. The main reason for these missing standards is not on the lack of an official body to govern and monitor this industry in the kingdom".*

4.3.2.9. Role of the Government in the Formulation of Safety Policies in the Construction Industry of Saudi Arabia

a. Saudi Arabia lacks well publicised H&S regulations

Eight participants explained that even though individual organisations had health and safety regulations that they were using in-house the Kingdom of Saudi Arabian construction industry could do better to publicise existing H&S regulations so that they can be more pervasive. One stated that *"the problem is, in the construction industry, the contractor's H&S regulations have been copied from the American or British regulations. Due to the unclear H&S regulations during the construction stage, the implementation of a safety culture is still weak"*. They referred to the culture as being different and hence international H&S regulations need to be tailored to the culture and environment of Saudi.

b. Inspection

Four participants believe that the government has a crucial role in the inspection of the safety policy. As explained earlier, there is no safety government regulatory body making the inspection part difficult. e.g. *"Generally, in developed countries, the government has a safety regulation body. The task of these bodies is to prepare, review, and implement countries safety policies"*. It was explained that continuous inspections are needed to make sure that the country's safety regulations are being implemented effectively in every project.

c. Huge Responsibility

Government has a huge responsibility to implement and govern a systematic and standardised approach to the safety concerns and policies of the construction industry (3

participants). And to achieve this, participants stated that the Government must form a body/agency to regulate the business as per modern standards, practice globally to get benefits and minimize the cost, time spent and increase quality of safety policies. e.g. *"I think the country loses a lot from poor safety policies and poor implementation, and I think the government has a huge responsibility towards reforming safety policies in Saudi Arabia".*

4.3.2.10. Impact of safety Culture and Safety policies on Safety Performance

a. Positive Relationship

According to nine participants, the safety culture and the safety policy are inter-related and they affect the project performance positively or negatively depending on the nature of the culture. They explained that a positive safety culture leads to better safety policies and a better management of projects, and ultimately better products. e.g. *"I see a positive correlation there, positive and good culture leads to safety and better management".*

b. Safety Policy is the Backbone

It is explained by nine participants that the safety policy is considered the backbone of any organisation, which can lead organisations to run and achieve targets. *"I see the safety policy as the backbone of the organisation I work in. Poor safety policies reflect a poor organisational culture".* It was highlighted that good safety policy can be reflected in the personnel's behaviour, their method of work, cost and time, and the quality of the product.

c. Commitment

The culture of the organisation reflects the commitment (according to 9 participants) to safety policies. Such commitment is known to lead to better implementation and can influence the work force, how they work and achieve their goals/targets as per their policy. The more committed the organisation is, the more likely they are to allocate resources, train individuals and monitor safety. e.g. *"I see culture as a commitment to important aspects of the organisation and safety is one of them, and I assume that highly committed organisations have better policies and better end products".*

d. No Link

In the case of large and small projects in Saudi Arabia, there seems to be no standardized safety policies in large projects, and there is also a limited commitment to work systematically in most small projects. Labourers in both projects mention that they all work in terrible conditions without any safety standards and compliance with basic safety requirements.

4.3.2.11. Development of a framework for safety in the Saudi Arabian construction industry

a. Culture and Commitment-Positive

Ten participants explained that the culture reflects the industry has high level of commitment to the development of safety; and commitment reflects a positive cultural outlook from the industry. Depending on the type of commitment, the safety policies are implemented and this can affect the projects. Some companies might have poor commitment

leading to the poor implementation of safety regulations and as a result, poor end products in terms of safety. Hence, this relationship can be viewed either positively or negatively depending on the type of cultural commitment. e.g. *"the link is obvious: a good positive commitment leads to better safety and better projects and the opposite is true"*. Another participant stated that organisation culture and safety policies mirror the practices in the organisation, hence a commitment to a positive culture and to safety policies lead to better projects.

b. Commitment to Safety Regulations

Three participants stated that it is difficult to explain the relationship between culture and commitment, especially in terms of the safety regulations that do not exist. e.g. *"In Saudi Arabia, safety regulations do not exist, which gives the project client, consultant and contractor a huge responsibility in developing, and sustaining a safety culture in accordance with progress. Hence, the culture's effect cannot be seen to the full"*. It was further stated that the top management of an organisation makes Culture and their commitment (as stated earlier) is a key in ensuring a safe working environment.

4.3.2.12. Culture and Safety Policies Relationship

a. Culture of Commitment:

As explained in the previous question, it was repeated by 10 participants that the safety policy is a document only. They have highlighted top management commitment with the safety culture leading to the implementation of successful safety policies and standards. It was noted by one participant *"if the higher management is not committed, this is the mind*

set which reflects on the ground, their way of business, their employee's behaviour and production". It was also highlighted that the safety policy guides top management on how work can be accomplished with safety and quality. e.g. *"If there is a commitment in the use of the guidelines, then such commitment is reflected to the site, to the employees and in the quality of their work".*

b. Culture Determines Policies

According to five participants, culture determines policies, and that by highlighting clear responsibilities and duties to members of the organisation, safety can be determined and successfully implemented. It was noted that organisations should make safety as the responsibility of everyone and by doing so, safety becomes more positive. It was stated *"Safety policies are useless if the implementation is not in place in the organisation"*. Another participant highlighted that *"Policies adopted in any issue in life are formed by the culture i.e. past experiences, governing standards, environmental factors and the law. Therefore, the organisational culture, or the culture of the decision makers, is one of the main factors forming the safety policy in an organisation"*. It was explained that frequent assessment of safety determines future modifications and improvements in the organisation culture.

4.3.2.13. Key Factors Hindering Improvement of Health and Safety Practice

a. No Continuous Monitoring

Participants were asked to report factors that they thought could hinder the improvement of health and safety in their organisation. In doing so, it was highlighted that the most reported

factor is the lack of continuous monitoring to improve construction safety within a company. It was also highlighted that this is an issue that is often ignored in contracts. e.g. *"there are certain problems when it comes to continuity in monitoring health and safety. It is checked on rare occasions"*.

b. Focus on End Product

Also, 11 participants indicated that companies are mainly concerned with the end product and not the methods by which they are achieved. To the participants, most of the medium and small contractors were focusing only on the completion of the project, hence failing to address other issues including health and safety. e.g. *"I think companies are not concerned about health and safety, but they are concerned with the end product and the profit".*

c. Violation of Safety Rules

Eleven participants stated that some managers and supervisor are violating safety rules, and their violations set poor examples to the other workers. e.g. *"Many times, managers violate health and safety. As a result, other workers might think it is fine to follow suit"*. It was explained that instead of safety officers warning workers about violations on health and safety they see, these officers should report these immediately to the managers and other concerned authorities in the company.

d. Organisation Commitment

Organisational commitment to health and safety is considered a factor that hinders health and safety practices (3 participants). It is seen that if the organisation is not committed to meeting the high standards of safety, then it is impossible to fully implement safety

regulations. It was explained that the main problems when discussing commitment includes, the lack of communication between individuals within the organisation, the extra work load placed on some individuals, as well as the lack of competent individuals and resources for safety. e.g. *"A commitment to health and safety is achieved with the right resources, with communication, and competency"*. According to one participant, commitment is translated into different factors. It was stated *"commitment is translated into communication, coordination, control and competence. And one of the main things that hinder all of these factors is the presence of multilingual nationals who might not fully understand health and safety due to language barriers"*.

4.4 Case Study

4.4.1. Participants

Three case studies were undertaken for this study. In these case studies, the researcher interviewed fifteen expert participants from three large and different construction companies. After they were invited to take part in a research study and also before they decided, it was important for them to understand why the research is being done and what it will involve. The participants also had informed to ask if there is anything that is not clear or if they would like more information as well as to take time to decide whether or not they wish to take part. So, after they had read the consent form, they gave us the permission to disclosure the companies' names and their names as well. In this research study there were named as **Case Study A, B & C**

4.4.2. Themes

4.4.2.1. Safety Culture Applied

For Case Study A, the participant stated that, there isn't any specific safety culture. It was highlighted that the safety culture is being made and tailored as *per the client requirements*, project conditions, organisational behaviour and project team knowledge.

On the other hand, in case study B: The Participants in Considered culture and safety as an integral part *an organisation*. It is the legal, social, and economical requirement of an organisation to fulfil safety regulations in the company. Furthermore it was stressed that the *safety culture is implemented* and reviewed by management. In addition it was stated that

management commitment is the most important aspect in maintaining a safety culture at the workplace. Furthermore, it is present on a *continuous basis*, with responsible personnel planning their job with the assistance of the safety department. All workers are also *provided with* accident records regarding any new job prior to gaining safety on the job. In case study B, the participant went further to stress that the best way to implement the safety culture in their company is *to make it part of the law* or of the contractors building contract. Also, at the same time, to put it as *part of payable items* so that there is no way for any workers to excuse themselves whenever there is a safety requirement.

As for Case-study C, the participant stated that the safety culture that followed can be either of the following three which include:

1. International Safety Regulation, OSHA, HSE, ISO, ILO
2. Local Country Safety Regulations
3. Client Safety Requirements.

4.4.2.2. Company Culture Impact on Safety

In case study A, the participants explained that the culture is termed as "the way the people think and act upon as per the company's vision". It was further narrated that culture has an immense influence on safety, either positive or negative. It was explained that if safety is given the same importance as progress/production, then it will have a positive influence on the workers and vice versa.

The participants in case study B explained that culture is simply *"the attitude of the organisation".* This attitude includes the way they behave, their work procedures, as well as accident/incident records. Again and similar to the previous case study, it was explained that if the culture has a *positive approach to OHSE,* then it reflects throughout their business. But it was stressed that the top management is the main party responsible for implementing/enforcing OHSE, and that this should be one of their main responsibilities.

Such explanation was supported by participants C where it was highlighted that *the top management of an organisation makes culture* and their commitment is the key in ensuring a safe working environment.

4.4.2.3. Impact of Culture on Safety on Motivation and Output

According to participants in case A, the culture is being introduced and implemented through the will of top management. Therefore it was stressed that *top management must ensure that safety policies are implemented* in accordance with safety plans and guidelines. In laying out these guidelines and acting upon the safety plan, the employee will *feel confident* that the top *management cares* for them and would provide them a healthy and safe environment. In short, Participants in A sees that with the top management's careful implementation of safety policy, the employees would learn to trust them, they would in turn; increase their output when it comes to safety.

Participants in case B went on to explain that the organisational culture provides every employee *assigned responsibilities and duties*. The implementation of the safety policy is part of the employees' responsibilities. Participants in case C declared that if safety policies are not fully implemented then would be deemed useless. As a result, employees would be

less motivated to follow these safety policies. E.g. *"The implementation is down to management and a poor management culture also leads to poor implementation and to poor motivation".*

According to participants in case C, the safety culture had an utmost impact when it comes to reducing accidents in the workplace. Such culture consists of the management and the employee, their *attitude and commitment*, policies and procedures, their responsibilities and accountabilities, their training, motivation, including the 'you see you act policy'. Participants in case C sees that *" a strong safety culture cultivates employees at all levels, relentlessly encouraging, the identification and remediation of hazards, stopping each other when risk behaviour is observed, and also recognising each other when safe behaviour is perceived"*. Participants in C went on to explain that there is a culture known as the *"Blame Game"* in some organisations where members of an organisation blame others for failures in safety. He considers this a hurdle in the maintenance of a positive health and safety culture. This 'blame game' has to be eliminated because it can reduce the motivation of employees in terms of safety. Furthermore it was stressed that safety should not be considered a separate issue that is to be discussed during a weekly safety meetings, rather *"Safety should be a part of every conversation and considered in every decision within the organisation".*

4.4.2.4. Factors and Barriers Related to Implementation of Safety Culture in KSA

When discussing potential barriers associated with the implementation of the safety culture in the construction industry, Participants in case A stated that the *lack of coordination* between the different departments, the *lack of knowledge* of responsibilities associated with

the safety of the workers, the *lack of willingness* of responsible persons towards safety, and providing *less importance to safety* are key barriers in the establishment of a safety culture in the construction workplace. Participants in case A see that all barriers stem from a lack of clear safety policies on safety and the poor implementation of any existing safety policies from the top management to the employees. Furthermore, it was discussed that the *traditional mentality* is also an obstacle here, along with the *cost of safety.* "Top management and seniors might think of safety as less important when compared to the end product, and that following safety policies will cost money. This is an old view that needs to be changed".

In a similar view, participants in case B see that the *will to implement the safety policy* is the main barrier. Similar to participants in A, see that all barriers are associated with top management, and the crucial barrier is *commitment, and* the lack of will to implement the safety policy. He stated that the *"OHSE Department needs commitment and support from top management to implement a safety culture".* It was stated that there is a lack of *trained personnel* to follow the policy guidelines. *"Within the OHSE department, there is a lack of competent and trained personnel who can use this commitment to implement".*

Lack of commitment was another barrier mentioned by Participants in C. It was explained that the existing safety policies are not effective, also partly due to *poor communication* and a *lack of coordination* between different departments/people within the organisation. Another barrier is the lack of control and competence in the organisation in terms of safety policies and standards. Participants in C stated, *"a lot of the employees are not competent and not well trained to undertake safety policies, and there is little control over any*

successful implementation of the safety policy". When talking about coordination and communication, participants in C further explained, *"In the construction industry, there are a lot of foreign workers, who do not speak English or the Arab language. As such, language barriers hinder communication and coordination especially in terms of safety and communication within the construction company.*

4.4.2.5. Implementation of Safety Culture in Saudi Arabian Construction Industry

The successful implementation of the safety culture in the construction industry according to participants in A need to start with the company's *willingness* to implement safety policies, followed by regulatory bodies *strictly monitoring the workplace* to ensure that safety practices and policies are being fully observed. Participants in A also stated that there needs to be a regulatory body on safety. He stated, *"In Saudi Arabia, at the moment there is no regulatory body associated to the safety field"*. It is suggested that it is the responsibility of the *client and consultants* to continuously to monitor the safety performance of any company to provide them the guidance towards improving it. Finally it was suggested that construction companies must *provide equal importance* to the safety field including other technical fields.

Participants in B went on to explain the need for *safety legislation* in Saudi Arabia. He stated that *"the construction industry needs legislation, especially at the time of offering or signing contract client ensure that all work being carried as per standards and safety is the top most priority on all business".* It was suggested further that there needs to be a reward and punishment (discipline) initiatives to make sure that safety is being fully implemented in the organisation. It was explained that the company and the client should fully monitor

projects to ensure effective compliance of OHSE rules and regulation as specified in contract. It also was explained the construction company needs to be *disciplined* if they failed to follow strict safety, and that should be highlighted in contracts.

As for Participants in C, he sees that most construction companies in Saudi Arabia are not fully implementing the safety culture. He sees that for safety to be followed to the full *only top management* can do so. According to Participants in C, safety should *be prioritised*, and it should follow strict guidelines from top to bottom. It was further explained that the client needs to play a role, while safety standards should be clear. *"As well as we monitored inside the big projects in Saudi Arabia, there is a serious way of understanding the safety from the client side of the construction. Briefly, the best way of the guarantee for the safety implementation is to require high safety standards starting from the bidding to the completion of the projects".*

4.4.2.6. Safety Culture Influences on Safety Performance

Safety performance according to Participants in A an end product resulting from the organisation culture and the safety methods being applied. It was explained that they are all *interrelated*. It was also explained *"through culture, the organisation can decide to implement safety policies, and successful implementation can lead to better safety performance. So I would say one leads to another, either positively or negatively".*

Similarly, Participants in B explained that if there is a culture of safety then the working *conditions would be ideal with* everyone knowing his or her *responsibility* and also the responsibility of others. He sees culture as the model, which comes out after the implementation of the OHSE. If the organisation following or implementing OHSE is a

positive one, then everyone would be enjoying and working with their peace of mind intact. In negative circumstances, everyone suffers from top to bottom. *"In a negative culture, everyone loses. This can lead to stress, can decrease motivation and can ultimately lead to poor safety standards".*

Participants in C understand that all are related, and this is translated by following stepwise procedures which help ensure good safety standards. He explained that every project client has to *set some safety policies*, and their implementation needs to be *controlled regularly* from the top management, the consultants and the contractors. He explained that the *"Organisational culture assigns every member a set of responsibilities and duties. Implementing safety is part of their responsibility"*. Following such steps and responsibilities is crucial to safety performance. He stated, *"Safety policies are useless if their implementation is not in place by the organisation members".*

4.4.2.7. Improvements on Safety Performance

Safety performance according to Participants in A can be improved through a number of instructions. Crucially, and as stated earlier, the *support of top management* towards safety is crucial. There is a need for *coordination* between safety and other fields, possibly the hiring of a *competent project team* who knows their responsibilities towards safety.

On the other hand, Participants in B sees that such improvement can be achieved through different points. He sees that companies need to have rewards and incentives to enhance employee's performance; that there is a need for better communication with employees; that it is important to ensure a better welfare for employees; that there is a need to provide a safe working environment; that there is a need to provide sufficient training to employees and,

finally, there is a need to secure close monitoring and the review of policies and work procedures.

For Participants in C, to improve safety, top Management general policy *should follow a safety first condition* in all levels of their operations. Otherwise, he explains that the company cannot improve safety at work. It was further explained *"the companies that have a good safety performance have likely achieved such performance by setting forth a well-organised and successful implementation and monitoring of safety policies and activities".* He declared that among organised companies, successful safety monitoring improves everything in the organisation, including the *"quality, productivity, efficiency and the work conditions of the organisation".*

4.4.2.8. Recommendations for Culture and Safety Measures for Company

Participants in B summarised the different factors, which influence safety measures in the organisation. These factors include poor communication, lack of training and evaluation processes on workplace safety, lack of active monitoring and CAPA (Corrective and preventive action), fines and no rewards for job well done, and poor working procedures. E.g. *"for me all these points are commonly seen in construction companies. I think they all lead to poor safety performance especially when they all exist in the company".*

As for Participants in C, the main factors affecting the safety performance in the construction industry are the lack of commitment by the organisation's management, continuous change in management, and failure or poor implementation of safety policies. He further explained that the *"safety policies are ignored at most levels by the construction department. In the participant's construction firm, safety policies are not being*

implemented efficiently because managers and employees believe that having to observe or implement safety policies would only delay their work and because these personnel also believe that actually implementing and planning the safety policies would take up too much time, time delays which may cause the company money.

4.4.2.9. Safety Drills

According to Participants in A, their company conducts safety drills. In explaining it further, he stated that the drills include safety committee meetings to discuss safety, safety briefings to explain it to clients and workers, trainings on how to fully implement safety, toolbox, and instructions on leading a safe environment. He added, *"Such safety drills do not mean successful implementation. They exist but may not be a lot of use for the company".*

Participants in B stated that safety drills do exist and are conducted on monthly and yearly basis. The main form of safety drills come in the shape of training plans onsite, such as plans on what to do in cases of fire and injuries. Participants in C, stated that the company doesn't have any safety drills *"we do not have any safety drill in the company, there are plans but no actual drills"*

4.5 Summary

The results indicate first and foremost that there were eight factors related to the effects of implementing safety culture within the construction industry of Saudi Arabia, which had an Eigenvalue higher than 1, and the factors are credited for differences before and after Varimax rotation. Factors subject to principal component analysis include:

1. Commitment to Safety Procedure, Training and Practices
2. Importance of Safety Culture within Organisation
3. The influence of poor knowledge about Safety Culture at Workplace
4. Safety Culture value for employees in the organisation
5. The reward management system applications and employee performance toward safety culture
6. Poor implementation of safety culture within an organisation

These factors were related to items loaded in each factor. The reliability of each item under the factors was also evaluated. In general, the reliability of all factors was deemed relatively high with Factor 1 scoring with the highest reliability, and Factor 2 following next, and the least reliable being Factor 4. There were 29 items associated with commitment to safety procedure, including training, and practices. Highest ranked item based on results was on helping workers secure necessary training in order to avoid accidents and ensure safety. The next ranked item related to the relevance of the safety culture, and ranking third was the use of ergonomic and suitable machinery. These items represent the safety processes associated with the construction industry. The participants also declare that with the use of injury posters, their safety culture was not significantly affected. A notice board on injury management is also posted in their workplace; and yet, the poor safety culture in their workplace has not motivated them to follow safety instructions.

The participants also declare that where the safety culture was strong in some respects, feedback was often constant in terms of incidents related to safety issues within seven days

following any complaints registered on safety. The respondents also claimed that in times of management meetings, safety was a priority for participants. In factor 3 the poor knowledge about safety culture at workplace was noted with poor knowledge affecting any sort of commitment to best practices. In terms of the safety culture value for employees, the respondents agreed more on the fact that there was no commitment to safety practice causing employees to feel that the safety culture is not relevant.

In terms of the reward management applications in relation to the safety culture, the respondents believed that a reward system associated with safety was very much important to employees. In general, the respondents acknowledged that there was a poor implementation of the safety culture in the organisation. In considering each item or factor, a major disadvantage lies in the fact that not all staff members have induction trainings on safety. This problem was followed by the poor safety culture in the management level, prompting poor safety solutions in the workplace. There is also poor safety reporting processes, often prompting employees not to report incidents or to use the available poor reporting processes.

In the interviews, there were 15 participants interviewed. All of the participants were in the construction industry. Three experts from three construction companies were also interviewed. Themes were extracted from the responses. In general, the respondents answered by discussing how the construction industry is a multi-disciplinary field that includes a number of tasks and duties (e.g. building). The construction industry is also referred to as a hazardous job. Most of the safety policies include rules, which seek to secure procedures in the workplace. Systematic approaches to safety also seek to promote safety in

the workplace. Companies in KSA, according to respondents practice international as well as local safety policies. However, compliance is poor.

Moving on, participants were asked to explain the challenging factors that hindered the implementation of safety policies in the construction industry. They referred to a number of factors. It was stated by some that safety regulations do not exist, and that there is a lack of commitment when it comes to implementing safety from top management. Factors such as continuous changes in management, governmental role in safety, lack of training, lack of resources and contractors' behaviour were all considered serious factors and challenges to the safety policies and their implementation.

When explaining the role of the government in the formulation of safety policies, participants indicated that the Saudi government has a huge responsibility. It should act as an inspector of safety. Others explained that Saudi Arabia doesn't have health and safety regulations hence it has no role to play at the moment. Furthermore it was asked how organisational culture and safety policies influence project management performance. It was concluded here that the influence is positive, where positive cultures tend to implement safety policies and in return this leads to better project management. Others saw that the safety policy is the backbone of organisational success. It also translates to success on the field. It was again highlighted that the organisational culture is understood through the commitment to safety policies, and the more committed they are, the better end product they will have.

The culture within an organisation seems to have a positive association with the implementation of safety policies in construction projects. This is again translated through

the organisational culture and commitment to safety policy. Others stated that safety regulations do not exist in Saudi; hence it is difficult to judge any organisation in terms of their compliance and implementation of safety policies. Overall there seems to be a consensus on the organisational commitment to safety policies, and a higher commitment leads to better safety policy implementation in the construction industry.

Finally, and in the context of their organisation, participants were asked to summarise the main factors that hindered the improvement of health and safety in their workplace. It was evident that the lack of continuous monitoring is the main problem, followed by the violation of safety rules by the government. In general, the problem lies in the poor commitment to safety in general.

To conclude, the case studies, the three expert participants echoed what the 15 interviewees reported. They have provided answers that support what were found with regard to safety policies and organisational culture in the Saudi construction sector. It was reported that their companies tend to follow foreign safety policies, while acknowledging that there are a number of problems arising in the context of Saudi Arabia. They say that there is a negative link between the organisation culture and the way the culture implements safety policies and project outcomes. They clearly see that the top management commitment is the integral factor here. Positive commitment leads to better safety implementation. The top management is seen as the party to assign tasks and follow safety onsite. In terms of factors hindering the implementation of safety policies, they see that poor top management commitment is the main factor. They state that the lack of safety legislation and the inexistence of a safety regulatory body are also barriers to the implementation of safety

policies in the KSA construction industry. These issues result in the poor monitoring of policy in terms of safety. They also mentioned lack of coordination and communication as barriers. As for recommendations to improve the safety culture, the top management seems to be the best place to start. There also needs to be more commitment, a regulatory body, and legislation to ensure the implementation of safety policies in the construction sector while also providing instructions for improved safety policies. Overall and similar to the interviews in the previous section, top-management and its commitment to safety can be seen as one of the main factors which can impact on safety in the workplace.

5. CHAPTER FIVE: DISCUSSION

5.1. Introduction

The discussion chapter has started with the overview of the problem related to the safety culture within Saudi Arabia construction industry, the overview of the findings related to the study, and then the research questions related to the research objectives. This research study has been able to present the general conditions of safety in the Saudi Arabian construction industry. The respondents in this study, who are stakeholders in the construction industry of the KSA, admit that there are huge problems in the safety of the construction industry in the KSA. They mention, among others, the lack of safety regulations and laws in the country, the poor implementation of existing safety policies, and the non-engaging attitude of the workers towards safety regulations and policies in the Saudi construction industry. The safety culture in the construction industry is not fully incorporated or integrated into their daily activities. Major changes in the structure and attitudes of the country and the construction industry are needed before a culture of safety can be seen. From the previous chapters, it can also be noted that the Saudi Arabian construction industry is surrounded with issues on its most basic level, with the knowledge on safety very much poor and regulations for safety in the workplace virtually non-existent. This study also specifically presents the different elements of safety as well as safety in the construction industry. The gaps in safety have been identified by this study, with the construction industry respondents specifying their perspectives on safety.

5.2. Overview of the problem

A culture of safety in the construction industry is not in place in the KSA. Based on the accidents and injuries in the construction industry in the KSA, safety regulations are not being fully implemented. However, such poor implementation is also founded on a deeper problem of limited or no specific laws or regulations on safety for the construction industry in the KSA. The current Saudi Arabia conditions for their construction industry is unsatisfactory in terms of safety, with risks on the safety and life of the workers a major problem for the leaders and the managers of the construction industry. The policies in place in Saudi in relation to safety are not sufficiently extensive and implemented, and the safety culture has not infiltrated the industry to an acceptable of performance. It is therefore difficult to expect good implementation of safety regulations when there are limited regulations on safety in the country.

5.3. Overview of the Findings

As was mentioned in the summary in the previous chapter, the construction industry in the KSA has inadequate safety regulations. As a result, there are limited safety policies and regulations on safety, which the workers and managers in the construction industry can follow, or implement. Even though there are weak health and safety standards for the Saudi construction industry in general, results indicate that there is a positive outlook for safety culture has the potential to underpin the evolutionary development of highly publicised standards for safety. This implies that the industry is fertile for a fully implemented conscious attitude or behaviour on safety. Major improvements in the safety standards and

practices in the KSA construction industry are therefore needed in order to achieve a culture or safety in the industry.

These findings also indicate that the workers are being subjected to poor work conditions, conditions which continually endanger their life. Findings also show that at organisational level, workers and the managers alike could improve in terms of demonstrating a culture of industry wide embracement of the safety as they show in their respective workplaces. It means that organisational practice of safety have an element of strong safety culture does not reflect the Saudi construction industry as an industry-wide culture. As a result, the safety precautions they should be observing in the workplace are not being observed automatically when they enter the construction site and while in the site, they do not protect or observe safety practices.

5.4. Research Question One

The type of organisational culture, which exists in the construction industry in Saudi Arabia, cannot be easily defined. In general, it may be said that they are goal-oriented because they are focused on achieving their goals in relation to the completion of their construction activities. However, in terms of safety policies, they are not goal-oriented or policy-oriented. In fact, in their drive to finish their construction activities and goals, they have also sacrificed any commitment to the safety of the workers. The organisational culture in the Saudi Arabian construction industry is also only reactive to any accidents in the workplace. Such culture has not allowed for the institutionalization of safety into the daily practices of the workers and the company in general. The organisational culture is also not supported

by regulations and policies on safety; as a result, it is difficult to expect the workers and leaders to comply with any safety policies.

5.5. Research Question Two

The impact of a safety culture in the KSA is very poor, mostly because the safety culture in the Saudi construction industry is not structured, not standardized, not regulated, and not set in place (refer to sections, 2.8, 4.3.2.10, 4.4.2.2, and 4.4.2.3). As a result, it is difficult to measure to any significant degree the impact the safety culture has had on the construction industry in the KSA. A safety culture would imply a set of behaviour practiced by a group of individuals, applying such to their activities and decisions in the workplace. In the Saudi construction industry, such set of behaviour or actions have not been set and therefore, no definitive culture of safety can be observed in the country's construction industry.

This is unfortunate to note because as was mentioned earlier in the literature review, establishing a culture of safety in the construction industry is important. Saudi however has not fully integrated such culture in their construction industry. There seems to be an attitude among personnel and managers working in the construction industry that safety are a western concept which does not need application in Saudi. As such, the culture of safety is not a natural culture or natural behaviour or habit in the workplace. Workers have to be reminded to wear safety gear when they enter a hard hat area because for a long time, many of them have entered their workplaces without having to wear all the gear. It is also common for these individuals to reason that they have not suffered accidents in the past when they did not wear safety gear. Under these conditions, setting forth a safety culture is hardly an

easy task where the attitude of the labourers is not open and not welcoming of change or of practicing a safety culture in the workplace.

An important aspect of the safety culture which has been noted in this study and in previous studies is the prevention of accidents. Errors or accidents are often present in any organisation. However, the workers are usually considered the last defence in preventing such errors or accidents in the workplace. In other words, it is the ultimate responsibility of the frontline employees to prevent accidents (Eif, 1999). It is also important to recognise that companies who have a good and well-placed safety culture are able to empower their workers, ensuring that they do understand their role in ensuring the safety culture of the workplace. Although not mentioned specifically in the results above, empowerment relates to the employee's perception or his attitude based on the designation of authority or more responsibilities from the managers. In essence, for the empowered worker, he would feel the weight of the responsibility of management in securing the safety of the workplace. Under these conditions, the safety culture of the workplace would be something preserved and ensured by both the workers and the managers. Moreover, with a more empowered attitude, there is a greater motivation to make a difference in the workplace, or to go beyond the usual call of duty in order to promote and protect the organisational safety (Geller, 1994).

In the context of a safety culture, the empowered and more cooperative employee also has a say in the safety decisions for the company. These employees can initiate and also secure safety changes, and more importantly make themselves and others accountable for their violations of safety. Pride in helping maintain the safety culture can therefore be felt by the employee. In the results for this study, there is not link between the safety culture and the

employee. As a result, the workers do not own up to their end of ensuring corporate or construction safety. This disconnect has also been apparent for company leaders who are not fully aware of their responsibilities in ensuring the safety of the workplace.

The culture of safety in the workplace is also associated with the reward systems in the organisation. Safety practices have to be recognised and honoured, and unsafe practices have to be assessed. Doling out rewards and punishment for safe or unsafe practices must be based on clear and consistent evaluations (Reason, 1990). Fairly determining the observance of safety practices can help in eventually developing a culture of safety in the workplace. The concept of rewards and recognition in relation to safety practices in the Saudi construction industry needs to be reinforced.

5.6. Research Question Three

The safety policies being practiced in the Saudi construction industry are the policies founded on international standards (American, British) (chapter 1, background of the study; chapter 2 literature review). This would mainly cover the use of hard hats, PPEs, and protective gloves. However, even these policies are not being fully implemented and observed in the Saudi construction industry. The Saudi construction industry has very limited rules and standards of behaviour which are expected for implementation and which are expected to be followed by workers and managers in the industry. Moreover, majority of the respondents admitted that they have poor knowledge of these policies if they do actually exist.

An important aspect of safety policies and gaps in these policies within the construction industry relates to the poor knowledge of the workers about these policies. Accidents in the construction setting do not just happen, they are caused by different factors and gaps in safety practices. The results indicate how majority of risks in the workplace and the construction setting are from unsafe acts and conditions (Ridley, 1986). From these results, it can be deduced that accidents are not preventable. Where there are unsafe acts in the workplace, hazardous physical conditions are created and these can have a direct impact on the safety of the workplace. Majority of accidents often come about due to various causes and some of these causes have already been mentioned in this study. Blame has been placed on managers, workers, and conditions in the work place. At present, models can be used in order to help understand accidents in order to ensure that sufficient actions are undertaken in order to prevent future incidents. Still, in order to ensure a more permanent improvement in behaviour, the actual causes of the accident have to be established. In the Saudi Arabia setting, one of the primary causes for accidents and workplace injuries in their construction industry has been the limited knowledge and training of the workers on workplace safety. Without proper training and limited knowledge on safety, workplace accidents can occur (Kartam and Bouz, 1998). In some of the instances where safety was not observed, workplace accidents were observed (Abdelhamid and Everett, 2000). The risk of these accidents occurring also in the construction industry of Saudi Arabia is therefore very much high. Risks in the workplace include the failure to wear personal protective equipment, inadequate training in the operation of machinery, unsafe work habits, positions, and posture, as well as unsafe actions. Other studies also mention these workplace risks and

where a strong and effective culture of safety exists in the workplace, these accidents are not preventable (Lubega, et.al., 2000).

The role of leaders in the workplace setting and in ensuring safety is also very much important. The supervisors in this study acknowledge and recognize the fact that by taking the lead in the workplace, they would be able to ensure their worker's safety and prevent any accidents from taking place. The construction workplace is an especially hazardous work environment and without the proper safety precautions undertaken, accidents will occur (Lubega, et.al., 2000). In associating these results with the accident incidents in Saudi Arabia, the causes of such accidents can now be determined, and these accidents can actually be prevented. However, the vigilance of both workers and supervisors in the workplace is essential to preventing these incidents.

5.7. Research Question Four

The factors affecting the implementation of safety policies in the KSA construction industry include: the lack of set rules and laws specifically laying out the standards of safety which workers and managers have to comply with; inadequate information dissemination on these safety policies in the KSA, inadequate training for personnel and managers on safety in the workplace in the construction industry of the KSA, and the lack of implementation tools and resources for safety in the KSA construction industry (refer to sections 2.15, 4.2, and 4.3.2).

The factors affecting workplace safety in the construction industry are common factors also noted in other studies by other authors. Both in developed, but mostly in developing

countries are these factors often seen because of limited resources to ensure a safe workplace. In the Saudi construction industry, these factors relate to both worker and leader issues in the workplace. The workers cannot be expected to actually be vigilant about workplace safety, if their leaders and supervisors are not very vigilant about ensuring their safety and about supervising their workplace safety.

In analysing these different factors, it can also be noted that all the factors affecting workplace safety in the construction site affect the work conditions in Saudi Arabia. This proves that workplace safety is based on different factors present in the workplace. These factors when considered as a whole would help explain why workplace accidents occur and the frequency by which they occur. While the workplace supervisors have the burden of setting forth safe work conditions, the employees themselves have to make an equal commitment to safety. Workplace risks can be attributed to both the negligence of the workers and the supervisors and when these acts converge, accidents occur. There are minimal safe work conditions expected in the workplace and some of these conditions can be highlighted by the workers themselves as reasonable and logical individuals. For employers, the workplace in the Saudi Arabia seems to need a lot of improvement and only when these improvements are implemented can reasonable expectations on safety be made.

5.8. Research Question Five

The framework presented previously for this study is the Bergersen maturity model (2003) where the higher level of maturity the company has, the higher its level of safety is (refer to sections 2.12, 2.15, and 4.3.2.11). This can be considered an effective model in the case of Saudi Arabia because it can be immediately established from the results that its level of

maturity is at only on the reactive level. Based on the results, most of the workers and employers believe that safety is importance, "we do a lot every time we have an accident". In some cases, it has also been noted that its safety maturity is at its pathological level where the workers and leaders do not care about the safety culture, as long as they are not caught. This was one of the noted answers during the interviews where it was mentioned that contractors only cared about profits, and not about ensuring that their workers were safe in the site. This same uncaring attitude was also noted among managers who were not too concerned about the safety training which the workers had to participate in. This model is also appropriate for the Saudi Arabian construction industry because this safety model provides a step-by-step process for securing safety. It also indicates which aspects of safety should first be prioritized before any other aspects of safety should be addressed. The model also provides options for work sites where culture is hardly a priority and ensuring that safety would later be given more priority. This safety model also highlights the importance of establishing a culture where the people are eager to report their errors on safety concern in the field. This model also focuses on a just structure or culture where the people would trust each other to report any safety issues and ensure that any issues would be addressed and good practices are rewarded. Under this model, the flexible culture is promoted, aside from the learning culture and the eagerness to implement the necessary policies.

The results also indicate that Saudi Arabia is not in the third level of maturity (calculative) as it does not have specific policies and regulations on safety. Its current policies are borrowed from international policies. They have not therefore also reached the proactive level and definitely not the generative level of safety.

Based on the results, factors which can be used in order to develop the framework of culture and safety is to eliminate the uncaring attitude which workers and managers have in terms of safety. As soon as these workers start to significantly care about safety, they are likely to move up in terms of maturity for their company.

5.9. Chapter Summary

In summary, this chapter indicates the general conditions of safety in the Saudi Arabian construction industry. In general, it admits that there is a weak culture of safety in the construction industry in general, however, there are strong signs that individual organisations have a positive view of safety hence they would be developing a safety culture in Saudi Arabia. Currently, the many accidents and injuries in the construction is a sign of individual safety practices at organisational level; hence there is a need to secure safety policies in order to influence an industry wide safety culture. The Saudi Arabian construction industry does not have specific and comprehensive policies on safety for its workers and managers, making it difficult to ensure safety standards. The organisational culture in Saudi Arabia is also not easy to define. In general, their culture is goal-oriented because they focus on the achievement of goals in the construction industry. The impact of a safety culture in Saudi Arabia is very poor mostly because the safety culture in the country is not structured or regulated. Consequently, it is difficult to assess the actual impact of a safety culture in the construction industry in Saudi Arabia. Safety policies observed in the country include American and British standards; however these policies are still not being fully implemented in the Saudi construction industry. Factors impacting on the implementation of safety include limited provisions of law on safety, inadequate training of

managers and workers on safety, including the lack of tools for the implementation of safety in the Saudi Arabia construction industry. The Theoretical framework presented for this study with guiding from Bergersen model. The Bergersen maturity model wherein as a higher level of maturity for a company is seen, the higher its level of safety also is. This can be applied in Saudi Arabia because it can be immediately seen from the results on the maturity level of the construction industry where a reactive level is the highest level reached. A higher level of maturity for the construction industry needs to be reached in order to improve attitudes on safety and to eventually improve safety levels.

6. CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This Chapter has started with summarising the outcomes of the study and how it will be useful for the stakeholders in Saudi Arabia construction industry. Then, it moved to answer the questions which related to the research objectives. And then introduced a developed framework to be presented to the stakeholders in Saudi Arabia construction industry. Limitations and recommendations for future research, practice, theory, and knowledge. Finally, further research recommends more studies which have to be considered in the other workplace settings in Saudi Arabia and safety conditions therein.

6.2 Conclusion

In conclusion, it can be noted that the safety in the construction industry in the KSA is weak; even though individual organisations have demonstrated that they have a positive outlook for safety culture. Some of the key factors stifling the evolvement of industry wide safety culture have been the inadequate policies and regulations on safety in place. There is also poor implementation of any safety policy in the construction industry. The workers and managers are also unaware of safety expectations on their part. As a result, a culture of safety in the construction industry in the KSA seems to not have any impact on worker safety. Even though the empirical evidence states there is a positive outlook to safety culture in organisations, this perception does not transcend the whole industry. A major overhaul of any safety culture in the KSA has to be undertaken before any changes can be seen or observed (refer to sections 4.4.2.3, 4.4.2.4, 4.4.2.5, and 4.4.2.6).

This study concludes that in general, there are inadequate policies and regulations on safety for workers and managers in the Saudi Arabian construction industry. Also, the safety culture is not being supported by related standards on safety or clear conscious attitudes or behaviour supporting safety. Significant changes in safety standards in the Saudi Arabian construction industry therefore have to be considered by the policy-makers in the country, including the major businesses and corporations in the region (refer to section 4.3.2.8).

It is difficult to define the organisational culture in the Saudi Arabian construction industry. In general, however, the industry is goal-oriented as they seek to meet goals in order to fulfil their construction work and projects. However, as far as safety policies are concerned, these cannot be said to be goal oriented or even policy-oriented. It may however be admitted that in the desire of these companies to fulfil their construction activities and goals, they have as good as compromised their commitment to the safety of the construction workers. This in its very essence is the unfortunate reality for the Saudi construction industry (refer to section 4.5).

As far as an impact for a safety culture in the KSA, the impact is considered poor due to the unstructured, non-regulated, and non-standardised construction situation in the country. At present, it has proved challenging to actually measure the actual impact the safety culture has on the Saudi construction industry. The safety culture also relates to different behaviour often applied by different individuals, including activities and decisions in the work setting. For the Saudi construction industry, the specific behaviour including actions on safety have not been indicated and set in place in the past, and the current setting cannot be expected to

actually develop any safety structure when there is no precedent for it (refer to section 4.3.2.7).

This is an unfortunate reality for the Saudi construction industry. The literature review also supports such results. The review also cites areas where Saudi needs to improve its safety practices. The literature review discusses that factors affecting safety in the construction industry include the limited commitment of the managers to the safety of the construction workers (refer to section 2.15). The literature review also mentions the lack of training on the part of the workers in terms of safety standards which have to be observed. The value of planning for safety in the construction industry has also been mentioned in the literature review. These points have all been observed and noted in the results where failure of the managers and workers to commit to the policies on safety has been identified as a major issue in the Saudi construction industry. Related issues regarding compliance which have been highlighted in the results include failure, lack of training and lack of planning for safety within construction industry. Saudi has not fully accepted and embraced safety in its workplace, not just in the construction industry but also in the workplace in general (refer to section 4.4.2.8). The attitude for personnel as well as supervisors in the construction setting as far as safety is concerned still based on western standards which may not necessarily apply to the Saudi setting. The culture of safety does not come naturally to the workers in the construction setting in Saudi. It is noted from the results that workers have to be reminded that they have to wear hard hats in the field, and the leaders and managers do not reprimand workers for failing to wear the safety hats. The attitude of the construction workers also does not seem to be serious towards construction safety. They believe that accidents are unlikely to happen to them and that supervisors are not being strict with them

on the wearing safety gear or the observance of safety rules in the workplace. It can therefore be difficult to impose or plan a safety culture where the attitudes of the workers are not open to safety practices or a safety culture in the workplace (refer to section 4.4.2.3).

A very important element related to the safety culture, which has been established in this study, is the importance of preventing accidents. Most incidents relating to workplace injuries come about due to errors in the workplace and sometimes accidents in the workplace. These errors are all too common in many organisations, which do not have a culture of safety. One of the primary parties party to the prevention of these errors or accidents are the workers themselves. Their vigilance and their dedication to the safety culture can create a safe workplace. It is also crucial to recognise that companies with a good safety culture can motivate their workers to observe the rules and standards of a good workplace. The empowered worker also helps ensure that the working conditions are safe and where any unsafe conditions are observed, worker would not be afraid to speak his mind about it to his managers or supervisors. He would also share responsibility therefore in ensuring that the workplace is safe. The workplace is therefore an area where both workers and managers are engaged in, with issues therein a part of their responsibility (refer to section 4.5).

In relation to the safety culture, the empowered worker has a significant impact on the actual running of the company. It is their responsibility to speak and to air their grievance about the safety of their workplace. Any violations on safety are not just the responsibility of the managers, but are also their responsibility. Based on the results, the safety culture and the employees seem to be two separate entities. The workers are denying their share of the safe

workplace, and the safety climate is not promoted in the workplace. The disassociation has also been seen for the managers and leaders who are not sufficiently aware of their share in promoting the safe workplace (refer to section 5.4).

Based on the results, safety in the workplace can also be related to the rewards system within the construction setting. These practices have to be rewarded with the unsafe practices punished. The system of rewards and punishment has also to be consistent. Ensuring safety practices can also help establish a more welcoming workplace, one where the workers would feel comfortable and safe. Rewarding good behaviour and compliance is huge step towards promoting such comfortable and safe climate. The punishment system would also make the workers recognise the risks they are encountering on a daily basis, and how unsafe practices have to be discouraged (refer to sections 4.4.2.5 and 4.4.2.7).

Safety practices being applied in the Saudi construction industry can be based initially on the policies already set in the US and the UK. These countries already have a wealth of experience in the construction workplace and the possible dangers in such setting. These countries have also developed policies which are already meant to reduce the risk of the hazards in the construction setting (refer to sections 1.2& 2.13). Saudi Arabia can learn from these countries, and can localise its policies to meet the specific qualities of Saudi Arabia in terms of its culture, climate, resources, worker demographic, presence of foreign workers, and language. Accommodations for the Saudi Arabian workplace must be made in order to help ensure that the necessary adjustments to the workplace would fit the needs of the Saudi construction worker. While both the US and the UK provide effective policies

on construction safety, they are still based on western standards which may not necessarily fit the economic and cultural conditions in Saudi Arabia (refer to sections 4.3.2.3 & 5.6).

Very important aspect of the safety culture and policies noted in this study include the fact that the workers and managers do not have sufficient knowledge of construction safety. The managers are sometimes not aware of the policies in place in the construction setting and as such, the workers are also not aware that there are safety practices they should be observing in the workplace. Even with the knowledge that there are safety policies which should be in place in the workplace, some workers and managers do not know how to implement these practices. As a result, they are unknowingly creating their own unsafe workplace. These workers may sometimes be oblivious to the fact that accidents in the workplace can be prevented. Blame is sometimes placed on the lack of safety policies even if there are actually policies in place, only that these are being poorly implemented. It is important to understand that when the workers are fully informed about safety, their vigilance in the workplace can be increased, and the risks and hazards in the workplace can be prevented and managed better (refer to sections 5.6 & 4.4.2.3).

Leaders are at the very frontline of implementing workplace safety policies and regulations. Supervisors are aware that they have to set a good example in the workplace and that they would be strict in imposing safety standards and policies. There are inherent dangers of the construction workplace and as such, the leaders have to be extra vigilant in order to provide better outcomes for the safety of their workers. As pointed out in the statistics on Saudi Arabia, the causes of construction accidents are already known, and it is only a matter of

addressing the different causes in order to provide a safe workplace for the worker. However, all parties have to work with each other (refer to section 5.7).

A clear set of rules and standards are needed in order to secure a safe workplace in the Saudi construction industry. Information dissemination is poor in this context and the vigilance of managers towards information dissemination is very much needed. There are worker and leader factors affecting the safe workplace and in assessing the situation, the site can be made as safe as possible where the burden of safety is borne by all stakeholders before, during, and after the project has been completed. Through such vigilance, an escalation of the issue can be prevented (refer to section 5.6).

Throughout this study, the participation of the government in ensuring construction safety has not been considered to a significant extent, and yet, their role actually very much crucial because they are the parties who would draft, frame, and implement regulations on safety. The government can also provide sanctions towards construction companies who are seen to violate the rules on safety. They can make demands on these companies, for them to be more vigilant in the workplace, and to provide standards or behaviour. Ultimately, the government is an important unit in the workplace safety of not just the construction sector, but all workplaces (refer to section 4.3.2.9). Without its support, the policies cannot be laid out and any actions associated with workplace safety would not be as reliable or valid. Based on the different objectives, it can be concluded that there is no specific type of organisational culture prevailing in the Saudi construction industry. Secondly, the culture of safety does not have a significant impact on the Saudi construction industry, only because such safety culture is poor. As such, there is insufficient data available to establish or

indicate the impact of safety culture on the Saudi construction industry. Factors which impact on the implementation of safety policies in the Saudi construction industry include the lack of standards and policies specifically established for Saudi; poor awareness and information known by the workers and supervisors on safety practices; poor implementation of any safety policies in the Saudi construction industry; and the lack of resources of the Saudi construction industry in order to impose safer practices in the workplace (refer to section 4.2).

6.3 Research objectives which were set out to be answered by this research

6.3.1. Objective one: To investigate the type of organisational culture prevailing in the construction industry in Saudi Arabia.

Question; What are the organisational cultural trends typifying Middle Eastern construction firms and how to these trends compare with the international standards and practices in safety?

The Middle Eastern corporate culture is different from the rest of the world in the sense that it is still very much traditional in its practices and work beliefs. Specific factors affecting organisational culture in the construction industry relate to the lack of any advancement in terms of safety practices in the workplace. There have been no upgrades on work safety, owing to the fact that minimal changes on traditional work practices have been seen in the Middle East.

6.3.2. Objective two: To explore the impact of the safety culture on safety performance.

Question, to what extend does the safety cultural practices of an organisation impact organisational safety performance in the construction industries around the Middle East?

The various manners by which culture and safety measures taken by the organisation could affect the performance of the company in the construction industry in the Middle East implies better performance in the work and productivity of the company, including better employee retention, as well as lesser costs associated with errors and work accidents. Such impacts are different from other companies because the construction companies are more likely to encounter work accidents as compared to other companies (refer to section 2.2.2. & 2.11.1).

Question, what is the influence of culture on safety that can be associated with employee motivation to increase their output?

The culture of safety can influence the employee motivation because the employee would feel safer at work and would feel valued as a worker. As such, better productivity can be expected (refer to section 4.4.2.6).

6.3.3. Objective three: To discuss the safety policies practiced in the construction industry of Saudi Arabia

Question, what safety policies do construction organisations implement as the promote safety in their business environments within the construction industry of Saudi Arabia?

The construction industry is defined as the industry which is involved in the construction of various infrastructures including buildings, road works, and other similar infrastructures. Safety policies relate to the standards which workers should follow in the workplace in order to prevent accidents or workplace errors (refer to section 2.9 & 4.4.2.5).

The safety policies being observed in the Saudi construction industry are the international standards of safety, including standards recommended by western nations like the US and the UK (refer to section 4.3.2.3). The government has a significant role in the formulation of safety policies in the Saudi Arabian construction industry because it has the responsibility of legislating policies on safety and strictly implementing these on the construction industry (refer to section 4.3.2.9).

6.3.4. Objective four: To explore factors affecting the implementation of safety policies in the construction industry of Saudi Arabia

Question, What is the significance of safety rules, regulations and law to the formulation of safety policies in the construction organisations and to what extent do safety policies under the regulatory framework foster the implementation of safety in the work place?

Factors and potential barriers related to the implementation of the safety culture in the construction industry poor management commitment; lack of policy on safety; and poor training of personnel on safety (refer to section 4.4.2.4). The management has a significant role in promoting the safety culture. Their role is to implement the safety culture to the company and its personnel. Their role is to provide punishment for violations and rewards

for compliance of safety regulations. Their plan is also to plan a safety policies for the company and its personnel (refer to sections 4.3.2.7 & 4.3.2.9).

6.3.5. Objective five: To develop a framework on safety culture leading to better construction safety performance in Saudi Arabia.

Question, what are the main factors used to develop the framework of culture and safety that could have a significant impact on fostering safety in the construction industry of Saudi Arabia?

The main factors used to develop the theoretical framework of culture and safety include involvement: assigned responsibilities and duties management Attitude: blame game & positive culture; safety policy implementation; necessary proper training; work procedures for accident records; commitment to Safety regulations and lack of knowledge, and negligence toward safety (refer to section 4.2, 4.3.2.11, and 6.4) Both the organisational culture and safety policies affect the project management performance in Saudi Arabia in the sense that they both establish how a project is carried out, and what policies would be applied while the project is being carried out (refer to section 2.4.2.10).

6.4 Contribution to Knowledge

The main contribution to knowledge from this research has been the revelation of the fact that there is no tangible mechanism for which companies in the construction industry of Saudi Arabia can use to operationalise safety culture with a view to positively influence the safety performance of the business. The research has also contributed to the knowledge by establishing a framework (section 6.4 below) that can be used by organisations to institute

measures of influencing safety culture and seek to improve safety performance. With the proposed framework it is possible for construction businesses to establish correlations between organisational safety culture and safety performance so that strategic managers can highlight key areas to invest if they are interested in uplifting the safety performance of the business. Establishment of the framework has the potential to engage all levels of management and shop floor operatives so that they can all commit to a developing a positive safety culture for better safety in the workplace.

6.4.1 Developed Framework

The framework in Figure 6-1 has been developed with guiding from Bergersen maturity model (2003). With this model, companies are graded based on 5 levels. The more mature a company is, the more likely it is that it would adhere to safety culture principles.

Based on the secondary data in chapter two, the literature review section 2.16 and Figure 2-8, has discussed the theoretical framework for this study. Moreover, the fifth objective for this research was to develop a framework on safety culture leading to better construction safety performance in Saudi Arabia as well as helping stakeholders in the construction industry to understand better the correlation between the safety and organisational culture, and to make a connection with the overall improvements in the productivity of the industry when both of these factors have been considered into a collective concept known as safety culture. The theoretical framework was created based on the findings of literature review. It was then adopted to from the developed framework based on the outcomes of the interviews and questionnaires. Most of the elements that are mentioned in the theoretical framework

for this research have been discussed, and analysed. The final presented framework for this research will be suitable for contractors to use in the construction industry.

6.4.2 Outcome elements for the First Tier of the Safety Culture Development Framework

The framework for this research has been updated based on answers from participants who participated in the survey stage & case study as well.

6.4.2.1 Actions from the Organisation

There are three major actions that need to take place, as far as organisations operating in the industry are concerned.

(i) Firstly, establish clear level safety policies at all levels of organisational hierarchy. This includes things like training, responsibilities, penalties, rewards, internal records and resourcing.

(ii) Secondly, establish clear level of participation, duties and responsibilities for management, and leaders of the gangs so that there is a procedure to follow and positions to be held accountable;

(iii) Thirdly, there should be a system to measure management influence, attitude, and behaviour towards safety policy.

The three major steps from the framework on Figure 6-1 emanate from the results that show support for the immediate change in the way safety is managed. Refer to sections 4.4.2.3. & 4.4.2.6, Participants have explained that the organisational culture provides every employee assigned responsibilities and duties. The implementation of the safety policy is part of the employees' responsibilities. They also declared that if safety policies are not fully

implemented then would be deemed useless. As a result, employees would be less motivated to follow these safety policies. An example was given by one of the participants who said that the implementation is down to management and a poor management culture also leads to poor implementation and to poor motivation.

According to participants (refer to section 4.4.2.3), the safety culture has an utmost impact when it comes to reducing accidents in the workplace. Such culture consists of the following: management and the employee/ their attitude and commitment/ policies and procedures/ responsibilities and accountabilities/ training/ motivation, including the 'you see you act policy'.

Participants see that a strong safety culture encourage employees at all levels, continuously encouraging, the identification and remediation of hazards, stopping each other when risk behaviour is observed, and also appraising on another when safe behaviour is observed. They explained that there is a culture known as the "Blame Game" in some organisations where members of an organisation blame others for failures in safety. This 'blame game' has to be eliminated because it can reduce the motivation of employees in terms of safety. Furthermore, they stated that it is stressed that safety should not be considered a separate issue that is to be discussed during a weekly safety meetings, rather "Safety should be a part of every conversation and considered in every decision within the organisation".

Refer to section 4.4.2.6, other participants explained that if there is a culture of safety then the working conditions would be ideal with everyone knowing his or her responsibility and also the responsibility of others. They see culture as the model, which is direct result of the implementation of the Occupational Safety & Health Administration (OHSE). If the

organisation following or implementing OHSE is a positive one, then everyone would be enjoying and working with their peace of mind intact. In negative circumstances, everyone suffers from top to bottom. “In a negative culture, everyone loses. This can lead to stress, can decrease motivation and can ultimately lead to poor safety performance”.

Similarly, there are further elements implemented in the updated framework which lead to safer working conditions with reduced employee accidents and death.

1. Necessary proper training.
2. Work procedures for accident records.
3. Commitment to Safety regulations
4. Lack of knowledge, and negligence toward safety.

Refer to section 4.2.2, this section includes 29 items describing commitment to safety procedure, its training and practices. All items generated more agreement than disagreement. However when reviewing all items and by looking at the descriptive statistics (see table 4.10) it was evident that the highest ranked item was the one stating that the advantages of safety culture is to make people receive the necessary training to avoid accidents and maintain safety. In the analysis section 4.2.3 “Commitment to Safety Procedure, Training and Practices” generated the highest mean score in terms of agreement. Refer to section 4.3.2.7 five participants said that, they have been in the company for a number of years and have rarely heard of a training course that targets safety. They also stated that the employees and their managers do not receive training when it comes to safety, and the lack of training leads to the poor implementation of safety policies. Refer to the same section 4.3.2.7 three other participants stated that the government should play a more

prominent role when it comes to ensuring safety measures also highlighted the role of the government. The government should play a more critical role in stricter legal enforcement and organising safety training programs.

Refer to section 4.4.2.1 participants stated that management commitment is the most important aspect in maintaining a safety culture at the workplace. Furthermore, it is present on a continuous basis, with responsible personnel planning their job with the assistance of the safety department. All workers are also provided with accident records regarding any new job prior to gaining safety on the job. Refer to section 4.2.2 that the least agreement was generated for the items stating that the company's safety culture does not give the respondents enough time to learn safe work procedures. Participants also highlighted that there is also poor safety reporting processes, often prompting employees not to report incidents or to use the available poor reporting processes (refer to section 4.5).

6.4.2.2 Actions from the Industry (Government Body)

The three major steps for the industry to take in the short term are as follows:

(i) Establish a regulatory and standards institution that can oversee the issuance of the regulations. This includes the industry training, dissemination of standards and regulations and clear mandate or body of authority;

(ii) Establish a mechanism for collecting accidents and incidents record keeping from every project in order to establish a pattern for the industry;

(iii) Develop a detailed inspectorate protocol for the industry for the purpose of compliance.

These three steps form the first tier of the implementation of the framework on Figure 6-1; and are supported by the results. For instance, participants stated that the safety policy means compliance with the country's safety regulation. It was viewed that the safety policy is themed around two main elements organisation's general safety strategy, the organisation's safety management system (OHSAS 18001) as referred to section 4.3.2.2. They all stated that these come under compliance as per the country's/ client safety regulations and project safety plan, emergency response plan and safe working procedures. In addition to earlier explanations, three participants explained that the safety policy is an effective tool. It aims to ensure that safety regulations are set by the management implementation, and followed by workers on site. Similar to the above explanation, they explained that this policy is formed from a number of rules and regulations. Other participants also stated that Saudi Arabia does not have standard safety regulations and laws. This seems to be the main challenge for the country. They also mentioned that Saudi Arabia follow international safety regulations and policies such as the OHSAS, HSE, ISO and the ILO. It was also explained that the regulations are at times tailored to suit the country and can come under local country safety regulations or client safety requirements.

Participants stated that it is difficult to explain the relationship between culture and commitment, especially in terms of the safety regulations that do not exist. E.g. *"In Saudi Arabia, safety regulations do not exist, which gives the project client, consultant and contractor a huge responsibility in developing, and sustaining a safety culture in accordance with progress. Hence, the culture's effect cannot be seen to the full"*. It was further stated that the top management of an organisation makes culture and their

commitment (as stated earlier) is a key in ensuring a safe working environment (refer to section 4.3.2.13).

Refer to section 4.4.2.4, participants stated that the lack of coordination between the different departments, the lack of knowledge of responsibilities associated with the safety of the workers, the lack of willingness of responsible persons towards safety, and providing less importance to safety are key barriers in the establishment of a safety culture in the construction workplace. Participants see that all barriers stem from a lack of clear safety policies on safety and the poor implementation of any existing safety policies from the top management to the employees. Furthermore, it was discussed that the traditional mentality is also an obstacle here, along with the cost of safety. "Top management and seniors might think of safety as less important when compared to the end product, and that following safety policies will cost money. This is an old view that needs to be changed"

Refer to section 4.4.2.4, in a similar view, participants see that all barriers are associated with top management, and the crucial barrier is commitment, and the lack of will to implement the safety policy. They stated that the "Safety Department needs commitment and support from top management to implement a safety culture". It was stated that there is a lack of trained personnel to follow the policy guidelines. "Within the safety department, there is a lack of competent and trained personnel who can use this commitment to implement". Lack of commitment was another barrier mentioned by Participants. It was explained that the existing safety policies are not effective, also partly due to poor communication and a lack of coordination between different departments/people within the organisation. Another barrier is the lack of control and competence in the organisation in

terms of safety policies and standards. Please see below a developed framework for this study.

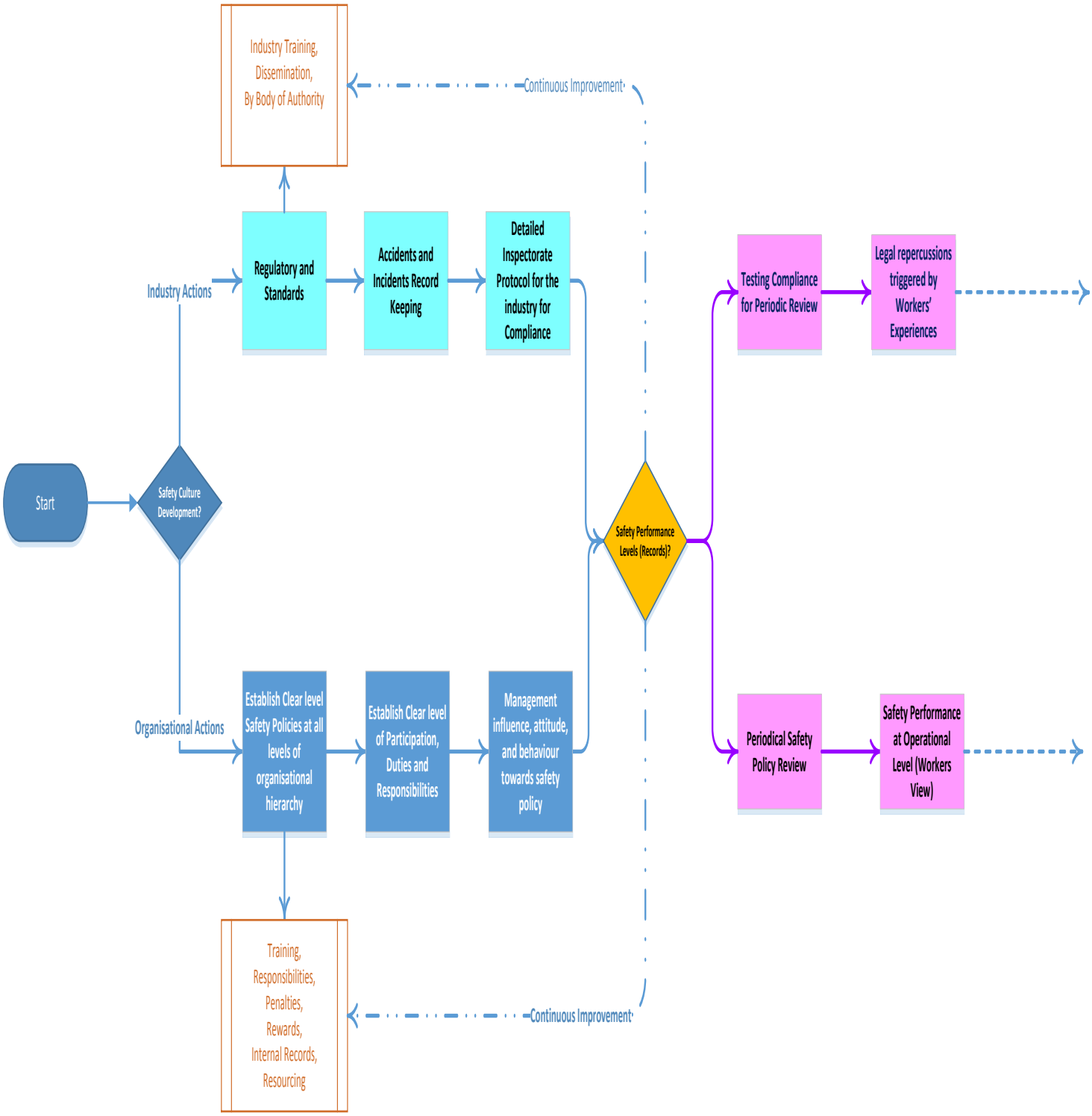

Figure 6-1: Developed framework for this study

6.4.2.3 Long Term (5 years onward) Actions for Safety Culture based on the Framework

Before organisations and the industry can move to the longer term implementation of the framework, there is a phase painted amber called "safety performance"; it forms a starting point for which results can be shared to see if the industry it developing or not. Whether the industry is developing or not, there is a need to review and improve continually, as the ethos of continuous development has been cardinal to safety for construction business internationally (ISO, 18001).

The long term view of the framework is for organisation to consider periodical safety policy review and safety performance at operational level (workers view). Secondly, the long term view of the framework from industry perspective is to ensure that they test organisations with regards to compliance for periodic Review and the Legal repercussions triggered by workers experiences.

6.5 Limitations and Recommendations for Future Research

There is a need to cover a bigger population of respondents, preferably more companies and more diversity in terms of the construction industry. A bigger population and a less generic respondent population would provide a more representative and more generalisable outcome for this research questions. In terms of data collection, limitations were observed in terms of the number of companies included in the case study. Only three were included. A more extensive number would have helped secure more reliable results. Nevertheless, sufficient data was available for study because most of the respondents were able to reply to the survey and interviews, and their responses were more or less consistent with each

other. Future studies can also include a comparative study on the construction industry – before safety regulations are imposed and after they are imposed in order to establish the actual impact of safety regulations on the safety of the workers.

6.6 Recommendations for Practice

In the practice, the KSA construction industry needs to significantly improve its safety regulations and policies including its implementation of these policies. Laws have to be laid out for the construction industry to follow and comply with and strict compliance has to be imposed. A government agency has to be setup in order to oversee safety not just in the construction industry but in the workplace as well. Any issues or gaps in the implementation of safety policies would be detected by this agency and penalties have to be imposed on violators in order to ensure compliance.

Suggested improvements to the safety practice in the construction industry of Saudi Arabia include site layout and planning. This is because where sites are not planned and are not orderly, accidents may be caused. Materials falling in the workplace as well as workers colliding with each other are ever present in workplaces without proper planning or order. In some cases, there may also be site constraints, but having layouts which can ensure the safety of workers and the general public can help prevent workplace accidents. Sufficient planning and proper management is important to the safety and efficiency of the construction site. As has been proven above, there are many incidents which are credited to tripping, slipping, and falling in the construction site, and by having an orderly site plan for the construction workplace, the workers would be properly appraised of the layout of the site and be able to prevent accidents.

The use of PPEs cannot also be overemphasised. These PPEs also have to comply with the best standards authorised by safety agencies. These PPEs include protective clothing, helmets, hard-hats, gloves, goggles, boots, and other equipment which would help minimise the impact of injuries in the workplace and also protect the worker from different physical, chemical, heat, electrical, and blunt impacts in the work site. Aside from the use of these PPEs, PPE programs also have to be set in place. This program would address the hazards present in the workplace. It would help implement the training of the workers on the proper use of these PPEs. It is important for the workers to understand why they are wearing PPEs, and these PPEs serve different purposes including eye protection, face protection, hearing protection, hand protection, foot protection, head protection, protection from falling, and respiratory protection. Surveying the work site and assessing the knowledge of the workers on the use of these PPEs is also important because it would help establish gaps in the worker's knowledge about the use of PPEs. Addressing these gaps would therefore become easier.

The use of first aid kits is also an essential part of the construction workplace. First aid kits must always be available in the work site, and these kits must adequately fill the needs of the employees including possible and likely injuries they would encounter in the workplace. Trained first aiders must also be available on site at all times. Blankets and stretchers must also be available, including medical transport to the nearest medical facility. For workers numbering 200, standards indicate the availability of at least one fully equipped first aid facility.

Posting health and safety warning signs on site is also essential in ensuring safety in the workplace. These safety signs include the wearing of protective equipment when entering a specific area of the construction work site. For instance, some areas may require the use of goggles or head phones in order to prevent any harm to the ears or the eyes. These signs must also be fully visible, readable in Arabic and in the language used in the workplace. The workers must also know the meaning of the signs if the signs are only images without any text translation. These signs also include directions for fire exits, fire action evacuation plans, earthquake evacuation signs, and other safety sign boards.

It is also important for managers, especially site managers to write down safety policies for their worksite in order to set safety and health standards. Ultimately, such safety should be one of their objectives. This policy must mention the senior leaders who would be responsible for ensuring that the standards are met, and this executive would also have the authority to assign responsibilities to the management and the supervisors within all levels and to also ensure that these responsibilities are fulfilled. Construction safety policies are therefore matters which must be established by different site managers before any construction work is carried out. As soon as it is development, the safety plan must be planned into a training program which has to secure the participation of all site workers before their jobs are carried out. Site meetings are therefore important in order to inform workers of their job on site, their risks, and the supervisors also have to ensure that they have the opportunity to communicate important matters on safety to their workers. Site meetings also help sensitise and inform workers on their current health and safety, and that they may need to undergo more training and to know more about their safety needs and considerations. The developed framework of safety presents an effective framework for the

Saudi construction industry because it is simple and it presents reachable goals. Each level of elements are spelled out simply and it can clearly be noted that the Saudi construction industry is still in its initial levels of maturity. With the help of Bergersen maturity model (2003), in most aspects of its safety, it is generally considered reactive and pathologic. Based on this information, it can be deduced that the workers and the managers in the construction industry need to improve and change their perception of safety. From the results of this study, it can be recommended that the workers and managers have to stop thinking that work accidents are not likely to happen to them; in other words, they need to care more and care much about their safety. Their safety level must also move on from being reactive. Any actions on safety have to be less reactive and be more proactive. Developing policies and regulations on safety are a significant step towards reaching such a proactive level and generative.

6.7 Recommendations to Theory

This study recommends that the concept of safety in the construction workplace has to be reworked based on the context of developing countries, where the development of safety policies are still poor. Even as developed countries have extensively developed their safety practices and have improved their resources on safety, the same cannot be said for developing countries. It is important to therefore establish theories and models in practice which would be localised to a specific area. These theories would be supported by the practices, culture, specific qualities, beliefs, and behaviour of the area or region. Under these conditions, the policy-makers would therefore have to be guided by these specific localized qualities.

6.8 Recommendations to Knowledge

This study also presents recommendations related to knowledge, mostly on the value of safety practices in the construction setting. This study recommends that information related to each construction incident has to be published and studied with the hopes of ultimately avoiding any repeats of these incidents. It also acknowledges that the Saudi construction industry is very much behind in terms of its technology on safety. Standards on safety materials are not set in place in the country, making the Saudi workplace a dangerous place for labourers. It also recommends that more information on applicable safety resources have to be made available, especially in the use of hard hats, prevention of skin cancer, prevention of heat stroke, prevention of falls, and possibly the prevention of equipment-related injuries.

6.9 Further Research

This study recommends more studies which have to be considered in the other workplace settings in Saudi Arabia and safety conditions therein. More studies also on areas where the most accidents occur in the construction industry can also be undertaken. A group study is recommended in order to study the impact of safety practices which can be implemented in the workplace in Saudi Arabia, whether these practices would reduce accidents and hazards in the workplace.

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Appendixes

Appendix One: Ethical Approval

Academic Audit and Governance Committee

College of Science and Technology Research Ethics Panel (CST)

University of Salford MANCHESTER

MEMORANDUM

To Nayef Saad (and Dr Chaminda Pathirage)

cc: Prof Charles Egbu, Acting Head of School of SOBE

From Nathalie Audren Howarth, College Research Support Officer

Date 17th April 2014

Subject: Approval of your Project by CST

Project Title: Influence of culture on safety and project performance in Saudi Arabia construction industry

REP Reference: CST 14/09

Following your responses to the Panel's queries, based on the information you provided, I can confirm that they have no objections on ethical grounds to your project.

If there are any changes to the project and/or its methodology, please inform the Panel as soon as possible.

Regards,

Nathalie Audren Howarth
College Research Support Officer

For enquiries please contact:
College of Science and Technology
College Research Support Officer
The University of Salford
Maxwell building, (7th floor, room 721)
Telephone: 0161 295 5278
Email: n.audren@salford.ac.uk

Appendix Two: Questionnaire Survey

<table>
<tr><td colspan="4">SAFETY CULTURE SURVEY</td></tr>
<tr><td>Personal Information</td><td colspan="3">• Education level: FdA☐ BSc☐ MSc☐ PhD ☐
• Position…….....
• Years of Experience……..</td></tr>
<tr><td>Categories</td><td colspan="3">A: Management commitment;
B: Training & technical competence;
C: commitment to practice & safety culture;
D: Proficient & timely planning.</td></tr>
<tr><td colspan="4">Please RANK which one do you feel the most important factor in term of Health & Safety?</td></tr>
<tr><td>A. Management strategy and commitment.</td><td></td><td rowspan="4">1. Very important.
2. Fairly Important.
3. Important.
4. Slightly Important.
5. Not at all important.</td><td rowspan="4"></td></tr>
<tr><td>B. Training, adjustment and technical competence.</td><td></td></tr>
<tr><td>C. Commitment to best practice and safety culture.</td><td></td></tr>
<tr><td>D. Proficient and timely planning.</td><td></td></tr>
<tr><td>Likert Scale</td><td colspan="2">Strongly agree (5); agree (4); neutral (3); Disagree (2); Strongly disagree (1)</td><td>Please indicate your response by marking on one</td></tr>
</table>

			of the options below				
Categories	**No**	**In My Plant……**	**1**	**2**	**3**	**4**	**5**
A	1	Management commitment is needed for safety Policy implementation.	O	O	O	O	O
	2	In management meetings Feedback on safety is very important.	O	O	O	O	O
	3	During management meetings' agenda, safety discussion comes first.	O	O	O	O	O
	4	Project leadership consider that Safety has to be constantly implemented every time and everywhere.	O	O	O	O	O
	5	One of the Safety procedures is to use ergonomic and suitable machinery and equipment in the projects.	O	O	O	O	O
	6	One of the safety cultures within an organisation that there is a reward system based on observation of safety.	O	O	O	O	O
	7	Management encourages by giving a reward based on observation of safety.	O	O	O	O	O
	8	One of safety culture that there is a system in place for appraisal regarding safety.	O	O	O	O	O
	9	Management systems and behaviour has priority in Safety culture model.	O	O	O	O	O
	10	Non-commitment to safety culture procedure has caused a failure in safety policies.	O	O	O	O	O

	11	A positive and strong safety culture has given top management greater ability to initiate effective safety policies.	O	O	O	O	O
	12	Stable safety culture gives Managers a full understanding of what they and we should do regarding safety.	O	O	O	O	O
	13	A strong safety culture gives management how to get involved in safety issues.	O	O	O	O	O
	14	Safety culture means that Managers/Supervisors know what to say and to do regarding safety matters.	O	O	O	O	O
	15	The company's safety culture procedure that there is notice board has a poster about injury management	O	O	O	O	O
B	16	The company trains all employees that the words "SAFETY FIRST" have a significant meaning.	O	O	O	O	O
	17	The company's safety culture is to train people by their Leaders/Supervisors.	O	O	O	O	O
	18	The advantages of safety culture is to make people receive the necessary training to avoid accidents and maintain safety.	O	O	O	O	O
	19	One of the company's safety culture procedures is to train people on first aid and emergency procedures.	O	O	O	O	O
	20	One of the company's safety culture disadvantages isn't everyone getting induction training when they start.	O	O	O	O	O
	21	The company's safety culture is that all employees get trained in safe work procedures* for their jobs.	O	O	O	O	O

	22	The company's safety culture makes our manager/supervisor checks that we can do the job safely.	O	O	O	O	O
	23	The company's safety culture has to assign someone that makes us aware of safety issues.	O	O	O	O	O
	24	Most of the accidents happen by foreign workers that is a consequence of Poor safety culture implementation.	O	O	O	O	O
	25	The company's safety culture gives us enough time to learn our safe work procedures.	O	O	O	O	O
	26	Due to the poor safety culture procedures, we don't do risk assessments when we start a new process or when a process is changed.	O	O	O	O	O
	27	Due to the strength of safety culture, we always get feedback (e.g. minutes, tool box talks) on what's happening with our safety issues within seven days.	O	O	O	O	O
	28	Safety culture adjustment is the ability of an employee to be trained for the safety of co-workers and work equipment.	O	O	O	O	O
	29	The company's safety culture is training us how to respect the instructions given by our guide.	O	O	O	O	O
	30	The company's safety culture forces us to wear personal protective equipment.	O	O	O	O	O
	31	The company's safety culture gives penalty to people who not wearing protective gear at the workplace.	O	O	O	O	O

C	32	Strong safety culture gives the company to maintain best practice that cannot fall into safety problems.	O	O	O	O	O
	33	Construction system that aligns operations to a safety culture opens gate to success.	O	O	O	O	O
	34	Poor safety culture intends to non-commitment to best practices to either cut cost or ensures fast production.	O	O	O	O	O
	35	Poor safety culture strategies have led to failure in implementation of safety policies.	O	O	O	O	O
	36	People do understand how safety culture impacts on safety performance.	O	O	O	O	O
	37	Poor safety culture has led company management not to work out all the jobs/tasks in the area that have safety risks.	O	O	O	O	O
	38	The influence of implementing safety culture is to make workers always involved in reviewing safe work procedures.	O	O	O	O	O
	39	The company's safety culture does not give us enough time to learn our safe work procedures.	O	O	O	O	O
	40	The impact of safety culture gives best practice in competence, attitude, commitment and value for a free accident site.	O	O	O	O	O
	41	Poor safety culture implementation makes no one would really care if I didn't follow a safety instruction.	O	O	O	O	O
	42	Our company has high priority practice for Safety culture within projects.	O	O	O	O	O

	43	Non-commitment to best practice gives feeling like safety culture does not matter or influence on safety performance.	O	O	O	O	O
D	44	Implementing the right safety policies significantly contribute to the success of a safety performance	O	O	O	O	O
	45	Poor organisational safety culture prevents achievement of targets and safety objectives.	O	O	O	O	O
	46	Our poor safety culture makes us not caring to communicate with managers about health and safety.	O	O	O	O	O
	47	There is a safety-reporting procedure, but poor implementation of safety culture makes us sometimes use them.	O	O	O	O	O
	48	The clashes in Management rules toward safety make us not always report safety incidents.	O	O	O	O	O
	49	Timely planning on safety culture encourages us to report safety incidents.	O	O	O	O	O
	50	Safety department sometimes follow up safety incident reports	O	O	O	O	O
	51	No one of Health & Safety department reviews safe work procedures after an incident report to try to find out why an incident happened and how to fix it.	O	O	O	O	O
	52	A sign of the important of safety within organisation is that If we report a serious problem where someone could get hurt, they take an urgent action.	O	O	O	O	O
	53	The importance of safety culture makes the company resources/money are mostly focus on safety within projects.	O	O	O	O	O

	54	The clashes in management responsibilities have made some managers/supervisors not get involved in safety culture.	O	O	O	O	O
	55	Lack of knowledge in the workplace toward safety culture indicated that Managers/supervisors don't mean what they say or do what they say, in safety matters.	O	O	O	O	O
	56	Safety decisions are made on a timely basis based on how people react toward safety culture.	O	O	O	O	O

Appendix Three: Interview Questions for Experts

1	How can the construction industry and safety policy be defined?	
2	Which safety policies are practiced in the construction industry as stipulated by the government?	
3	What are the factors challenging the safety policies in the construction industry?	
4	What safety policies do the companies operating in the construction industry of Saudi Arabia implement?	
5	What is the role of the government in the formulation of safety policies in the construction industry of Saudi Arabia?	
6	How do both organisational culture and safety policies affect the project management performance in Saudi Arabia?	
7	How does culture influence the safety policies and practices in Saudi Arabia projects?	
8	How organisational culture is related to the safety policies?	
9	What key factors hinder the improvement of health and safety practice within your organisation?	

Appendix Four: Case Study Interview

1	What safety culture that your company follows?	
2	How does the company culture influence on safety?	
3	What is the influence of culture on safety that can be associated with employee motivation to increase their output?	
4	What are the factors and potential barriers associated with the implementation of the safety culture in construction industry?	
5	How can the safety culture be implemented in the construction industry of Saudi Arabia?	
6	How does the culture & safety influence on safety performance?	
7	In terms of safety performance how do you think the company could improve? Which areas?	
8	What are the different manners by which culture and safety measures taken by the organisation could affect Safety performance of the company?	
9	Are there safety drills in the company?	
10	How does safety culture impact on safety performance?	

Appendix Five: Table Descriptive Statistics for Factors

	S.D	D.	N	A	SA	M	SD	Rank
The company's safety culture forces us to wear personal protective equipment.	14	15	15	41	50	3.7259	1.34069	4
	10.4%	11.1%	11.1%	30.4%	37.0%			
The advantages of safety culture is to make people receive the necessary training to avoid accidents and maintain safety.	16	8	19	34	58	3.8148	1.36144	1
	11.9%	5.9%	14.1%	25.2%	43.0%			
Management commitment is needed for safety Policy implementation.	21	11	8	38	57	3.7333	1.46705	4
	15.6%	8.1%	5.9%	28.1%	42.2%			
One of the Safety procedures is to use ergonomic and suitable machinery and equipment in the projects.	11	15	18	38	53	3.7926	1.29348	3
	8.1%	11.1%	13.3%	28.1%	39.3%			
Implementing the right safety policies significantly contribute to the success of a safety performance	12	13	16	58	36	3.6889	1.21843	6
	8.9%	9.6%	11.9%	43.0%	26.7%			
The company's safety culture is training us how to respect the instructions given by our guide.	11	13	21	46	44	3.7333	1.24109	4
	8.1%	9.6%	15.6%	34.1%	32.6%			
Stable safety culture gives Managers a full understanding of what they and we should do regarding safety.	18	7	22	51	37	3.6074	1.30496	9
	13.3%	5.2%	16.3%	37.8%	27.4%			
In management meetings Feedback on safety is very important.	14	15	18	47	41	3.6370	1.30216	8
	10.4%	11.1%	13.3%	34.8%	30.4%			
	16	13	19	37	50	3.6815	1.36945	7

Project leadership consider that Safety has to be constantly implemented every time and everywhere.	11.9%	9.6%	14.1%	27.4%	37.0%			
Strong safety culture gives the company to maintain best practice that cannot fall into safety problems.	12	10	24	47	42	3.7185	1.23174	5
	8.9%	7.4%	17.8%	34.8%	31.1%			
The company's safety culture has to assign someone that makes us aware of safety issues.	17	9	22	48	39	3.6148	1.31004	9
	12.6%	6.7%	16.3%	35.6%	28.9%			
The company's safety culture gives penalty to people who not wearing protective gear at the workplace.	11	20	30	32	42	3.5481	1.29129	14
	8.1%	14.8%	22.2%	23.7%	31.1%			
Safety culture adjustment is the ability of an employee to be trained for the safety of co-workers and work equipment.	14	11	32	48	30	3.5111	1.22088	18
	10.4%	8.1%	23.7%	35.6%	22.2%			
The company trains all employees that the words “SAFETY FIRST” have a significant meaning.	11	21	14	27	62	3.8000	1.37570	2
	8.1%	15.6%	10.4%	20.0%	45.9%			
One of the company's safety culture procedures is to train people on first aid and emergency procedures.	13	11	22	44	45	3.7185	1.27345	5
	9.6%	8.1%	16.3%	32.6%	33.3%			
The company's safety culture makes our manager/supervisor checks that we can do the job safely.	9	17	31	42	36	3.5852	1.19941	10
	6.7%	12.6%	23.0%	31.1%	26.7%			
The company's safety culture is that all employees get trained in safe work procedures* for their jobs.	15	11	29	43	37	3.5630	1.27904	13
	11.1%	8.1%	21.5%	31.9%	27.4%			

A strong safety culture gives management how to get involved in safety issues.	12	17	24	51	31	3.5333	1.22657	16
	8.9%	12.6%	17.8%	37.8%	23.0%			
Safety culture means that Managers/Supervisors know what to say and to do regarding safety matters.	8	19	18	46	44	3.7333	1.22292	4
	5.9%	14.1%	13.3%	34.1%	32.6%			
A positive and strong safety culture has given top management greater ability to initiate effective safety policies.	15	15	22	48	35	3.5407	1.29155	15
	11.1%	11.1%	16.3%	35.6%	25.9%			
Poor safety culture strategies have led to failure in implementation of safety policies.	13	18	22	43	39	3.5704	1.29604	12
	9.6%	13.3%	16.3%	31.9%	28.9%			
The company's safety culture is to train people by their Leaders/Supervisors.	9	20	25	46	35	3.5778	1.21229	11
	6.7%	14.8%	18.5%	34.1%	25.9%			
Management systems and behaviour has priority in Safety culture model.	10	14	31	46	34	3.5926	1.18634	10
	7.4%	10.4%	23.0%	34.1%	25.2%			
Non-commitment to safety culture procedure has caused a failure in safety policies.	11	19	24	43	37	3.5672	1.25924	12
	8.2%	14.2%	17.9%	32.1%	27.6%			
The impact of safety culture gives best practice in competence, attitude, commitment and value for a free accident site.	17	17	15	51	35	3.5185	1.33747	17
	12.6%	12.6%	11.1%	37.8%	25.9%			
The company's safety culture procedure that there is notice board has a poster about injury management	14	16	32	42	31	3.4444	1.25583	20
	10.4%	11.9%	23.7%	31.1%	23.0%			
A sign of the important of safety within organisation is that If we report a serious	19	12	23	44	37	3.5037	1.35423	19
	14.1%	8.9%	17.0%	32.6%	27.4%			

problem where someone could get hurt, they take an urgent action.								
Poor safety culture implementation makes no one would really care if I didn't follow a safety instruction.	20	11	26	47	31	3.4296	1.33014	21
	14.8%	8.1%	19.3%	34.8%	23.0%			
Due to the strength of safety culture, we always get feedback (e.g. minutes, tool box talks) on what's happening with our safety issues within seven days.	17	22	34	39	23	3.2148	1.26600	22
	12.6%	16.3%	25.2%	28.9%	17.0%			