

The management of Accident in the Oil and Gas Servicing Firms in Nigeria through Workplace Safety Programs

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Abstract: Organization in the course of the discharge of their activities in the workplace encounter both inherent and potential hazards. The manifestation or occurrence of this accident in the discharge of assigned exude grievous negative impact to not just the injured but the organization at large. It affects the output level, integrity of the firm and its image, growth and survival and continues operation. It has a telling effects on the firms in terms of lost work days, medical bills, compensation, fines, delay production as a result of facility/plant shut down etc. given this cost implications, organization are in constant need of models and programs to stern this tide. Given the integral nature of this all-time desire and in the realization of this, lot of scholarly works have been advanced postulating and prescribing models and theories on how to achieve this feat. Some of those have yielded results while others have not. In the light of this desire we attempt to examine the workplace safety models and program which is considered to be elaborate, robust and all-encompassing and thus, situate it within the Nigeria oil and gas work sector and investigate how this can impact on accident management. To put the study in perspective, workplace safety program was measured using management commitment, worksite inspection, training and education and safety culture and accident was measured by the occurrence of injury. Four null hypotheses deduced from literature was structured to put the work in working context. After a critical analysis adopted using structural equation modelling through the AMOS package several findings were made upon which some recommendations were equally advanced.

Keywords: Workplace Safety Program, Management Commitment, Worksite Inspection, Training and Education and Safety Culture, Accident, Occurrence of injury., Structural Equation Modelling.

Introduction

Workplaces and work activities have inherent and potential hazards in the course of discharge of the assigned duties. These hazards and manifestation of these accidents are as a result of workers unsafe behaviors and unsafe work environment. These hazards and risk factors in the workplace is threatening not just to the workers but also to the shareholders, output level, integrity of the firm and its image, growth and survival and continues operation (OSHA, 2010). Occupational accidents are indeed the most disruptive problem, firms contend with. The logic behind the assertion is that workers are the most valuable asset of a company, accident cost money in terms of lost work days, medical bills, compensation, fines, delay production as a result of facility/plant shut down etc. when the firm is faced with the above-mentioned elements, reputation is dented, profit dwindles, which in extension could lead to worker redundancy and shut down.

In the light of the above, organizations are now developing high penchant for safety at workplace as well as promoting health and work ability of all employees including workplace safety programmes. Workplace safety programs deal with the prevention of accidents and/or minimize the resulting loss and damage to lives and properties. Every worker has the right to a safe working environment, the right to be properly trained, and the right of refusal of unsafe working conduct and environment. It is everyone's responsibility to ensure that any work undertaken meets minimum safety requirements (Adeniyi, 2001). Available data reveal startling and tremendously high rates of work-related deaths and injuries in both developed and developing (Gyekye, 2006; National Safety Council, 2004). Despite these huge global figures on occupational health and safety, only a small number of empirical research studies on workplace health and safety have been conducted in Nigeria, where citizens are engaged in jobs classified hazardous such as the oil and gas industry, mining and construction industry etc.

Although workplace safety and workplace safety programs has improved dramatically in the developed economies in this past few decades, that has not been the case in the developing countries like Nigeria, where the accident rate is still high, and the fatality rate is daunting (ILO, 2018).

To address this issue, several scholars—such as Asuzu (2003), Omokhodion (2009), Ehi (2010), and Adeogun and Okafor (2010)—have conducted studies across various industries and thematic areas. In recognition of the significant role that accident prevention models play in organizational safety, numerous empirical studies have been undertaken, offering diverse theoretical perspectives and practical models aimed at reducing workplace accidents. These contributions include, but are not limited to, equipment supervision (Asuzu, 2003), regular servicing and maintenance practices (Omokhodion, 2009), the design and implementation of effective facility layouts (Ehi, 2010), and the provision and proper use of safety kits and protective gear (Adeogun & Okafor, 2010).

Given the plethora of research work as evident in the management literature cited above, it is obvious that there is no single generally accepted effective model established which captures one best approach in preventing, minimizing of accident in the organization or improving safety. At best the different scholars or in their different scholarship make different preposition or prescription on improving safety in the organization based on the standpoint or background of study. This probably explains the volume of literature on the subject matter. These studies and extant literatures did not consider workplace safety program that is all encompassing as a factor neither did it provide any empirical knowledge on the role of workplace safety program in the organization, yet in the work place lots of measures are undertaking to ensure safety of employees in the discharge of their work role. The closer attempt at this is evident in the studies by Borys (2009) where the issues examined were not within the context of the oil firms nor the same work setting and environment.

In the light of the literatures examined so far we are inclined to believe that the direction of interest of the scholars as it pertains to workplace safety were restricted to different measures of minimizing accident. Others who attempted an examination were basically from only the perspective of health without their impact or bearing on economic, social and psychological spectrum. When they do, they either only glossed over them or were not quite assertive. Workplace safety is a multidisciplinary concept that influences both private and social lives of employees in all spectrums of work. Therefore, the rationale for a good health and safety management system is to improve work conditions and employees' health in the workplace.

Thus, these views necessitated this study. In essence, this work is structured to give a more definitive and assertive position base on empirical evidence on the impact of workplace safety program on the management of accident in oil servicing firms in Nigeria. Our point of departure from several other studies is to fill the identified gap in literature by investigating the relationship of workplace safety program on the management of accident in oil servicing firms in Nigeria. To this end, this research tends to fill the gap left unfilled on workplace safety programs on accident

management by substantial number of research works, seeking to add to already existing literature. Most indigenous companies in Nigeria unlike multinational organizations like SPDC and AGIP view workplace safety to be at cross-purposes with productivity and profit enhancement, they fail to recognize a good occupational safety and health record give them competitive advantage.

Literature Review

Theoretical Framework

Human Factors Theory

Shuen and Wahab (2016) argued that the human factors theory is a contrasting theory to workplace safety as human factors theory is the involvement of events occurring sequentially caused by human error. Ferrell (1977) developed human factors theory based on the chain of human factor events leading up to an accident. De Camp and Herskovitz (2015) and Lyndon et al. (2015) supported Ferrell's (1977) assertions that human factors were the causes of accident occurrences when engaged in three situations. Ferrell (1977) claimed that human factors theory is comprised of three components: overload, improper response, and improper activity. The premise of the human factors' theory is human errors and are the leading causes of accidents concerning unsafe acts in the workplace (Javaid, Isha, Ghazali, & Langove, 2016).

Asanka and Ranasinghe (2015) and Gyunka and Christiana (2017) identified the negligence of the worker as the number one human factor leading to accidents. Workers are negligent when human factors are affecting safety. Managers have the responsibility of providing employees with training, education, and tools to develop a safe and productive work environment. Chikono (2017) referred to the interaction between manager and employee contributions to potentially hazardous conditions as uncertainties and unpredictability. Individuals understanding potentially hazardous conditions and safety-related knowledge might control, eliminate, or reduce the safety risk (Zhang, Boukamp, & Teizer, 2015). Proctor and Chen (2015) explained managers and employees appreciated human factor theory in an organization as both benefitted from understanding how to avoid potential hazards involving risk. Javaid et al. (2016) specified that when a worker recognized unsafe conditions and related hazards, an individual exhibited risk or hazard consideration. Feng, Zhang, and Wu (2015) explained the negligence of human factors caused higher accident costs in the organization. Feng et al. (2015) stated organizational managers who are expected to capitalize on product quality and cost reduction, rely on the implementation of quality improvement strategies.

Peterson's Accident Theory.

Peterson introduced accident theory as an extension of human factor theory in 1982 (Alaswad & Xiang, 2017). Peterson (1982) introduced aspects associated with human factors as the decision to error, ergonomic traps, and system failures. Moura, Beer, Patelli, Lewis, and Knoll (2016) posited that accidents are caused by incidents induced errors. Under Peterson's theory, Goode, Salmon, Lenné, and Finch (2015) attributed major industrial accidents to the cause of safety management systems. Babiceanu and Seker (2016) asserted system failures that occurred from production systems fail to function as expected. System failures had an original cause, which probably evolved into human error (Alaswad & Xiang, 2017). Salmon et al. (2017) found systems failure was present when employees did not abide by the standards designed to ensure the safety of products, employees, and activities. Aitsi-Selmi and Murray (2016) analyzed the origins behind the Chernobyl disaster in the former Soviet Union and identified the error on the part of nuclear plant operators, which caused subsequent explosions of the plant from the lack of cooling. Klement (2018), an incident theorist, stated accidents arise from conscious or unconscious decisions to error. A conscious decision involves an individual making an unsafe decision while knowing the probable consequences and the magnitude of risk involved (Phillips, Fletcher, Marks, & Hine, 2016).

Kumar, Gupta, Agarwal, and Singh (2016) indicated the risks associated with decisions made had an impact on why individuals committed human errors leading to accidents. Zhou and Lei (2017) noted that unconscious decisions entailed individuals making unsafe decisions without knowledge. Zhou and Lei discovered conscious and unconscious decisions by low-level skilled or experienced individuals were components leading to latent and active human errors in workplace accidents (Thompson, 2016). Accident theorists blamed accident occurrences on ergonomic traps, organizational practices deemed correct with latent errors in management function (Sabran, 2016).

Safety practices were not deemed hazardous until the occurrence of an accident (De Camp & Herskovitz, 2015). De Camp and Herskovitz (2015) uncovered inappropriate responses from organizational management that could be among ergonomic causes of workplace accidents. Although the incident theory has taken root in modern safety studies, the theory does not offer a comprehensive explanation of all accidents (Leveson, 2015). The placement of accident blame on human factors is the central focus of the accident theory (Ergai, Cohen, Sharp, Wiegmann, Gramopadhye, & Shappell, 2016).

Accident Management

The definition of an accident provided by Heinrich in the 1930s is often cited. Heinrich defines an accident as an unplanned and uncontrolled event in which the action or reaction of an object, substance, person or radiation results in personal injury or the probability thereof. Bird and Germain for instance define an accident as an unintended or unplanned happening that may or may not result in property damage, personal injury, work process stoppage or interference, or any combination of these conditions under such circumstances that personal injury might have resulted Bird and Germain (1996).

In more recent literature, it is often argued that the notions unplanned, uncontrolled are misleading. This might give the idea that the event is related to fate or chance. It can't be controlled. However, when the causes are determined, it is usually found that many events were predictable and could have been prevented if the right actions were taken. This implies that the event is not one of fate or chance.

The National Safety Council also define accident is an undesired event that results in personal injury or property damage. This definition implies two important points. First, accidents are unavoidable; the chance of one occurring will virtually always be present. Second, the chance of an accident occurring is a variable that can be changed. Leveson (2011) shows accident as an undesired and unplanned event that results in a loss (including loss of human life or injury, property damage, environmental pollution, and so on). Harms-Ringdahl (2013) accident as an event that causes unintentional damage or injury.

Most contemporary definitions don't include the notion "unplanned" and/or speak in more general terms of "incident" instead of accident. The OHSAS 18001 standard focuses on the definition of an incident (OHSAS, 2007). An incident is referred to as a work-related event(s) in which an injury or ill health (regardless of severity) or fatality occurred, or could have occurred. An accident is regarded as a particular type of incident in which an injury or illness actually occurs. A near-miss is an incident where no injury or illness occurs. Therefore, an incident can be either an accident or a near-miss. OHSAS (2007).

The standard definition of occupational accident contains the following elements:

- fortuitous, sudden, or unexpected external event;
- during working hours/on the way to and back from the workplace;
- arising out of work performed in the course and the scope of employment;
- bodily harm;
- causal link between the event and the harm.

The fact that occupational accidents are fortuitous, sudden, unexpected external events allows making a decision that accident is not caused by an extended process but by a sudden event. Occupational accidents occur during working hours and/or on the way to and from the workplace. In a broad sense occupational accidents also include commuting accidents.

The definition of an occupational accident also includes the fact that the accident has to arise out of work performed in the course and the scope of employment. This criterion often leads to discussions about accidents during activities in the workplace where the link with the scope of employment is somewhat questionable e.g. during excursions, doing private work or business at the workplace, etc. The criterion injury usually comprises not only bodily harm, but also psychic problems caused by an accident.

Finally, the concept of an is based on the fact that there has to be a causal link between the event and the injury. Only direct consequences of the occupational accident can be compensated. Occupational accident is an occurrence arising out of, or in the course of, work which results in: fatal occupational injury or non-fatal occupational injury.

Workplace Safety Program

The conceptual approaches in the definition and interpretation of workplace safety have been viewed by various scholars and institutions. A safety workplace could also be defined and interpreted as "a workplace where everyone works together to achieve an agreed vision for the health and well-being of workers and the surrounding community. Safety at work constitutes one of the basic rights of the workers and reduction of the rate of industrial accidents through preventive measures. However, Onuegbu (2011) stated that Health and safety at work are inseparable in practice.

International Labor Organization (ILO) and the World Health Organization (WHO) in 1950, shared a common definition of occupational health which was revised in 1995. The definition reads: occupational health should aim at: "the promotion and maintenance of the highest degree of physical, mental and social well-being of workers in all occupations; the prevention amongst workers of departures from health caused by their working conditions; the protection of workers in their employment from risks resulting from factors adverse to health; the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological capabilities; and, to summarize, the adaptation of work to man and of each man to his job". Leigh, (2011) posited that every job virtually carried the potential risk of injuries or diseases and each accident, injury or disease developed from multilinear interactions of the contributory factors and causes (Toft, Dell, Klockner, & Hutton, 2012). Workplace hazards are generated from three main components which included management decision, people, and physical workplace or environment which showed an interdependent relationship as each of the elements can interconnect and influence each other.

According to Reason's Swiss Cheese Theory, the incident will happen when the combination of weaknesses which related to these three components in the defense's barriers, which contributes to damage and workplace accident (Reason, 2000). Some researchers claimed that people who lack awareness, inadequate knowledge, and attitude result in unsafe behaviour that causes injuries in the workplace (DeRoo, & Rautiainen, 2000; Said, 2012; Taufek, Zulkifle, & Kadir, 2016). Reason (1997) contended that the occupational accidents were as a result of failure to recognize the potential hazards in the systems as there was lack of defenses used to prevent unwanted outcomes. On the other hand, Health and Safety Executives (HSE, 2002) concluded that human behaviour is the leading factor of the accident occurrence.

Consequently, Ahiuma-Young (2012) commenting on safety and health development in Nigeria, revealed that the global estimate of 2.3 million occupational fatalities occur annually while nothing less than 100 occupational fatalities and some billions of capital losses have been recorded in Nigeria between April, 2009 and April, 2010. Not less than 200 cases of industrial accidents occur in the workplaces in Nigeria daily with an equally high rate of fatalities. The

frequency of fatal industrial accidents is very alarming. Many times, the managements collaborate with some union officials to conceal cases of industrial accidents and secretly negotiate compensation. Presently, it is not only the workers in the factory that are pruned to accidents but those in the white-collar jobs are also increasingly exposed to job hazards, they may be unaware of the hazards because of the long gestation of such hazards and those in this category include workers in the financial sector, oil and gas as well as civil service.

However, Fajana (2012) posited that a properly-managed safety culture, based on tested principles of workplace safety will produce employees who participate actively in training; these employees will be able to identify and alert one another and management to potential hazards. They develop effective control measures and feel a sense of responsibility for their safety and safety of others. Accepting safety as a responsibility demonstrates a sincere concern for each employee; which establishes the foundation for an effective safety culture, he opined.

Management Commitment

Management commitment is about the employees committed to their employer in safety and health issues. The top management plays an important role in reducing the injuries or accidents to their workers in the workplace while employees also are crucial to give commitment to support the practices. Hsu (2007) in Taufek et al. (2016) defined management commitment as management always showing positive and supportive safety and health attitudes to their employees' perception about safety in the workplace. As cited in Mashi, Subramaniam, and Johari (2018) defined management commitment to safety as the extent to which management is perceived to place a high priority on safety, and communicate and act on safety issues effectively. Cooper (2006) also defined management commitment as the involvement and engagement of employer and their employees in actions to achieving a goal. However, Brown (2000) in Taufek et al. (2016) suggested that the perceptions of management and employees are equal and they understand about workplace safety. Both of them must show participation towards safety and health practices in the workplace.

According to Barbera (2014), workers perceived that management should inform employees about the relevance of priority in term of safety and health and guiding employees through the appropriate task behaviour that involved potential physical and health hazards and lead workers to develop consistent expected safety behaviour and outcomes and act accordingly, hence it could reduce the negative outcomes. According to Zohar (1980), the organization's safety program can successfully through the effectiveness of management commitment with safety and health awareness program, the participation of employees within that organization and the measurement of the scope of the work of the organization. As discussed by Zohar (1980): Arboleda, Morrow, Crum, and Shelley II, (2003): Choudhry, Fang, and Ahmed (2008), management's commitment to safety is one of the determinants that cause an organization's safety program successful. If the management level is committed and aware of their employees' safety, so it will reduce unsafe working environment for them.

The initiatives of management commitment and involvement in term of safety policy enforcement and establishing safety rules and procedure would develop a sense of self-efficacy among workers to demonstrate safety behaviour (Mashi et al., 2018) and could help to reduce the probability of employees getting injured (Hon, Hinze & Chan, 2014). Management is one of the determinants to ensure the success of workplace safety program. If the managers are committed and aware of the workers' safety, it will help to reduce the unsafety working condition (Choudhry et al., 2008). Workers who work under supportive environment are more motivated to involve in safety activities as they feel satisfied because they have a sense of valued by the organization. It also stimulates the growth and learning among workers to work on safety practices such as to use the protective equipment (Nahrgang, Morgeson, & Hofmann, 2011).

Work Inspection

Worksite Inspection (job hazard analysis) as a technique that focuses on job tasks as a way to identify hazards before they occur (OSHA, 2002). It focuses on the relationship between the

worker, the task, the tools, and the work environment. Ideally, after you identify uncontrolled hazards, you will take steps to eliminate or reduce them to an acceptable risk level.

OSHA (2002) cited that many workers are injured and killed at the workplace every day. Workplace injuries and illnesses can be prevented by inspecting the workplace operations, establishing proper job procedures, and ensuring that all employees are trained properly. One of the best ways to determine and establish proper work procedures is to conduct a workplace inspection. A job hazard analysis is one component of the larger commitment of a safety and health management system. He further stated that supervisors can use the findings of a worksite inspection to eliminate and prevent hazards in their workplaces. This is likely to result in fewer worker injuries and illnesses; safer, more effective work methods; reduced workers' compensation costs; and increased worker productivity. The analysis also can be a valuable tool for training new employees in the steps required to perform their jobs safely. For a job hazard analysis to be effective, management must demonstrate its commitment to workplace safety and follow through to correct any uncontrolled hazards identified. Otherwise, management will lose credibility and employees may hesitate to go to management when dangerous conditions threaten them. Workplace inspections are an opportunity to identify hazards and assess risk in your workplace on an ongoing basis. As part of a proactive injury-prevention process, inspections reveal the current state of your workplace and any activities that you can see. It can help you identify hazards and prevent unsafe working conditions from developing.

Carroll (2001) emphasized that supervision is a multifaceted process that integrates various elements—including goals, functions, tasks, roles, strategies, procedural components, individual personalities, as well as defined beginnings, middles, and endings—into a cohesive system. Due to the interplay of these components, supervision is inherently complex and dynamic.

In safety training, employees are under responsibilities of an employer. Thus, they should care about its employee's safety Barling (2005). The employees should have high supervision to manage safety practices and control from injuries. Brown (2000) in Taufek et al. (2016); Cooper (2002); and Zohar (1980), agreed on in order to reduce workplace injuries or accidents, safety programs for example, give a briefing and induction training about safety and health practices should implement in industrial production and manufacturing companies. The root causes for accidents or injuries are the implementation of the safety and health practices in an organization (Arboleda, Morrow, Crum, & Shelly II, 2003; Brown, 2000; Cooper, 2002; Petersen, 1996). According to Zohar (1980), beliefs and attitudes have a significant positive relationship towards safety and health practices in an organization.

Coversely, one of the root causes of workplace injuries, illnesses, and incidents is the failure to identify or recognize hazards that are present, or that could have been anticipated. A critical element of any effective safety and health program is a proactive, ongoing process to identify and assess such hazards. Identifying and assessing the hazards and risks is an essential

Training and Education

Training will encourage employees to become productive and increase safer work environment. The study of Schlesinger (2017) revealed that training is an opportunity to engage employees and mold their behaviour to the desired outcomes of the solution. In addition, Ali, Abdullah, and Subramaniam (2009) suggest the occupational accidents and injuries will increase because of the ineffectiveness of safety training. An appropriate training perceives as the best practice to reduce human factor that could lead to accidents in the working places. According to Said, Halim, and Said (2012), technical skill education and training program are the preventive actions to reduce the risk of getting harmed in the workplace. While, employers will have a ready workforce with necessary skills and knowledge to be hired to handle the safety machines, equipment, and devices.

A study of Smith-Crowe, Burke, and Landis (2003) found that safety knowledge has a moderate relationship with the safety performance. While the transfer of safety training program acts as the mediating factor between safety knowledge and safety performance. Hatala and Fleming (2007)

stated that employees who involve in training are more likely to utilize the knowledge if they perceive it is relevant their work activities. However, Smith-Crowe, Burke, and Landis (2003) also claimed that the transfer of training would not effective without support from the organization. Bolarinwa (2020) stated that training is a planned process that is used to change attitudes, knowledge, skills and behavior through the learning experience in order to achieve effective performance in a specific activity or range of activities.

Furthermore, study by Becker and Morawetz (2004) have generated important lessons about effective training methods, including the value of hands-on approaches that provide opportunities for interaction and dialogue (Burke, Sarpy, Smith-Crowe, Chan-Serafin, Salvador, & Islam, 2006) and that engage workers in activities to identify, control, and prevent hazards in their work environment (Weinstock & Slatin, 2012). Others have conducted cross-sectional studies to compare the frequency of injuries or unsafe behaviours of workers that have attended a training program with the same indicators measured for workers who have not had access to the same interventions (Materna, Harrington, Scholz, Payne, Stubbs, Hipkins, & Uratsu, 2002; Spangenberg, Baarts, Dyreborg, Jensen, Kines, & Mikkelesen, 2003). In the studies of Bell & Grushecky, (2006); Dong, Entzel, Men, Chowdhury, & Scheneider, (2004); Spangenberg et al., (2003), investigated the direct association between worker training and accident rates showed a real reduction in the latter as a result of the attendance. Moreover, the consistent emergence in the studies that analyzed the effects of training on workers' subsequent behaviour (Becker & Morawetz, 2004; Materna et al., 2002) was a real increase in the frequency of safe behaviour due to participation in a safety training course.

Conversely, in most workplaces, occupational safety and health (OSH) training is likely to be a natural part of job skills training. In occupations such as logging, for example, "poor technique" is widely reported as a cause of injury resulting from inadequate training and a failure to learn the proper work methods. The bulk of training activities involve fundamentals programs that instruct workers to avoid known hazards through the proper use and maintenance of equipment and materials. However, training can also be proactive, teaching workers to recognize and head off potential problems through teamwork, via union or management efforts, and encouraging workers and supervisors to be jointly accountable for injury control. The extent to which safety training can be transferred to actual jobsite demands, and the employer's commitment to promote training as well as improve post-training productivity and injury outcomes can affect the success of training efforts. These factors can also complicate attempts to evaluate the effects of safety training separately from other workplace factors. Training effects may be easier to detect in more immediate indicators of an establishment's injury record like changes in toxic exposure levels or increased compliance with safe work practices than in effects on ultimate measures of workplace injury.

Safety Culture

Safety culture had become a greater interest in several industries as a means of reducing work-related accidents within the working places. Also, safety climate increasingly important as an indicator of employees' safety and health in various industries such as manufacturing, construction and etc. Safety climate, also as known as safety culture is defined as the shared perceptions of workers on practices, procedures, and policies correspond to the importance of occupational safety in the organization (Sawhney, et al., 2011). Safety culture has earlier been shown to be related with work-related accidents and acts or behaviours (Brown et al., 2000; Watson et al., 2005) and recent research has successfully linked safety culture to safety practices (Guldenmund, 2010). The study conducted by Christian, Bradley, Wallace, and Burke (2009) stated that the safety climate was positively affected safety performance behaviours and negatively influence outcomes. The study indicated that the factor of safety climate such as management commitment had increased the motivation of workers and the negative outcomes are accidents and injuries. Also, Schlesinger (2017) claimed that organizational culture and norms are part of the causes contributing to the accidents. People tend to follow the

organization's norm where they follow the way they do thing over there, emphasizing on the production performance instead of safety concern (Schlesinger, 2017).

Some safety culture researchers posit that allowing employees to work without following safety protocol creates a negative organizational safety culture. They maintain that if cultures such as the ones present in the Upper Big Branch Mine and Davis-Besse are sustained for an extended period, disasters are almost inevitable (Agnew & Daniels, 2010). On the other hand, these researchers maintain that a positive safety culture can help prevent work-related injuries, including major disasters similar to what occurred at the Upper Big Branch Mine (Hayes, Perander, Smecko, & Trask, 1998; O'Toole, 2002).

OSHA, (2003) accentuated those injuries and their associated costs will decrease over time when an organization views safety as an investment rather than an expense. Similarly, there is widespread belief that a small near-term investment in safety programs could potentially prevent large, future costs due to a disaster. These costs could include workers compensation, lost-time work, or substantial legal costs. Additionally, public reputations could be damaged if the incident was significant, resulting in other financial losses for companies in the market. In an attempt to reduce injuries and costs, many organizations have developed efforts to assess and promote a positive safety culture (Arboleda et al., 2003; Haber, Shurberg, & Hofmann, 1994).

Empirical Review

Jilcha and Kitaw (2016) carried out a study on literature review on global occupational safety and health practice & accidents severity. Global occupational safety and health practice & accidents severity research was undertaken since 1980s onwards. The purpose of the study is to identify existing gaps on workplace safety and health management and propose future research areas. The review adds value to existing electronic database through integration of researches' results. To identify existing gaps, a systematic literature review approach has been used. The reviews were undertaken through keywords and safety related topics. In the literature, various characteristics of workplace safety and health problems were found emanating from the lack of operational activities of the employees, internal working environment and external environment those impose hazards on employee temporarily, permanently and on working environments. The integration of multidisciplinary approaches and collaborative model of hub and peripheral industries to protect workplace safety hazards to develop multilevel model has been undermined in many researches. The other face of finding is that knowledge transfer mechanism and industrial topology factors are left. Some researches finding showed that they have focused on single problems related to health and health factors leaving universal improving workplace safety. In general, this literature reviews compare various studies output based on their research method and findings to fills gap and add value to a body of knowledge.

According to Albert, Matthew, Hallowell, and Kleiner (2014), work-related construction safety incidents continue to be a critical societal problem. Despite continued efforts, the industry has not seen any significant reduction in recordable injury rates in the last decade. An essential component in construction safety management is the identification of potential hazards to establish proactive physical or procedural controls that reduce safety risk exposure. Unfortunately, studies indicate that a large portion of hazards are not adequately identified or assessed, thus compromising worker safety. To address this issue, promising site-based construction hazard identification strategies were identified in a wide body of literature and potentially breakthrough strategies were developed by an expert panel of construction safety professionals in brainstorming sessions. The strategies were then prioritized based on their potential and applicability to construction using the nominal group technique, facilitated by a group-decision support system. Consensus analysis was conducted to verify consistency within the expert panel. A prejob safety-meeting-quality measurement tool to provide active feedback regarding hazard identification capability and communication emerged as being the most relevant strategy. This was followed by a computer based augmented virtuality training environment. The results of this study can be used by construction practitioners to strategically identify potential hazard recognition programs to complement existing methods. Future studies

will focus on validating findings through field-based empirical tests on active construction projects.

However, Jovanovic (2004) was of the opinion that medical services, physicians and nurses play an essential role in the plant safety program through primary treatment of injured workers and by helping to identify workplace hazards. She further stated that physician and nurse should participate in the worksite investigations to identify specific hazard or stresses potentially causing the occupational accidents and injuries and in planning the subsequent hazard control program. Physicians and nurses must work closely and cooperatively with supervisors to ensure the prompt reporting and treatment of all work-related health and safety problems. Occupational accidents, work related injuries and fatalities result from multiple causes, affect different segments of the working population, and occur in a myriad of occupations and industrial settings. Multiple factors and risks contribute to traumatic injuries, such as hazardous exposures, workplace and process design, work organization and environment, economics, and other social factors. With such a diversity of theories, it will not be difficult to understand that there does not exist one single theory that is considered right or correct and is universally accepted. These theories are nonetheless necessary, but not sufficient, for developing a frame of reference for understanding accident occurrences. Prevention strategies are also varied, and multiple strategies may be applicable to many settings, including engineering controls, protective equipment and technologies, management commitment to and investment in safety, regulatory controls, and education and training. Research needs are thus broad, and the development and application of interventions involve many disciplines and organizations.

Moreover, Ivascu and Cioca (2019) noted that the rate of occupational accidents is increasing, leading to a number of organizational deficiencies. For European Union (EU), the non-fatal accident number in 2017 was 3,315,101. An increase in the number of accidents is recorded in many of the member states. In addition, the increase in accidents tends to focus on certain sectors and is due more to the increase in the incidence rate than the increase in the workforce. Companies in these industry sectors have also implemented less intensive prevention practices than firms in other sectors. Performing a statistical evaluation of non-fatal and fatal accidents is an important one. This assessment helps managers understand the importance of implementing prevention and control methods across organizations. For this research, we used series of data obtained from the Romanian National Institute of Statistics (NIS), Labor Inspection in Romania, and Eurostat of the European Commission. Data series evaluations were conducted for the EU and Romania. A qualitative assessment of the industry data series had been carried out. Furthermore, T-tests and analysis of variance analysis (ANOVA) were performed to identify the relationships between the frequency index of fatal and non-fatal accidents, and the categories chosen. The values obtained for men were significantly higher than those of female workers. Based on the results of the qualitative assessment and European and national strategies, an experimental model for the prevention and control of occupational accidents is proposed. At the end of the paper, the situation of labor accidents in Romania and Bulgaria, two EU member states, is assessed in the agriculture, forestry and fishing, manufacturing, construction and transport, and storage sectors. A series of trends are presented for the period 2018–2020. The results obtained from the evaluation of the data series represent an important core of the Romanian Labor Inspectorate for the development of strategic actions.

Burke, Sarpy, Smith-Crowe, Chan-Serafin, Salvador, and Islam (2006) investigated the relative effectiveness of worker safety and health training methods. The study recommends major strategies for improving construction safety, such as: reinforcing the safety regulatory authority; incorporating safety in contractor's licensing, renewal and bidding processes; establishing an effective mechanism for safety training and accident reporting; and ensuring an enhanced client's commitment to safety by introducing safety incentive schemes. In addition, it is suggested to update and enforce the safety laws, and launch safety awareness media campaigns at the national level of safety. The research sought to determine the relative effectiveness of different methods of worker safety and health training aimed at improving safety knowledge and performance and reducing negative outcomes (accidents, illnesses, and injuries). Ninety-five

quasi-experimental studies (n=20991) were included in the analysis. Three types of intervention methods were distinguished on the basis of learners' participation in the training process: least engaging (lecture, pamphlets, and videos), moderately engaging (programmed instruction, feedback interventions), and most engaging (training in behavioral modeling, hands-on training).

Lastly, Gupta, Malhotra, Verma, and Yadav (2017) looked at the in-depth analysis of pattern of occupational injuries and utilization of safety measures among workers of railway wagon repair workshop in Jhansi (U.P.) and noted that occupational or work-related injuries became more common after the industrial revolution. Over time, in response to great demand for better working conditions, the first occupational laws were enacted in 19th century in England. Occupational injuries are associated with lots of suffering and loss at individual, community, societal and organizational levels. According to the International Labour Organization (ILO); occupational injuries and diseases represented 4% of total Gross National Product (GNP). Since occupational injuries may occur by dangerous actions of workers, the prevention programs should focus on the human performance, behavior and factors in terms of better training, education and motivation of workers. However, certain industrial sectors with high risk of injury have central role in the global burden of occupational injuries and should be a part of the prevention strategy. Nearly half of the worker population in highly industrialized countries and even more in newly industrialized and developing countries are exposed to the risk of fatal injuries. Occupational fatal injuries therefore still remain as worldwide problem.

Nderitua, Mwaura, and Gichuhi (2019) posited that contemporary employees spend most of their working lives at the workplace. Work provides economic, social and psychological experiences that promote the mental wellbeing of individuals. The work environment should be devoid of hazards as much as possible to provide healthy and decent work for the workforce. However, numerous injuries, illnesses, property damages and process losses take place at different workplaces. It is unclear how effectively OSH programs are being implemented in Kenya's water sector since no study has been done. The general objective of the study was to establish influence of management commitment on Occupational Health and Safety policies implementation in Water and Sanitation Companies in Kenya, a study of water and Sanitation Companies in Nyeri County. The study was based on the theoretical foundation that comprises of two theories Leader-Member Exchange theory and Bourgeois and Brodwin's Five Models of Strategy Implementation. The target population consisted of 474 employees in all water & sanitation companies in Nyeri County. From this population a sample of 243 respondents was drawn using random sampling technique but only 188 respondents filled and returned valid questionnaire giving the study 80% response rate. The study employed both descriptive and inferential statistics to present and analyze the data. Quantitative data was analyzed using descriptive statistical tools namely frequencies, percentages, mean and standard deviation while inferential statistical tools such as multiple regression was used to determine relationship between variables. The study findings revealed that there was a statistically significant positive relationship between management commitment and implementation, the 27.9% unit change in implementation of OSH policies was explained by the management commitment. Study recommends that the water companies' management should be committed to implementation of OSH.

Deducing from the reviewed literature on the measures and dimension of the criterion and predictor variables which constitute the subject matter of this research, the following hypotheses were formulated to guide the work in the statistical test:

Hypotheses

HO₁: *There is no significant relationship between management commitment and accidents management in oil servicing firms in Nigeria.*

HO₂: *There is no significant relationship between safety training/education and accidents management in oil servicing firms in Nigeria.*

HO₃: *There is no significant relationship between organization's safety culture and accidents management in oil servicing firms in Nigeria.*

HO₄: *There is no significant relationship between worksite inspection and accidents management in oil servicing firms in Nigeria.*

Methodology

This study adopted a descriptive and cross sectional survey. For the population a total of one hundred and thirty one (131) oil servicing firms were targeted for this study. Ten (10) were selected for the study. Thus, the 10 oil and gas servicing firms were chosen because of their market value and given that they are quoted on the stock exchange market as well as ease of accessibility of their required data (<https://lekoil.com>; <https://nairametrics.com>). Respondents were selected at random from the pool of management staff based on convenience. A total of 350 respondents were administered the questionnaire in the study

The study is at the organizational level, so all inquiry and investigations are to the management staff. The choice of the firms were based on the size of the market value and operational rating in the Nigerian Stock Exchange Market. Choices of respondents were through judgmental sampling technique based on accessibility and convenience. Workplace safety program is the independent variable, and it is measured using management commitment, worksite inspection, training and education and safety culture while accident which is our dependent variable is measured by the manifestation of injury. The data analysis techniques for hypothesis testing is Structural Equation Modeling due to the nature of the study and the structure of the hypotheses. Decision criteria for validation and test of significance is at 95% confidence level. Descriptive Statistics were measured using the mean and standard deviation, used to capture the characteristics of the variables under study via Statistical Package for Social Sciences (SPSS) software version 25. Inferential Statistics were tested using the Structural Equation Modelling (SEM). Structural Equation Modelling (SEM) comprises of both a measurement model and a structural model. The measurement model is based on the common factor model. SEM has been chosen as the main statistical method to test the hypothetical model because of the following justifications:

- (1) Likert-scale ordinal data with large sample sizes tend to have a distribution that is close to normality demonstrated that if samples consist of several observations, the researcher may overlook the nature of data and use a tool such as SEM.
- (2) The study involves simultaneous analyses of multiple interactions among the dimensions of multitasking capacity and organizational performance. Submit that SEM enables researchers to answer a set of interrelated research questions in a single, systematic, and comprehensive analysis by modelling the relationships among multiple independent and dependent constructs simultaneously.

The AMOS (Analysis of Moment Structure) was used in this study. AMOS is one of the popular specialized SEM software programs.

The *AMOS software* was deployed because it has easy-to-use graphical interface and a clear representation of models, and other advantages, such as extensive bootstrapping capabilities.

Table 1: Names of Oil and Gas Firms and Number of Employees

S/N	NAMES OF FIRMS	NUMBER OF EMPLOYEES
1	Lekoil Nig limited	45
2	SHELL NIGERIA	50
3	CHEVRON NIGERIA	30
4	EXXONMOBIL NIGERIA	20
5	ARDOVA PLC	25
6	ADDAX PETROLEUM	40
7	OANDO PLC	32
8	CAMBRIDGE LNG	36
9	FRONTIR OIL	35
10	ONAIL	37
	Total	350

Sources: Researcher 2024

Fig: 1 Conceptual Framework

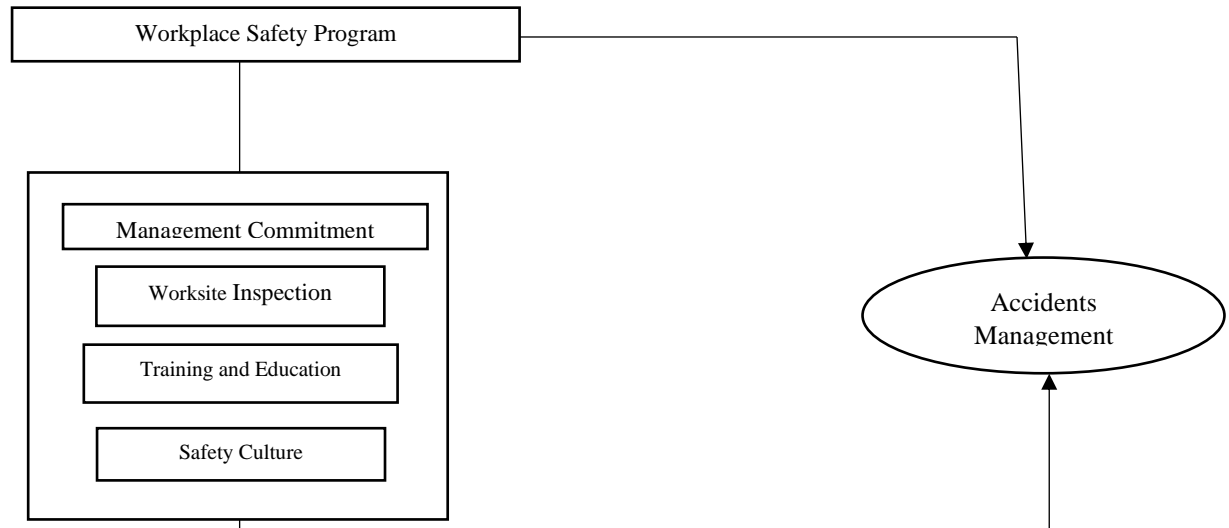


Fig 1: Conceptual Framework on Workplace Safety Program and Accidents Management

Source: The dimensions of workplace safety program was adapted from the works of Borys (2009), and the accidents management as the measure was adopted from the works of Gyekye (2006).

Test of Reliability

Reliability is a matter of whether a particular technique, applied repeatedly to the same object, would yield the same result each time. Implying that reliability has to do with the amount of random error in a measurement . The researcher, therefore, used test-re-test form of reliability test to ensure reliability on the instrument after such test must have yielded a Cronbach's Alpha co-efficient correlation of at least 0.70 indicating the level of internal consistency.

Cronbach's Alpha which is in the Statistical Package for Social Sciences (SPSS) is used in measuring the reliability of this research instrument. Also, based on the Cronbach's Alpha rule of thumb, only the study items with alpha value of 0.7 and above were selected to make up the research instrument.

Table 2. Reliability of Research Instrument

VARIABLES	DIMENSIONS/MEASURES	STATEMENT ITEMS	ALPHA COEFFICIENT
Independent: Workplace Safety Program	Management Commitment	5	0.86
	Worksite Inspection	4	0.79
	Training and Education	4	0.72
	Safety Culture	5	0.91
Dependent: Accidents Management	Financial Performance	4	0.77

Source: SPSS OUTPUT (2023)

Data Presentation

Table 3: Distribution and Retrieval of Questionnaire

Questionnaire	Number Distributed	Number Returned and Used
Frequency	350	325
Percentage	100%	81.2%

Source: Research Survey, 2023

The study being predominantly quantitative, generated data using the structured questionnaire. A total of 350 (100%) copies of the questionnaire were distributed to targeted oil and gas servicing firms in the Nigeria within a specified time-frame; copies were manually distributed through established contacts in the firms, thereafter retrieval was also accomplished through same contacts in the firms. Retrieval of distributed copies recorded a success of 225 (81.2%) copies.

Data Analysis

Table 4: Measurement Model Analysis of Accident Management

Model	Chi-Square (df), Significance	NFI	TLI	CFI	RMSEA	Variable	Standardized Factor Loading Estimates	Error VAR
Accident Management	(33df) =225, p>0.000	0.80	0.72	0.82	0.15	AM 1	0.91	0.38
						AM 2	0.88	0.41
						AM 3	0.63	0.53
						AM 4	0.96	0.22

Source: Amos 24.0 output on research data, 2024

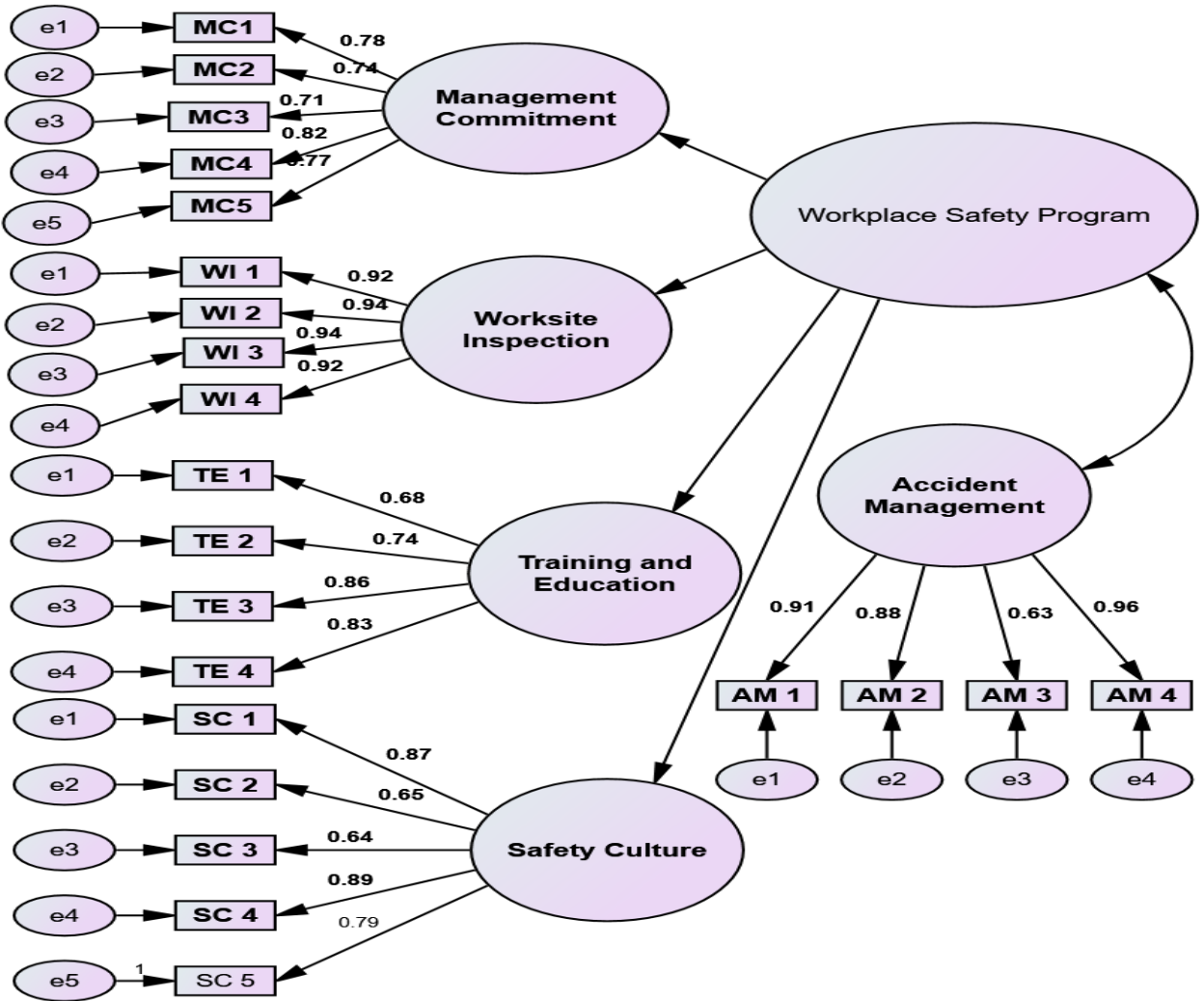


Fig. 1: Structural Equational Model

Hypotheses Testing

Table 5: Result of standardized and unstandardized regression estimate of the model.

S/N	Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
1.	X → Y (Hypothesis 1)	Management Commitment and Accidents Management	0.46	0.88	0.12	2.33	0.000	Not Supported
2.	X → Y (Hypothesis 2)	Safety Training/Education and Accidents Management	0.54	0.81	0.33	3.22	0.000	Not Supported
3.	X → Y (Hypothesis 3)	Safety Culture and Accidents Management	0.57	0.85	0.14	4.16	0.000	Not Supported
4.	X → Y (Hypothesis 4)	Worksite Inspection and Accidents Management	0.64	0.82	0.19	3.27	0.000	Not Supported

Source: Amos 24.0 Output on Research Data, 2024

Hypothesis One

Table 5 illustrates the analysis for the association between management commitment and accidents management in oil and gas servicing firms in Nigeria, where $\beta=0.46$, $r=0.88$ and $p = 0.000$. The findings show a very positive and significant association between both variables (where $\beta>0.3$, $r>0.7$ and $p < 0.05$).

Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
X → Y (Hypothesis 1)	Management Commitment and Accidents Management	0.46	0.88	0.12	2.33	0.000	Not Supported

Thus, based on the criteria for null hypothetical statement acceptance ($\beta<0.3$, $r<0.7$ and $p > 0.05$); or rejection ($\beta>0.3$, $r>0.7$ and $p < 0.05$), we reject the null hypothesis and restate that there is a positive significant relationship management commitment and accidents management in oil and gas servicing firms in Nigeriat. Therefore, H_{01} was not supported.

Hypothesis Two

Table 5 illustrates the analysis for the association between safety training/education and accidents management in oil and gas servicing firms Nigeria, where $\beta=0.64$, $r=0.82$ and $p = 0.000$. The findings show a very positive and significant association between both variables (where $\beta>0.3$, $r>0.7$ and $p < 0.05$).

Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
X → Y (Hypothesis 2)	Safety Training/Education and Accidents Management	0.54	0.81	0.33	3.22	0.000	Not Supported

Thus, based on the criteria for null hypothetical statement acceptance ($\beta<0.3$, $r<0.7$ and $p > 0.05$); or rejection ($\beta>0.3$, $r>0.7$ and $p < 0.05$), we reject the null hypothesis and restate that there is a positive significant relationship between safety training/education and accidents management in oil and gas servicing firms in Nigeria. Therefore, H_{02} was not supported.

Hypothesis Three

Table 5 illustrates the analysis for the association between safety culture and accidents management in oil and gas servicing firms in Nigeria, where $\beta=0.57$, $r=0.85$ and $p = 0.000$. The findings show a very positive and significant association between both variables (where $\beta>0.3$, $r>0.7$ and $p < 0.05$).

Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
X \rightarrow Y (Hypothesis 3)	Safety Culture and Accidents Management	0.57	0.85	0.14	4.16	0.000	Not Supported

Thus, based on the criteria for null hypothetical statement acceptance ($\beta<0.3$, $r<0.7$ and $p > 0.05$); or rejection ($\beta>0.3$, $r>0.7$ and $p < 0.05$), we reject the null hypothesis and restate that there is a positive significant relationship between safety culture and accidents management in oil and gas servicing firms in Nigeria. Therefore, H_{03} was not supported.

Hypothesis Four

Table 5 illustrates the analysis for the association between worksite inspection and accidents management in oil and gas servicing firms in Nigeria, where $\beta=0.64$, $r=0.82$ and $p = 0.000$. The findings show a very positive and significant association between both variables (where $\beta>0.3$, $r>0.7$ and $p < 0.05$).

Mediation Stage	Relationship	Std. Beta	Actual Beta	S.E.	C.R.	P	Remark
X \rightarrow Y (Hypothesis 4)	Worksite Inspection and Accidents Management	0.64	0.82	0.19	3.27	0.000	Not Supported

Thus, based on the criteria for null hypothetical statement acceptance ($\beta<0.3$, $r<0.7$ and $p > 0.05$); or rejection ($\beta>0.3$, $r>0.7$ and $p < 0.05$), we reject the null hypothesis and restate that there is a positive significant relationship between worksite inspection and accidents management in oil and gas servicing firms in Nigeria. Therefore, H_{04} was not supported.

Discussion of Findings

The first hypothesis (H_{01}) stated that there is no significant relationship between management commitment and accidents management in oil and gas servicing firms in Nigeria. The findings show a very positive and significant association between both variables (where $\beta>0.3$, $r>0.7$ and $p < 0.05$). Thus, based on the criteria for null hypothetical statement acceptance ($\beta<0.3$, $r<0.7$ and $p > 0.05$); or rejection ($\beta>0.3$, $r>0.7$ and $p < 0.05$), we reject the null hypothesis and restate that there is a positive significant relationship between management commitment and accidents management in oil and gas servicing firms in Nigeria. Therefore, H_{01} was not supported. Nevertheless, territories dedicate resource in order to maximize economic outputs (e.g., GDP) and to minimize the negative externalities of economic activity, that is, work accidents. Therefore, it seems plausible to assume that specific work safety policies may help to mitigate work accident rates. From a policy point of view, an analysis that takes into account work safety controls may offer valuable information on the effectiveness of the occupational health and safety (OHS) system.

The second hypothesis (H_{02}) stated that there is no significant relationship between safety training/education and accidents management in oil and gas servicing firms in Nigeria. The findings show a very positive and significant association between both variables (where $\beta>0.3$, $r>0.7$ and $p < 0.05$). Thus, based on the criteria for null hypothetical statement acceptance ($\beta<0.3$, $r<0.7$ and $p > 0.05$); or rejection ($\beta>0.3$, $r>0.7$ and $p < 0.05$), we reject the null hypothesis and restate that there is a positive significant relationship between safety

training/education and accidents management in oil and gas servicing firms in Nigeria. Therefore, Ho2 was not supported. Bolarinwa (2002) felt that safety education and training for industrial workers are necessary, because he observed that the present level of awareness about occupational hazards among factory workers in rural areas of Nigeria was rather limited. Zeng et al. (2008) pointed out that some accidents, such as falling from height and being hit by falling materials in construction, could easily be prevented by implementing training programs for employees.

The third hypothesis (Ho3) stated that there is no significant relationship between safety culture and accidents management in oil and gas servicing firms in Nigeria. The findings show a very positive and significant association between both variables (where $\beta > 0.3$, $r > 0.7$ and $p < 0.05$). Thus, based on the criteria for null hypothetical statement acceptance ($\beta < 0.3$, $r < 0.7$ and $p > 0.05$); or rejection ($\beta > 0.3$, $r > 0.7$ and $p < 0.05$), we reject the null hypothesis and restate that there is a positive significant relationship between safety culture and accidents management in oil and gas servicing firms in Nigeria. Therefore, HO3 was not supported. Furthermore, many industrial accident investigations have found that safety culture is a contributory factor in accident causation (Cullen, 2001). It's now generally accepted that organizations with a strong safety culture are more effective at preventing workplace accidents and injuries. Health and safety practitioners have a significant role to play in improving health and safety at work by giving competent advice.

The fourth hypothesis (Ho4) stated that there is no significant relationship between worksite inspection and accidents management in oil and gas servicing firms in Nigeria. The findings show a very positive and significant association between both variables (where $\beta > 0.3$, $r > 0.7$ and $p < 0.05$). Thus, based on the criteria for null hypothetical statement acceptance ($\beta < 0.3$, $r < 0.7$ and $p > 0.05$); or rejection ($\beta > 0.3$, $r > 0.7$ and $p < 0.05$), we reject the null hypothesis and restate that there is a positive significant relationship between worksite inspection and accidents management in oil and gas servicing firms in Nigeria. Therefore, HO4 was not supported. The employees should have high supervision to manage safety practices and control from injuries. Brown (2000) in Taufek et al. (2016); Cooper (2002); and Zohar (1980), agreed on in order to reduce workplace injuries or accidents, safety programs for example, give a briefing and induction training about safety and health practices should implement in industrial production and manufacturing companies.

Conclusion

Empirical findings from the data analyzed established the following conclusions relative to the scope of our study;

That there is a strong positive relationship between management commitment and accident management and also a significant relationship between training and education and accident management, between worksite inspection and accident management, and between safety culture and accident management. The practical implication of this is that, when employee's gives room for negotiation, that for the most part of it, leads to enhanced corporate image for the organization.

Recommendations

Based on the finding of the study, the following recommendations are made:

1. Owners of businesses/managers should ensure that there is proper training and education made available for employees in their various positions. This includes teaching them how to use equipment and follow safety procedures during their course of work.
2. Employees must also be equipped for their specific job. Equipment may vary from safety harnesses to proper gloves and goggles. Under no circumstances should employees perform functions without the proper equipment.

3. A cluttered, unclean work area is more difficult to efficiently maneuver in and workers are more prone to hazards. Make sure staff adhere to something as simple as running computer cables and cords properly so that they do not create a tripping hazard. No matter if your work environment is a manufacturing warehouse or an office cubicle, keeping the area clean and well-maintained decreases the chance of accidents.
4. Managers/supervisors/experts should from time to time inspect the work progress, vehicles, machines used in the organization for proper maintenance in order to avoid breakdown of machines that might be hazardous to the employees.

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