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Analysis of Effects of Health Related Risks on Construction Project Success at Rainbow Town Project in Port Harcourt, Nigeria

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Abstract:
Health related risks from the stakeholders view have been considered as one of the factors constraining project success. The thesis examined health related risks on construction sites and the extent to which they affect project success at Rainbow Town Project, Port Harcourt. The specific objectives were to identify health related risks at Rainbow Town construction site, to identify the extent of health related risks awareness among workers in the construction site, to identify the medical provision made for health related risk in construction site, and to examine the relationship between health related risks and project success in the study site. Primary data were obtained from administration of questionnaire and the study was analysed with descriptive statistic such as frequency, simple percentage, multiple regression and correlation analyses. The findings of the study revealed that physical hazards , workers fall from height, electric shock, malaria , fire and emergency, dislocation due to heavy load, excessive exposure to noise , heat ,solar radiation , skin infection, cold and cough and dirty water have negative and significant effect on project success. There is negative relationship between health related risks and project success in the construction site. The researcher recommended that a trained medical doctor should be resident in every government project site and individual projects should have one health personnel on ground or a first aid box in case of any accident.

Keywords: Construction site, Health, Risk, Hazard, Safety.

1.0 INTRODUCTION

The fundamental goal of an effective safety program should be captured in planning phase of project implementation. To achieve this goal, it is important that project managers identify possible health related risks that could cripple project implementation process before execution (Nwachukwu, 2016). Most of construction activities in Nigeria are inherently health and safety risks such as working at height, working underground, working in confined spaces and close proximity to falling materials, handling load manually, handling hazardous substances, noises, dusts, using plant and equipment, fire, exposure to live cables, poor housekeeping and ergonomics. In an urban context, health and safety accidents are relatively higher due to the fact that high rise buildings remain predominant with the fast-growing complexities of domain-wide construction projects to cope with modernizing cities arena and high demand for housing, offices, services and other infrastructures due to the high urbanisation (Muiruri&Mulinge,2014) Generally, accidents at work occur either due to lack of knowledge or training, a lack of supervision, or a lack of means to carry out the task safely, or alternatively, due to an error of judgment, carelessness, apathy or downright reckless. In addition to these factors, the short term and transitory nature of the construction industry, the lack of a controlled working environment and the complexity and diversity of the size of organizations, all have an effect on safety performance within the industry. Every project is time framed and the success is determined by the completion of that project as at the time due, within the available budget and acceptable performance/ quality. In Nigeria, there are cases of abandoned projects and failed projects which have contributed negatively to the economy of the country (Dodo, 2016). Most laws on safety on the construction sites are not strictly adhered to while health workers are only concerned about infectious diseases and not preventive measures. Safety at work is a complex phenomenon, and the subject of safety attitudes and safety performance in the construction industry is even more so (Dodo, 2016). This study is aimed at reducing if not eliminating the health challenges among stakeholders during project implementation in Rainbow Town project.

The following hypotheses were formulated for evaluation in this study:

$H0_1$: Health related risks in construction sites have no significant effect on project success.
$H0_2$: Non-adherence to health and safety rules in the construction sites have no significant effect on project success.
$H0_3$: There is no relationship between health related risks and project success in Rainbow Town Construction site.

The Problem: Despite its importance, construction sites have been regarded as very risky areas where construction workers are subjected to varying health related risks. Many building construction activities are inherently risky to health and safety such as working at height, working underground, working in confined spaces and close proximity to falling materials, handling loads manually, handling hazardous substances, noises, dusts, using plant and equipment, fire, other relative explosives and exposure to live cables. The health of workers on construction site play a vital role in determining the success rate of that project. The fundamental goal of an effective safety program is to identify and plan how to manage it at any stage it may occur and proffer solutions either before commencement or implementation process of the project (Ezenwa, 2011). Most of the scholars like Oyebanji, Akintoye, and, Liyanage, (2011), Olotuah,(2015), Bakar, Razak and Abdullah (2016) identified some health related risks and ways of maintaining

safety but no effort was made in analysing these risks to ascertain how they impact on project success. The problem is how to analyse the impact of health related risks in construction environment. Unfortunately, health related risks are not given serious attention in private and some government projects, and hence, the study seeks to analyses the effects of health related risks on construction project success in Port Harcourt, Nigeria.

2.0 CONCEPT OF HEALTH RELATED RISKS:

Health Related Risk have been define by so many scholars, These include; Adekunle (2016) who defines health related risk as uncertain event or condition which, if it occurs, can have positive or negative impact on one health. Health related risk arise from uncertainty present in every project. Known risks are those risks that are recognized and analyzed, and thus it is possible to plan and prepare. Health related risk is an integral part of each project phase, and thus risk management is an essential part of the decision-making process at every stage of a project. The success or failure of a project largely depends on the approach to possible risk in which the appearance of risk could affect productivity, quality, deadlines, and/or project cost. Traditionally, risks were managed intuitively with the goal of dealing with the consequences. Today, the use standards and methodologies, such as PMBoK(Project Management Book of Knowledge) by PMI or ISO 31000, allows for a possibility to proactively manage risks. That is, although it is not possible to eliminate risks, they can be reduced, transferred, accepted, or avoided (Adekunle, 2016). In Nigeria, Health and Safety has not been given the required attention to reduce or prevent hazards and accidents on construction sites, thereby posing serious threats to workers and even non-workers, creating the need for a quick solution for the issue to be addressed. Oresegun (2009) opines that the attempt to determine the impact of Health and Safety on construction and its correlation with project performance, labour performance, labour motivation and safety plan is as a result of non-compliance of the Nigerian construction companies with Health, Safety and Environmental (HSE) regulations. He further asserts that there is no reliable data on accident cases in construction in Nigeria because contractors neither report accidents appropriately nor keep proper records on accidents. According to Health and Safety Executive (2010), every year more working days are lost due to work-related illness compared to injuries. The statistics reveal that construction workers have a high risk of developing diseases from a number of health issues.

Health Related Risk in Construction

In Nigeria, Health and Safety has not been given the required attention to reduce or prevent hazards and accidents on construction sites, thereby posing serious threats to workers and even non-workers, creating the need for a quick solution for the issue to be addressed. Oresegun (2009) opines that the attempt to determine the impact of Health and Safety on construction and its correlation with project performance, labour performance, labour motivation and safety plan is as a result of non-compliance of the Nigerian construction companies with Health, Safety and Environmental (HSE) regulations. He further asserts that there is no reliable data on accident cases in construction in Nigeria because contractors neither report accidents appropriately nor keep proper records on accidents. According to Health and Safety Executive (2010), every year more working days are lost due to work-related illness compared to injuries.

1. Cancer

Construction has the largest burden of occupational cancer amongst the industrial sectors. It accounts for over 40% of occupational cancer deaths and cancer registrations. It is estimated that past exposures in the construction sector annually cause over 5,000 occupational cancer cases and approximately 3,700 deaths. The most significant cause of these cancers is asbestos (70%) followed by silica (17%) working as a painter and diesel engine exhaust (6-7% each).

2. Hazardous Substances

Dusts, chemicals and potentially harmful mixtures (e.g. in paints) are common in construction work. Some processes emit dusts, fumes, vapours or gases into the air and these can be significant causes of breathing problems and lung diseases. A number of construction-related occupations also have high rates of dermatitis from skin exposures to hazardous substances.

3. Physical Health Risks

Skilled construction and building trades are one of the occupations with the highest estimated prevalence of back injuries and upper limb disorders. Manual handling is the most commonly reported cause of over seven day injuries in the industry. Construction also has one of highest rates of ill health caused by noise and vibration.

Causes of Health Related Risk

1. Accidents and Incidents

Laufer and Ledbetter (2016) described accident as chance-caused events that are normally not given to direct observation but rather most methods are based on post-factum measurement. Dodo (2016) asserts that the three most frequent accidents that topped the rank in occurrence are: scaffolding accidents, falls from ladder and stepping or kicking abandoned objects. The two least frequent accidents are: accidents caused by fire or explosion and compressed gas accidents. The terms accident and injury refer to separate phenomena, mutually interrelated as cause and effect (exposure and outcome). The terms ‘accident’ and ‘injury’ are hereby used in accordance with the definition adopted at the first World Conference on Accident and Injury Prevention (WHO, 1989); that is, an accident is an unintentional event which results or could result in an injury, whereas injury is a collective term for health outcomes from traumatic events (Andersson, 2015). Rejda (2015) defined an accident as a sudden, unforeseen and unintentional" event, which may result in physical harm to a person and/or damage to a property Accidents might be injurious or damaging events and can interrupt or disrupt the completion of an activity. An incident should be reported to avoid accident. Accident can result in direct and indirect cost. Direct costs of construction accident are medical bills, premiums for compensation benefits, liability and property loss.

Indirect costs associated with accidents are:

(1). Loss time of injured employee
(2). Cost of work stoppage of other employees from curiosity, sympathy, and providing assistance; and
(3) Loss of supervisory time from assisting injured employee, rearranging work crews because of lost employee.

It has been established that the reduction of hazardous events is fundamental to good construction safety management because

it is these events that have the potential to cause accidents which may result in injuries and fatalities (Carter and Smith, 2011). On injury analysis, there are various theories, but an interesting theory concerning importance of minor injuries state that for every one injury causing loss of time at work, there are 29 minor injuries and 300 accidents which do not cause personal injury (Betts, 1983). The theory was based on study of many cases (in thousands) and it follows that by reducing occurrence of minor injuries a proportionate number of serious and major injuries will be prevented. It is against this background that safety assessment and pursuit should be geared towards identification of hazards, assessment of risks, determination of their significance, evaluation of the available corrective measures, and the selection of the optimal remedies (Oresegun, 2009). Actions to ensure safe access and safe working areas must also be regularly reconsidered as construction proceeds otherwise safety may be compromised.

2. Site Layout and Planning

A badly planned and untidy site is the underlying cause of many accidents. This results from falls of material and collisions between workers and plant or equipment. Space constraints, particularly in urban work sites, are nearly always the biggest limiting factor and a layout which caters best for the safety and health of workers may appear to be difficult to reconcile with productivity. Proper planning by management is an essential part of preparation and budgeting for the safe and efficient running of a construction operation. There are many accidents due to tripping, slipping or falling over materials and equipment which have been left lying around, and stepping on nails which have been left projecting from timber (Muiruri, 2014).

3. Noise

Noise is a major hazard within the construction industry. Repetitive, excessive noise causes long term hearing problems and can be a dangerous distraction, the cause of accidents. According to Umeh and Uchegbu (2011), the additional effects of noise include disruption of sleep and rest, reduction in work performance, property devaluation resulting from sonic booms and interference with normal pattern of behaviour of domestic and wild animals. The use of simple ear plugs does not necessarily offer total protection against hearing damage – employers are required to carry out and document a comprehensive noise risk assessment – and issue appropriate PPE (Oresegun, 2009).

3. Hand Arm Vibration Syndrome

Hand arm vibration syndrome, or 'blue finger' as it is commonly referred to, is a painful and debilitating industrial disease of the blood vessels, nerves and joints, triggered by prolonged use of vibratory power tools and ground working equipment. This industrial disease is frequently cited in compensation claim cases opened by ex-construction workers who worked for years with little or no protection, using inappropriate and poorly maintained equipment (Oresegun, 2009)

4. Material & Manual Handling

Materials and equipment is being constantly lifted and moved around on a construction site, whether manually or by the use of lifting equipment. Different trades will involve greater demands, but all may involve some degree of risk. Where employee's duties involve manual handling, then adequate training must be carried out. Where lifting equipment is used, then adequate training must also be carried out, but may involve some form of test, to confirm competency. Records of training must be maintained for verification.

5. Collapse

Not exactly a hazard, more a risk an accident in waiting. Every year excavations and trenches collapse bury and seriously injure people working in them – precautions need to be planned before the work starts. The risk of an unintended collapse is generally more associated with demolition works or when a partially completed building or scaffolding collapses, but still accounts for a percentage of fatalities each year.

6. Asbestos

There are many public buildings that contain harmful asbestos materials: often hidden away, forgotten, and by and large, harmless – in its undisturbed state. Workers need to know where it is and what to do if they come across suspicious materials that might contain asbestos.

Factors that Contribute to Project Success

1. Laws, Legislations and Conventions

There are various legislations in most countries to safeguard health and safety at work. In UK, the Health and Safety at Work Act 1974 and the Management of Health and Safety at Work Regulation 1999 are the two most important health and safety laws for employers and contractors.The former provides a comprehensive legislative framework for promoting, stimulating, and encouraging high standards of health and safety in the workplace. In the New South Wales, Australia, there is Occupational Health and Safety (OHS) Regulation and OHS Act 2000. The later hold the principal contractors responsible for the oversight of all OHS matters. According to this regulation, clients, project supervisors, employers, individual contactors and self-employed persons, all have responsibilities to ensure safety under the Italian law (Oresegun, 2009). In the legal context, occupational health and safety laws in many countries place the primary responsibility for health and safety on employers whose degree of willing compliance with occupational health and safety law may vary according to their conception of risk relation to health and safety. Gunningham (2014), for example, argues that an employer may find it more cost effective to leave health and safety risks uncontrolled than to pay accident related costs, for example, the loss of skilled personnel and workers' compensation premiums. Whilst employers may find benefits in hazardous workplaces, employees experience these as risks to health and safety. According to Ezenwa (2011), on any construction site, appropriate Health and Safety methods should be considered and used that will reduce or eliminate risk to death or injury. In Nigeria, the first effort in regulating and controlling Health and Safety at work was the Factories Act of 1958, but unfortunately there is lack of provisions for the enforcement of Health and Safety standards in construction industry. This Act was repealed in 1987 and replaced with the Factories Decree No. 16 and Workman's Compensation Decree No. 17. Both were signed into law on June12, 1987, but became effective in 1990. The Federal Ministry of Labour and Productivity is responsible for the enforcement of the safety and welfare regulations in Nigeria (Oresegun, 2009). However, the Ministry charged with the enforcement of these laws has not been effective in identifying violators probably due to inadequate funding as well as lack of basic resources and training. Also, a safety oversight of other enterprises, particularly construction sites and non-factory works, was neglected. The labour decree does not provide workers with

the right to remove themselves from dangerous work situations without loss of employment (Nigerian Factories Act, 2002).

2. Laws

The two main sources of law which protect workers on construction sites are the common law and the statute law. The latter are the acts passed by the national and state assemblies and these override common law in the event of conflict. In 2004, the Senate passed a bill stipulating that all public building must have fire policy and building more than one storey under construction must have a policy. Some grey areas still require clarification before the policies can be successfully implemented (Muiruri, 2014). Under the common law, there is liability for safety of employees. An employer may be sued for damages if he does not provide reasonably safe systems of work. If an employer fails in his obligation to take reasonable care and avoid unnecessary risks, a civil wrong or tort of negligence is committed. The injured person may sue for damages and in serious cases, the state may consider the offence a crime and therefore prosecute (Muiruri, 2014).

3. Indemnity

Okeola (2009), In order to avoid legal liability for injuries to person or property, many standard contract do includes indemnity clause that basically "hold harmless" one or more parties to the contracting agreement. For examples, the contractor may indemnify and hold harmless the client (as in all University of Ilorin building/civil contract projects), architect, site engineer and Project manager from and against all claims, losses, and expenses arising from performance of the work caused by any negligent act or omission of the contractor, subcontractor, or anyone directly or indirectly employed by any of them. In general, the court will try to honour the indemnification term set out in the agreement. In addition to express agreement, parties may impliedly agree to indemnify each other because of their obligation to perform their duties in professional manner.

4. The Contractors' Role in Construction Site Safety

The success of a project depends on the intricate planning and decisions that are made on site. Most construction accidents result from basic root causes such as lack of proper training, deficient enforcement of safety, unsafe equipment, unsafe methods or sequencing, unsafe site conditions, not using the safety equipment that was provided, and a poor attitude towards safety (Toole, 2012). Often times the role of the various contractors is unclear as some contractors may try to transfer responsibility for safety to others. The most common construction project arrangement is that of general (prime) contractor/subcontractor. Under OSHA 1926.16, the prime contractor has overall responsibility for job site safety (compliance with OSHA regulations). General (prime) contractors have the highest level of influence on site safety because they monitor, coordinate and direct the work of the subcontractors. General contractors frequently provide equipment that is shared by multiple subcontractors. There may be one or more prime contractors in some cases (Muiruri, 2014). Subcontractors provide the labor and tools to complete their work. Under OSHA 1926.16, subcontractors are responsible for the safety of their employees with regard to their portion of the work. If a subcontractor creates a hazard, the subcontractor must protect its own employees as well as others who might be exposed.

Empirical Review

Paulinus and Ibimina (2014) conducted a study is to investigate and establish the Critical Project Management Success Factors (CPMSF) for the sustainable social (public) housing estates' delivery/provision in Nigeria . Documentary analysis of data collection was used in the study which involved an extensive and investigative theoretical review of online and visual document resources, followed by an interpretative identification of categories and limits of various materials and information considered vital to the phenomenon in the study. The documents were analysed with a content analysis approach under four criteria of how: authentic; credible; representative; and meaningful. The study reveals that 22 Critical Project Management Success Factors (CPMSF) are essential for the achievement of sustainable social (public) housing estates' delivery/provision in Nigeria. These relate to: the project managers' performance; the organization that owns the development project; the characteristics of the team members; and the external project environment. At the same time, the study reveals that these are social, economic, and environmental factors that are associated with the triple objectives of sustainable development. This study reflection aims to resolve or reduce to a minimum the acknowledged housing estate delivery and provision inadequacy problems in the country, and by exploring this phenomenon, best practice project management techniques will be understood and used to provide sustainable social (public) housing estate units for the Nigerian populace (Zadeh, 2008). Onengiyeofori, Odimabo, Chike. Oduoza, Subashini (2017) conducted a study to assess the methodology to improve the performance of building construction projects especially in developing countries. A survey of randomly selected samples to evaluate risk factors experienced by construction practitioners was conducted based on the likelihood of occurrence and impacts on projects. A response rate of 53% comprising 305 contractors and subcontractors and 38 clients was received. Risk Acceptability Matrix (RAM) was used to rank/prioritize risk factors in order to determine critical risks that could affect building construction projects especially in developing countries. Bayesian Belief Network was then constructed by structural learning and used to appreciate the relationship amongst the risk factors. Results showed that critical risks affecting building construction projects were mainly improper construction methods, poor communication between involved parties, supplies of defective materials, delayed payment in contracts, fluctuation of materials prizes and unsuitable leadership style. Peter, John and Okechukwu (2015) examined a study on the health and safety knowledge and compliance of building construction workers on site in Anambra State, Nigeria. Questionnaires containing information relating to health and safety at site were administered randomly to the construction workers selected from fifteen (15) selected building sites across the state. Mean Score Index and Pearson's Product-moment Correlation Coefficient(**r**) were statistical tools used for analysis of results. The result revealed that there was moderate level of health and safety knowledge, and low level of health and safety compliance among building construction workers in the state. It also found that the effect of the health and safety knowledge and compliance on project performance was low. The result established a very weak positive correlation **(r=0.19)** between health and safety knowledge and compliance. It further established a strong positive correlation between health and safety knowledge and project performance **(r=0.71)**; and between health and safety compliance and project performance **(r=0.76)**. However, when the significance of the correlation was tested, the t-values obtained were **(0.335)**, **(1.746)** and **(2.025)** respectively. From the result, all the t-values were less than the t-critical **(3.182)** at 5% significance level. The result implied that though there

were relationships between all the variables considered, the relationships were not significant. Practically, this meant that health and safety knowledge and compliance alone cannot substantially improve the project performance, but was limited to the values of their coefficient of determination (**R2**) **50.41%** and **57.76%** respectively. Thus, since knowledge and compliance alone cannot achieve optimum project performance improvement, some other factors such as management commitment, workers involvement and strict enforcement of safety regulation should be applied to complement. In this case, establishment of the Anambra State Safety Commission whose function would include inter alia; policy formulation, setting of safety standard for all sectors in the state is of paramount important (Zadeh, 2008). Vitharana and Subashi (2015) conducted a study to identify the health hazards, risks and causes of poor safety practices in construction sites. In addition, the differences in safety practices in both developed and developing countries and methods to improve construction site safety are discussed. Effects of some health hazards are chronic while some are acute. Mostly reported acute health hazards are "workers fall from height" and "electric shocks", while mostly reported chronic health hazard is "exposure to hazardous substances". Lack of awareness about site safety and dislike to wear Personal Protective Equipment (PPE) were identified as main causes of poor safety practices in construction sites. One of the major needs with regard to the construction industry is to enhance professionals' interests in active safety management and implementation of awareness programs, which must be developed and implemented among construction workers. Awareness on possible risk factors and knowledge on how to reduce these risk factors among workers and contractors will enhance site safety. EjohwomuOshodi and Onifade (2016) conducted a study on Construction projects are prone to conflicts. This is due to the multiplicity of individuals handling different phases of the projects. Empirical evidence from previous studies shows that conflicts affects projects outcomes, if not properly managed. Identification of the significant causes of conflicts is critical to minimizing the likelihood of conflicts occurring in projects. Thus, this study was aimed at identifying and assessing causes of conflicts in Nigeria based on the perception of consultants and contractors. To achieve the study's objectives, a 64-item questionnaire was used to collect information on experiences of construction professionals on the causes of conflicts in Nigerian construction projects. Responses from 69 professionals working for consultants and contractors were analysed. Seven significant causes of conflicts in the Nigerian context were identified. Based on the survey results, a poor financial projection on the client's side was identified as the most significant cause of conflicts. Furthermore, it was found that there are no differences in the perception of both groups of respondents. Taken together, these findings support strong recommendations on the need for effective management of finance on the client side, and engagement of experienced consultants in project. Implementation of these recommendations will minimize the likelihood of conflicts occurring in construction projects. Samuel (2014) conducted a study on both qualitative and quantitative investigation into the safety management system of a Nigeria-based construction company with a view of determining how compliant the system is to international standards. Identifying five major components and fifteen elements in the study, both primary and secondary data were collected through personal interviews, structured questionnaire and observation and these were analyzed using One Sample t-test at 0.05 level of significance. The results show that though a form safety management system exists in the company, the system is however poorly organized and consequently, it is characterized by ineffectiveness and poor documentation. It is therefore recommended that management gives an urgent attention to the company's safety management system with an intense interest to standardize its operations and functionality. As a roadmap to achieving this, the paper proposes an integrated "PCR" safety model based on the "TAB" philosophy Hammed, Akewushola and Olateju (2012) conducted a study to evaluate the effects of project management on project success in Blackstone Construction Company. The study adopted a survey research design, using a combination of stratified and judgmental sampling techniques, a structured questionnaire was administered on 40 top and middle levels management staff of the company. The scales in the questionnaire were content validated, and has a reliability correlation coefficient of 0.11.The data collected been analyzed using descriptive statistics and Chi−Square distribution. The research findings reveal that there is a relationship between project quality and business success, Project quality and technical success. The study also reveals that there is a significant relationship between Project cost and acceptability by clients. It was therefore recommended among others that total project cost on the side of clients should be minimized by ensuring that the project manager is innovative enough and creative in the apportion of project cost without reducing the quality of the project. Nicholas (2015) conducted a study to identify and assess the likelihood of occurrence and degree of impact of the risk factors on construction projects within the Ghanaian construction industry. Design/methodology/approach – A survey of randomly selected samples yielded responses from 34 contractors, 46 consultants, and 23 clients or owners (private and public) within the Ghanaian construction industry. Literature review is used to identify 25 relevant risk variables which were grouped into ten composite factors and then incorporated into the design of the survey instrument. Survey response data were subjected to descriptive statistics and analysis of variance (ANOVA), and subsequently the exposure rating levels were determined, which enabled the categorization of the probability-impact scores in low, medium and high levels. – Results of this study indicate a disparity of the ranking of the degree of occurrence and impact among the groups. There was a statistical difference at the p , 0.05 level significant for five out of 25 risk factors occurrences as follows: "construction methods", "inflation", "weather condition", "ground conditions and contaminant conditions" and "poor communication amongst project team" and only one for the degree of impact scores for "price fluctuation". Based on the composite risk factors, the financial and economic factors were found to be the most likely to occur and have the most impact on projects, whereas legal risk factor was found to be a low weighted risk, as it had the least likelihood to occur and the least impact score. The post hoc comparisons using the Tukey HSD test also indicated differences between the contractor and clients in the ranking of construction methods risk variable, but no significant differences between contractors/consultants and clients/consultants Bima, Ismaila and Baba (2016) conducted a study to assess the cost impact of Health and Safety management within the construction industry. The purpose of the study is to help identify the impact of cost directly to projects. Toward this end, a field survey was conducted with a sample of fifty contractors selected in a given geographical region with high density of construction work. Data were collected using structured questionnaires and analyzed using a tabular presentation

identifying percentages of given responses. The results reveal that contractors are aware that health and safety compliance is correlated with the scope of their operations. The study results also reveal that the accident and injury rates in the Nigerian construction industry are high. Thus, the results reveal the challenges facing Nigerian contractors and companies in terms of high cost incurred as a result of injuries and hazards on site.. The findings indicate the need for effective health and safety management and regulation and control of activities in the Nigerian construction industry more definitively.

3.0 METHODOLOGY

Research Design

This study adopted descriptive and survey method. This design was chosen because it permits investigating description and recording of information in their natural setting. This design helped the researcher to ascertain the views, ideas and feelings of difference expert involved in project construction at Rainbow Town Project in Rivers State.

Population of Study

Population is a census of all items or subject that possesses the same characteristics or has knowledge of the phenomenon being studied. The population of the study consist of selected staff and workers at Rainbow Town Project in Port Harcourt. A minimum of 150 construction workers including professionals from different backgrounds were targeted; the fraction of the targeted study population responding to questionnaire constitute the sample size.

Method of Data Collection

The data for this research were from questionnaire, interviews and observation. The study used both survey and descriptive designs. The survey technique was significant in gathering information from site supervisors and the workers on the construction experts by use of questionnaire. The primary data were gotten from response to questionnaire distributed in paper form and online. The secondary data was from Journals, articles; Real estate magazines and newspapers; conference /workshop papers and proceedings.

Method of Data Analysis

Objective 1 and 2 were analyzed with descriptive statistic such as simple percentage, mean and frequency while hypotheses 1 and were analyzed with multiple regression and hypothesis 3 was analyse with correlation coefficient. The hypotheses were tested at 0.05 level of significance. The data obtained was tabulated and statistically analyzed using the Statistical Package for the Social Sciences (SPSS) version 20. The validation was done by applying the F-value to check the significant effect of the independent variables on the dependent variable. The t-statistics was employed to find the statistical significance of the coefficients of the independent variables. On the basis of the traditional criteria, the coefficient was checked against the expected signs, the values of the R^2 and the ratios of the estimated coefficients to their respective standard errors. As usual, the R^2 measures the goodness of fit and the presence of the first order serial correlation was detected through an examination of the Durbin Watson (D/W) statistics

Model Specification

The following model was specified for hypothesis one, thus,

$Y = F (X_1, X_2, X_3, X_4, X_5, X_6 X_7, X_8, X_9, X_{10}, X_{11}, X_{12,} X_{13}, X_{14})$

$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + \beta_9X_9 + \beta_{10}X_{10} + \beta_{11}X_{11} + \beta_{12}X_{12} + \beta_{13}X_{13} + \beta_{14}X_{14} + e_t$

The model was transform into log form;

$LogY = \beta_0 + \beta_1LogX_1 + \beta_2LogX_2 + \beta_3LogX_3 + B_4LogX_4 + \beta_5LogX_5 + \beta_6LogX_6 + \beta_7LogX_7 + \beta_8LogX_8 + B_9LogX_9 + \beta_{10}LogX_{10} + \beta_{11}LogX_{11} + \beta_{12}LogX_{12} + \beta_{13}LogX_{13} + \beta_{14}LogX_{14} + e_t$

Where;

Y = Project success
X_1 = Physical hazard
X_2= Body ache respiratory
X_3= Worker fall from height
X_4= Electric shock
X_5= Malaria
X_6 = Skin infection
X_7= Fire and emergency
X_8= Dislocation due to heavy load
X_9 = Solar radiation
X_{10}= Excessive exposure to noise
X_{11}= Heat
X_{12}= Eye problem
X_{13} = Cold and cough
X_{14}= Dirty water
B_0 = Intercept
β_1-β_{14} = Parameter estimate
et = Stochastic variables

The following model was specified for hypothesis two, thus,

$Y = F (X_1, X_2, X_3, X_4, X_5, X_6)$

$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + e_t$

The model was transform into log form;

$LogY = \beta_0 + \beta_1LogX_1 + \beta_2LogX_2 + \beta_3LogX_3 + \beta_4LogX_4 + \beta_{5Log}X_5 + \beta_{6Log}X_6 + e_t$

Where;

Y = Project success
X_1= Carelessness
X_2= Poor access to health facilities
X_3= Poor working condition
X_4= Exposure to work health hazard
X_5= no proper training
X_6 = non-adherence to safety rules
B_0 = intercept
β_1-β_6 = parameter estimate
et = stochastic variables

The following model was specified for hypothesis three, thus,

$Y = F (X_1, X_2, X_3, X_4)$

$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + e_t$

The model was transform into log form;

$LogY = \beta_0 + \beta_1LogX_1 + \beta_2LogX_2 + \beta_3LogX_3 + \beta_4LogX_4 + e_t$

Where;

Y = Project success
X_1 = Safety equipment
X_2= Safety management
X_3= Worker attitude on safety
X_4= Safety training
β_0 = intercept
β_1-β_4 = parameter estimate
et = stochastic variables

Hypothesis four was analysed with correlation coefficient thus,

$$r_i = \frac{n\sum xy - \sum x \sum y}{\sqrt{(n\sum x^2 - (\sum x)^2) - (n\sum y^2 - (\sum y)^2)}}.$$

Y = Project success

X = Health related rsk
∑ = summation sign.
r_i= correlation coefficient in period.
n = number of student

4.0 RATE OF RETURN OF QUESTIONNAIRE

Respond-Ents	Distributed Question-Naire	Returned Question-Naire	Wrongly filled	Properly filled	%	Not Returned	%
Clients	**10**	**10**	**1**	**9**	**10.5**	**0.9**	**0.8**
Architect/Design	**26**	**15**	**2**	**13**	**15.1**	**1.8**	**1.7**
Quan. Survey	**10**	**8**	**0**	**8**	**9.3**	**0**	**0**
Contractor	**10**	**9**	**0**	**9**	**10.5**	**0**	**0**
Site Engineer	**11**	**7**	**1**	**8**	**9.3**	**0.9**	**0.8**
Site Mana/sup	**12**	**10**	**0**	**10**	**11.6**	**0**	**0**
Stru. Engineer	**10**	**9**	**0**	**9**	**10.5**	**0**	**0**
Estate Survey.	**10**	**10**	**2**	**8**	**9.3**	**1.8**	**1.7**
Health Officer	**10**	**8**	**0**	**8**	**9.3**	**0**	**0**
Total	**109**	**86**	**6**	**80**	**95.4**	**5.4**	**5**

Source: Field Data, 2018

The table 4.1 above described that 109 copies of the questionnaire were issued to clients, architect/ design, quantity surveyor, contractor, Site engineer, site manager/supervisor, structural engineer, Estate survey and Health officers, 86 copies were returned. In the process of collecting the data it was discovered that 6 copies of the questionnaire were wrongly filled. In effect, 86 copies of the respondents constituted the sample which translates into 95.4% rate of returned questionnaire while 6 copies of questionnaire were not returned by the respondents translating into 5%.

4.1 Research Questions

What are the health related risks that affect project success at Rainbow Town Construction Site?

Health Related Risks	SA	A	N	D	SD	Total
1.Physical Hazard	45 56.3%	30 37.5%	1 1.3%	3 3.8%	1 1.3%	80 100
2. Body ache respiratory	40 50%	35 43.8%	2 2.5%	1 1.3%	2 2.5%	80 100
3. Worker fall from height	50 62.5%	20 25%	5 6.3%	1 1.3%	4 5%	80 100
4. Electric Shock	47 58.8%	25 31.3%	1 1.3%	3 3.8%	4 5%	80 100
5. Malaria	35 43.8%	40 50%	1 1.3%	1 1.3%	3 3.8%	80 100
6. Skin infection	46 57.5%	30 37.5%	1 1.3%	2 2.5%	1 1.3%	80 100
7.Fire and emergency	50 62.5%	25 31.3%	1 1.3%	3 3.8%	1 1.3%	80 100
8. Dislocation due to heavy load	50 62.5%	25 31.3%	2 2.5%	1 1.3%	2 2.5%	80 100
9. Solar Radiation	45 56.3%	30 37.5%	5 6.3%	- -	- -	80 100
10. Excesssive exposure to noise	40 50%	36 45%	1 1.3%	1 1.3%	2 2.5%	80 100
11. Heat	45 56.3%	30 37.5%	3 3.8%	1 1.3%	1 1.3%	80 100
12. Eye problem	40 48.9%	30 41.5%	5 5.3%	4 3.2%	1 1.1%	80 100
13. cold and cough	50 62.5%	25 31.3%	2 2.5%	1 1.3%	2 2.5%	80 100
14. Dirty Water	50 62.5%	25 31.3%	1 1.3%	1 1.3%	3 3.8%	80 100

Source: Field Survey, 2016

The table 4.3 show that 56.3%, 50% 62.5%, 58.8%, 43.8%, 57.5%, 62.5%, 62.5%, 62.5%, 56.3%, 50%, 56.3%, 48.9%, 62.5% and 62.5% of the respondents strongly agrees that physical hazards, body ache respiratory, workers fall from height, electric shock, malaria, skin infection,

fire and emergency, dislocation due to heavy load, excessive exposure to noise, heat, Solar radiation, skin infection, cold and cough and dirty water affected project success while 37.5%, 43.8%, 25%, 31.3%, 50%, 37.5%, 31.3%, 31.3%, 37.5%, 45%, 37.5%, 41.5%, 31.3% and 31.3% of the respondents agrees that Physical hazards, body ache respiratory, workers fall from height, electric shock, malaria, skin infection, fire and emergency, dislocation due to heavy load, excessive exposure to noise, heat, Solar radiation,

skin infection, cold and cough and dirty water affected project success and least were those who strongly disagree that 1.3%, 2.5%, 5%, 3.8%, 1.3%, 2.5%, 2.5%, 1.3%, 1.1% were the Physical hazards, body ache respiratory, workers fall from height, electric shock, malaria, skin infection, fire and emergency, dislocation due to heavy load, excessive exposure to noise, heat, Solar radiation, skin infection, cold and cough and dirty water affecting project success

What is the levelof health related risks awareness among workers in the construction site?

Table.4.5. Rating of level of health related risks awareness among workers in the construction site

Respondents	Frequency	Percentage
Very High	40	50.0
High	20	25.0
Low	15	18.8
Very Low	5	6.3
Total	**80**	**100**

Source: Field Survey, 2018.

The table 4.5 above shows that majority of the respondents rate the level of health related risks awareness among workers in the construction site to be very high with 50% followed by those who rate to high with 25% and the least were those who rate it to very low with 6.3%.

What are the medical provisions made for health related risk in construction site?

Medical provisions made for health related risk	SA	A	N	D	SD	Total
1.First aid treatment for any accident in construction site	35 43.8%	30 37.5%	5 6.3%	4 5%	6 7.5%	80 100
2. Vehicle for easy covey of injured personnel	30 37.5%	45 43.8%	2 2.5%	1 1.3%	2 2.5%	80 100

Source: Filed survey, 2016

The table above show that 43.8% and 37.5% of the respondents strongly agrees that first aid treatment for any accident in construction site and vehicle for easy covey of injured

Personnel were medical provisions made for health related risk in construction site while 37.5%, 43.8%, agree that first aid treatment for any accident in construction site and vehicle for easy covey of injured personnel were medical provisions made for health related risk in construction site and the least were those who strongly disagree that first aid treatment for any accident

In construction site and vehicle for easy covey of injured personnel were medical provisions made for health related risk in construction site with 7.5% and 2.5%.

Is there any the relationship between health related risks and project success in the construction site?

Rating	Frequency	Percentage
Yes	60	75.0
No	20	25.0
Total	**80**	**100**

Source: Field survey data, 2018

Table 4.8. shows that majority of the respondents (75%) agree that there is relationship between health related risks and project success in the construction site while 25% disagree that there is no relationship between health related risks and project success in the construction site

Testing of Hypothesis 1

Ho_1: Health related risks in construction sites have no significant effect on project success

Table.4.9. For Hypothesis 1, we specify multiple regression, thus;

Variable	Parameters	Coefficient	Std Error	t – value
Constant	β_0	1.328	0.030	8.810***
Physical hazards (X_1)	β_1	-1.328	0.031	9.091**
Body ache resp(X_2)	β_2	-1.102		2.095**
Worker fall from he(X_3)	β_3	-0.419		5.065***
Electric shock (X_4)	β_4	-0.501	0.531	4.902***
Malaria(X_5)	β_5	-0.210	0.310	7.086***
skin infection(X_6)	β_6	-1.510	0.210	6.722***
fire and emerg (X_7)	β_7	-1.314	0.713	8.001***
Dis. to heavy load (X_8)	β_8	-1.321	0.310	6.132***
exceexp to noise(X_9)	β_9	-1.631	1.810	8.012***
Heat. (X_{10})	β_{10}	-1.865	1.764	9.108***
Solar radiation(X_{11})	β_{11}	-1.120	1.000	6.107***
Eye Problem (X_{12}),	β_{12}	-1.901	1.110	7.321***
cold and cough (X_{13})	β_{13}	-1.310	1.101	6.168***
Dirty water (X_{14})	β_{14}	-2.103	1.123	6.011***
R-Square	0.89			
Adjusted R-Square	0.78			
F-statistic	25.00***			

*****, **, and * denotes significance of coefficient at 1%, 5%, and 10% level respectively**

Source: Field Survey, 2018. (SPSS Vision 20)

The result of coefficient of multiple determination (R^2) was 0.89 which implies that 89% of the variations in dependent variable (project success) were explained by changes in the independent variables (physical hazards, body ache respiratory, workers fall from height, electric shock, malaria, skin infection, fire and emergency, dislocation due to heavy load, excessive exposure to noise, heat, Solar radiation, skin infection, cold and cough and dirty water) while 11% were unexplained by the stochastic variable indicating a goodness of fit of the regression model adopted in this study which is statistically significant at 1% probability level. The result shows that a unit increase in physical hazards will lead to corresponding decrease in project success by -1.328 unit.

The implication here is that more physical hazards faced by construction expert will lead to low project success. Also, a unit increase in body ache respiratory will lead to corresponding decrease in project success by -1.102 unit. The implies that the more body ache respiratory problem by construction staff will lead decrease in project success. A unit increase in workers fall from height will lead to corresponding decrease in project success by -0.419 unit.

The implies that workers fall from height will lead to negative project success A unit increase in electric shock will lead to decrease in project success by -0.501 unit. This implies that more electric shock experience by construction expert will lead to poor project success A unit increase in malaria will lead to decrease in project success by -0.210 unit. This implies that malaria attack on construction expert will lead to poor project success. A unit increase in skin infection will lead to decrease in project success by -1.510 unit. The implication is that construction expert are involved in the issue of skin infection this will have negative effect on project success. A unit increase in fire and emergency will lead to decrease in project success by -1.314 unit. This implies that with more fire and emergency in construction site will lead to poor project success. A unit increase in dislocation due to heavy load will lead to decrease in project success by -1.321 unit. This implies that with more dislocation due to heavy load in construction site will lead to poor project success. A unit increase in excessive exposure to noise will lead to decrease in project success by -1.631 unit.

This implies that with more excessive exposure to noise faced by construction experts the more this will lead to poor project success. A unit increase in heat will lead to decrease in project success by -1.865 unit. This implies that with more heat used by construction experts the more this will lead to poor project success A unit increase in solar radiation will lead to decrease in project success by -1.120 unit.

This implies that with more solar radiation affected construction experts the more this will lead to poor project success A unit increase in eye problem, will lead to decrease in project success by -1.901 unit. This implies that with more eye problem experience by construction experts the more this will lead to poor project success A unit increase in, cold and cough will lead to decrease in project success by -1.301 unit. This implies that with cold and cough by construction experts the more this will lead to poor project success A unit increase in dirty water will lead to decrease in project success by -2.103 unit.

This implies that with more dirty water drink by construction experts will have serious health implication on the health of construction experts and this will lead to poor project success F-statistic is 25.00***which show that the entire result is significant. Hence we conclude that physical hazards, body ache respiratory, workers fall from height, electric shock, malaria, skin infection, fire and emergency, dislocation due to heavy load, excessive exposure to noise, heat, Solar radiation, skin infection, cold and cough and dirty water have a significant effect on project success

Testing of Hypothesis 2

$H0_2$: There is no relationship between health related risks and project success in the study site

Correlations

		Health Related Risks	Project Success
Health Related Risks	Pearson Correlation	-1	.020
	Sig. (2-tailed)		-.849
	N	80	80
Project Success	Pearson Correlation	.020	-1
	Sig. (2-tailed)	-.849	
	N	80	80

The result above show that there is negative relationship between healths related risks and project success in the construction site.

5.0 CONCLUSION

The study examined health related risks on construction sites and the extent to which it affects project success. The study was conducted in Rainbow in Port Hacourt, River State. The findings of the study revealed that Physical hazards, body ache respiratory, workers fall from height, electric shock, malaria, skin infection, fire and emergency, dislocation due to heavy load, excessive exposure to noise, heat, Solar radiation, eye problem, cold and cough and dirty water have no significant effect on project success. Health related risks can slow down the pace of work for a period although the supervisors sometimes find a way to work round it in order not to waste too much time.

Recommendations

The following recommendations are made by the researcher

1) There is need for a good safety policy or legislation to guide, enforce and implement health and safety in all projects in Nigeria irrespective of the type of or scope project.
2) A trained medical doctor should be resident in every government projects, individual projects should have one health personnel on ground or a first aid box in case of any accident
3) There should be a body set up to enforce proper compliance to the use of PPE on site especially individual projects and discipline defaulters appropriately.
4) Management needs to show adequate commitment to HSE on site by disposing human and material waste at an approved site, ensure proper housekeeping, control horseplay and conduct safety induction for new employees on site.
5) Safety checks should henceforth be a priority as to ensuring a construction free accident and agency in charge of safety should consider it obligatory to inspect building sites to avoid some of this premature incidence of accidents
6) Well-designed projects incorporating health and safety aspects and effective supervision should be the cornerstone of the ethics of project consultants. Since risk management is part of construction project management, consultants need to conduct proper analysis on all health risks for all projects at the design phase.
7) Training institutions on health and safety need to review their curriculum regularly to incorporate more factors that promote health related risks in developing economy like Nigeria.

6.0 REFERENCES

[1]. Adekunle, A. L. (2016). Understanding the key risks in construction projects in Nigeria, International Journal of Project Management. 2(5): 1-14.

[2]. Akewushola, D. S. Olateju, C. C. (2012). Benchmarking the performance of construction procurement methods against selection criteria in Nigeria. Journal of Civil Engineering Dimension, 4(2): 6-22.

[3]. Amaruddeen, O. U. (2015). Risk management framework for construction projects in developing countries, Journal of Construction Management and Economics. 2(2): 7-25.

[4]. Andersson, E.S. (2015). Project evaluation scheme. Project management. Journal of Construction Management and Economics. 6(1), 1–29.

[5]. Ayyub, O. P. (2011). Project risk management in the Queensland, Engineering construction industry, a survey, International Journal Project Management. 2(2): 1–21.

[6]. Bakar, R. E., Razal, P. U. and Abdullah, W. U. (2016).The use of partial least squares path modeling in international marketing. In: Sinkovics RR, Ghauri PN, editors.Advances in international marketing. Bingley (UK): Emerald. 2(1): 7-27.

[7]. Bamisile, R. T. (2006) Risk allocation in design-build contracts, proceedings of associated school ofconstructions (ASC) conference, University of Denver, Colorado, USA, 2(2): 5-26.

[8]. Belohlavek, K. J., Adnan, H. E., Jusoff, K. U., and Salim, M. K. (2009). The Malaysian construction industry's risk management in design and build, Modern Applied Science, 2(2): 7-33.

[9]. Bima, E. T., Ismaila, S. A., and Baba, O. I. (2016). An appraisal of project procurement methods in the Nigerian construction industry. Journal of Civil Engineering Dimension, 1(1): 1-19.

[10]. Carter, P. O. and Smith, R. Y. (2011). The project risk maturity model, measuring and improving risk management capability. Gower Publishing, Ltd., Farnham, UK.

[11]. Dodo, F. S. (2016). Analysis of the design-build delivery method in air- force construction projects. Journal of ConstructionEngineering and Management, 5(2): 1-17.

[12]. Dodo, W. R., Manzuma, R. Y. and Stanley, S. P. (2011). Is there a relationship between construction conflicts and

participants' satisfaction? Journal of Engineer, Construction Architect Management. 7(2): 2–16.

[13]. Ejohwomu, R. Y., Oshodi, D. S., and Onifade, L. O. (2016). Developing a decision support system for the selection of appropriate procurement method for a building project in Nigeria. Global Journal of Researches in Engineering, 5(2): 8-30.

[14]. Ezenwa, F. S. (2011). Effect of risk on performance of design and build projects in Lagos State (unpublished M.Sc. Thesis), University of Lagos, Lagos, Nigeria.

[15]. Goetsch, L. L. (2013). Use and benefits of tools for project risk management, International Journal of Project Management, 1(1): 2-20.

[16]. Griffith, F. D. and Howarth, S. R. (2011). Information risk management and compliance- expect the unexpected. BT Technology Journal, 2(2): 1-29.

[17]. Gunningham, T. R. (2014). Institutional theory as a framework for analyzing conflicts on global projects, Journal of Construction Engineer Management. 3(3): 7–20.

[18]. Hammed, D. S., Akewushola, E. W. and Olateju, J. P. (2012). Effect of lack of adequate attention to safety measures on construction sites in AkwaIbom State, Nigeria," Journal of Earth Sciences and Geotechnical Engineering, 6(1): 1- 20.

[19]. Health and Safety Executive (HSE), (2004).Improving health and safety in the construction industry. London: The Stationery Office. Journal of Construction Management and Economics. 3(3): 1-19.

[20]. Health and Safety Executive. (2009).Managing health risks in construction. Journal of Construction Management and Economics. 4(2): 1-18.

[21]. Indecon, S. D. (2016). An assessment of clients' performance in having an efficient building process in Uganda. Journal of Civil Engineering Management, 1(1): 2-23.

[22]. Jäger, S. A. (2008). Building construction handbook, 6th ed., USA, Butterworth-Heinemann.

[23]. Jensen, D. S. (2000). Factors of conflict in construction industry: A literature review, in Procedia Engineering, 1(1): 9–20.

[24]. John, S. A. and Okechukwu, Y. T. (2015). Effective regulation and level of awareness: An expose of the Nigeria's construction industry, Open Journal of Safety Science and Technology, 2(1): 4-22.

[25]. Laufer, T. Y. and Ledbetter, Y. R. (2016).The effect of relationship management on project performance in construction, International Journal of Project Management. 3(2): 8–19.

[26]. Luka, T. R. (2014). Determinants of rework in building construction projects, Engineering. Construction Architect Management. 1(1): 9–27.

[27]. Muiruri, E. E. (2014). Success factors in large infrastructure projects: The contractor's perspective. Sweden: Chalmers University of Technology. Journal of Construction Management and Economics. 2(1): 1-17.

[28]. Muiruri, E. E., Umeokafor, D. E., Isaac, K. G., Jones, F. D. and Umeadi, B. S. (2014). Safety issues involving workers on building construction sites in Nigeria: An Abuja study," Master of Science Thesis in Civil Engineering, Eastern Mediterranean University, Gazimağusa, North Cyprus.

[29]. Müller, R. I. and Turner, R. B. (2006).The influence of project managers on project success criteria and project success by type of project. European Management Journal, 2(2): 8–30.

[30]. Mururi, A. S. and Mulinge, S. E. (2014). Risk management trends in the Hong Kong construction company: a comparison of contractors owners perceptions. Engineering Construction Architect Management. 2(1): 3-25.

[31]. Nicholas, K. O. (2015). Causes of construction delay: Traditional contracts. International Journal of Project Management, 2(2): 7-33.

[32]. Odeyinka, O. L. (2016). A quantitative assessment of the cost and time impact of variation orders on construction projects. Journal of Engineering, Design and Technology. 5 (1): 5-28.

[33]. Ogunsanmi, H. O., Salako, P. I. and Ajayi, T. R. (2011).Environmental factors and work performance of project managers in the construction industry, International Journal of Project Management, 2(4): 4 -37.

[34]. Ogunsanmi, P. P. (2013). Public procurement report 2011. A publication of the centre for social justice Ltd by guarantee, Abuja. 2(1): 1-22.

[35]. Okeola, W. E. (2009). The effect of attitudinal differences on interface conflicts in large scale construction projects: A case study, Construction Management on Economics. 3(1): 5–37.

[36]. Olotuah, D. F. (2015). Participation of indigenous contractors in Nigerian public sector, construction projects and their challenges in managing working capital. International Journal of Civil Engineering. 1(1): 2-21.

[37]. Onengiyeofori, U. I., Odimabo, P. I., Chike, E. D., Oduoza, S. L. and Subashini, O. J. (2017). A Study of failure and abandonment of public sector driven civil engineering projects in Nigeria: An empirical review. American Journal of Scientific and Industrial Research. 2(1): 5-28.

[38]. Oresegun, W. E. (2009). Analysis of conflict centers in projects procured with traditional and integrated methods in Nigeria, Journal of Engineering Project Production Management. 2(2): 6–27

[39]. OSHA, (2007). Occupational Safety and Health Administration, OSHA forms for recording work-related injuries and illnesses, Journal of Construction Management and Economics. 6(5): 1-18.

[40]. Oyebanji, Akintoye, and Liyange (2011). Building partnerships: case studies of client contractor collaboration in the UK construction company. Journal of Construction Management Economics. 3(2): 7-29

[41]. Paulinus, R. U. and Ibimina, T. H. (2014). Project management: A systems approach to planning, scheduling, and controlling, ed. 7th. New York: John Wiley & Sons, Inc.

[42]. Peter, I. K., John, P. E. and Okechukwu, P. J. (2015). A systematic approach to risk management for construction. St Survey. Journal of Construction Management and Economics. 9(5):5–25

[43]. Rejda, L. H. (2015). Risk management and construction. 2nd ed. Oxford: Blackwell Publisher.

[44]. Ross, E. R. (2014). Environmental factors and work performance of project managers in the construction industry. International Journal Project Management. 4(1): 4–37.

[45]. Samuel, T. R. (2014). Conflicting factors in construction projects: Korean perspective, Engineering Construction Architect Management, 5(5): 3–62.

[46]. Schieg, Q. S. (2008). Risk management for overseas construction projects, International Journal Project Management. 4(3): 1–23.

[47]. Toole, D. G. (2012). A review of techniques for risk management in projects. Benchmark International Journal. 4(1): 2–36.

[48]. Turner, R. B. and Müller, R. I. (2008). Understanding the key risks in construction projects in China. International Journal of Project Management. 2(2): 6–24.

[49]. Umeh, R. Y. and Uchegbu, O. T. (2011). Risk based decision support system for effective implementation of projects. International Journal of Risk Assess Management. 3(2): 3-19.

[50]. Vitharana, X. V. and Subashi, S. D. (2015). System dynamics modeling for project management. Sloan school of management, Massa chusetts institute of technology. International Journal of Management Data System. 4(2): 1-10.

[51]. Zadeh, L. O. (2008). Selection and application of risk management tools and techniques for build-operate-transfer projects. International Journal of Management Data System, 4(4): 3-34.

[52]. Zimmerman, F.M (2011). Construction project management– A practical guide to field construction management. International Journal of Management Data System, 6(6): 1-19.