

1ST INTERNATIONAL CONFERENCE OF ENVIRONMENTAL SCIENCES

ICES 2019

THE PROCEEDINGS OF INTERNATIONAL CONFERENCE OF
ENVIRONMENTAL SCIENCES

ICES 2019

EDITORS

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2019

FACULTY OF ENVIRONMENTAL SCIENCES,
UNIVERSITY OF ILORIN, ILORIN, NIGERIA



ICES2019

INTERNATIONAL CONFERENCE OF ENVIRONMENTAL SCIENCES

COLLABORATION FOR SUSTAINABLE
DEVELOPMENT IN THE BUILT ENVIRONMENT

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Faculty of Environmental Sciences, University of Ilorin, Ilorin, Nigeria

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COLLABORATION FOR SUSTAINABLE DEVELOPMENT IN THE BUILT ENVIRONMENT

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FOREWORD

It's my privilege and pleasure, on behalf of the Vice Chancellor of this great institution, Prof. Sulyman Agenjolola AbdulKareem, to welcome you all here today. It has been a long journey since the idea of the first *International Conference of Environmental Sciences* (ICES) was mooted. It looks then that we cannot do it, what with many other problems we have to cope with as a very young Faculty.

Being the very first academic outing of our fledgling faculty, we are all aware that it cannot be our best effort. We just needed to start somewhere, hoping that in subsequent years, as we develop capacity, we will continue to build on gains of today. So feel free to tell us areas we can improve upon because in years to come, the goal is to make ICES a flagship biennial national dialogue.

The encouragement for the university administration, particularly our Leader and Vice Chancellor, Prof. Abdulkareem and the doggedness of faculty staff and students have made today a reality. I therefore want to appreciate our Vice-Chancellor and my colleagues in the faculty for making today possible. .

The goal of sustainable development is to meet the needs of today, without compromising the needs of tomorrow. This implies that we cannot continue using current levels of resources as this will not leave enough for future generations. Therefore, stabilising and reducing carbon emissions is key to living within environmental limits as this will create a truly sustainable built environment that is fit for the future.

The theme, *Collaboration for Sustainable Development in the Built Environment*, captures our focus as academia and professional in the larger society and the broaden Sustainable Development Goals (SDGs). Beyond that, it gives exciting opportunities to several of our professionals like Quantity Surveyors, Architects, Geologists, Geo informatics, Town Planners, Land Surveyors, Estate Valuers, Engineers etc to express themselves and their activities at ICES.

Collaboration is essential for development in today's world because real life challenges require researches that are multidisciplinary in nature. When you want to control flooding for instance, you need Civil Engineers, Soil Scientists, Geographers, Geologists, even Public Relations Professionals etc for diverse roles.

For robust development of built environment in a sustainable ways, **geographers**, who are concerned with the study of places and relationships between people and their environments; **Surveying and Geo-Informatics Professionals** who are concerned with geo-data and geo-information about locations in relation to the earth and **Urban and Regional Planners** who will develop and design use of land are essential partners.

Furthermore, **Architects** helps with planning, designing, and construction of buildings and any other structures that made up the environment while based on the structural performance of different materials and geometries the **Structural Engineers** design the 'bones and muscles' that create the form and shape of the structures designed by the Architect. **Services Engineers** strive to achieve a safe and comfortable indoor environment whilst minimizing the **environmental impact** of buildings through collaboration with **Chemical Engineers** and other specialists. Then **the Quantity Surveyors**, who are the construction cost experts, will predict and manage construction cost from inception to completion.

So evidently, we must all collaborate to make possible the attainment of Sustainable Development Goals (SDGs). And as if to emphasize the need for collaboration, the drafters of the Seventeen (17) Sustainable Development Goals made goal Seventeenth, perhaps the ultimate goal- partnership for all the previous 16 goals. Besides, the University authorities here have always emphasize multidisciplinary collaboration among researchers.

We are honoured to have Prof. Adeniyi Suleiman Gbadegesin, our Keynote speaker, in our midst this morning. He is a colossus and mentor to many professors of Geography. As an international scholar of repute with wide and varied experience, this gathering will benefit immensely from his paper.

Similarly, we have with us Prof. Ahmad Doko Ibrahim of the Department of Quantity Surveying and Project Construction Management, Ahmadu Bello University (ABU) Zaria who had done a lot to bring ABU into reckoning. I salute you sir and welcome you heartily.

The 1st International Conference of Environmental Sciences (ICES 2019) received a total of 150 abstract, accepted 72 and today we have a total of 49 full papers to be presented by authors in 6 parallel sessions. Students' competition on the theme of the conference will be conducted to conclude the activities of the conference.

Let me express the warm appreciation of staff and students of this faculty and the entire university to all our professional colleagues who are gracing this occasion in the spirit of town and gown mandate.

"It's therefore my pleasure to extend a cheerful welcome to you all! Your presence makes us very happy."

Thank you for coming

Dr. Ganiyu Amuda-Yusuf
Ag. Dean Faculty of Environmental Sciences

ACKNOWLEDGEMENTS

The First International Conference of Environmental Sciences (ICES 2019) organized by the Faculty of Environmental Sciences, University of Ilorin, Nigeria owes its success to the hard work, commitment and support of individuals both in the academia and the general public. These individuals provided the technical, financial and logistic supports that enable the Faculty realize the objectives of this epoch making academic event.

First, the Local Organizing Committee (LOC) sincerely appreciates the Vice Chancellor of University of Ilorin – Professor Sulyman Age Abdulkareem, who provided huge moral and logistic support for the Faculty to make the conference possible. We are grateful to the Vice Chancellor and the entire University Management for providing accommodation and transport logistics for the Guest Speakers and for the general smooth running of the conference. This singular support demonstrates the commitment of the Vice Chancellor and his Management team to academic excellence which enhances the visibility of University of Ilorin both nationally and internationally.

The LOC is grateful for the dynamic leadership of the Acting Dean of the Faculty of Environmental Sciences – Dr. Ganiyu Amuda-Yusuf, whose vision and relentless efforts saw to the conception, planning and execution of this conference. Your support and encouragement have, in no small measure, assisted in the realization of the objectives of this conference. The support of the Acting Dean of Faculty of Communication and Information Sciences (CIS) – Dr. Jimoh R.G. at the conceptual and implementation stages of the conference is quite commendable. His inputs help crystallize the conference concept notes while the provision of venues for the technical and plenary sessions addressed our logistic needs. We are also grateful to the Dean, Students Affairs – Prof. L.T Ajibade who assisted the LOC in the review of conference papers and in the mobilization of the Students for the conference.

The keynote speakers at this international conference delivered thought provoking papers that served as the conference ice breaker and they have made us proud. We are grateful to Prof. Adeniyi Gbadegeshin, the immediate past Vice Chancellor of Ladoke Akintola University (LAUTECH), Oghomosho and Prof. Ahmad Doko Ibrahim of Ahmadu Bello University for accepting our invitation and for delivering the lead papers for the conference.

We recognize the contributions of Dr. Bolaji Sulieman, the Sub-dean of the Faculty of Environmental Sciences who coordinated conference planning and execution activities on behalf of the Faculty. The secretariat operations of the conference were adequately handled by the Faculty Officer –Mrs. Azeezat Ibrahim. The LOC is grateful to her and other administrative staff of the Faculty for their immense contributions.

At the preparatory stage of this conference, the Faculty reached out to individuals and corporate organizations for financial support. In response, many donated substantial amounts of money which assisted a lot in procuring materials for the conference. The Faculty appreciates the well-meaning individuals and management of all corporate organizations for this kind gesture.

This conference could not have been a success without the dedication and untiring efforts of the LOC and other sub-committees that handled the conference planning and implementation. On behalf of the LOC, I sincerely thank **all those** who served in the LOC and all other sub-committees. I am specifically grateful to the Chairmen of all sub-committees in person of Dr. N.A Bello (Technical Sub- committee); Dr. Maimuna O. Abdulraheem (Logistic Sub-committee); Dr. A.I Bako (Publicity and Linkage Committee) and Mr. Ahmadu Hussein (Student Competition Sub-committee).

Worthy of singular mention and appreciation is a member of the LOC - Mr Rasheed Abdulkadir Shehu who was a wonderful and reliable partner in progress. His calm and confident deportment to all knotty issues coming from any of the sub-committees translated in several ways to the accomplishment of this conference

The list of contributors to the success of this conference is almost endless. We are grateful to all Heads of Department and academic staff in the Faculty of Environmental Sciences who assisted in one way or the other to make the conference a resounding success. We hold all our paper reviewers, plenary chairpersons and rapporteurs in high esteem and thank them for their selfless services. Finally, I thank all the non-teaching staff and students of the Faculty for their roles. May God reward you all for your contributions.

Dr. Maimuna O. Abdulraheem

Chairperson, Local Organizing Committee

CONFERENCE CENTRAL ORGANISING COMMITTEE

Dr. Maimuna O. Abdulraheem - Department of Urban & Regional Planning – Conference Chair
Dr. N. A. Bello - Department of Estate Management - Conference Secretary
Dr. Ranti T. Adebisi - Department of Quantity Surveying - Member
Dr. A. I. Bako - Department of Urban & Regional Planning – Member
Mr. S.Y. Suleiman - Department of Architecture - Member
Mr. A.S. Rasheed - Department of Quantity Surveying - Member

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Technical Committee

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Mr. A.S. Rasheed
Mr. Idris Soliu
Mr. O.T.B Aduloju
Mr. H.A.Tanimu - Secretary

Conference Advisory Committee

Prof. L.T. Ajibade - Dean of Student Affairs, Department of Geography & Environmental Studies - University of Ilorin, Ilorin - Nigeria
Prof. N.B. Tanimooowo - Department of Urban & Regional Planning, LAOTECH, Ogbomoso - Nigeria
Prof. A.D. Ibrahim - Department of Quantity Surveying, Ahmadu Bello University, Zaria - Nigeria
Prof. A.A. Adedeji - Department of Civil Engineering, University of Ilorin, Ilorin - Nigeria
Dr. R.G. Jimoh - Ag. Dean of Faculty of Communication & Information Studies, University of Ilorin, Ilorin - Nigeria

Paper Review Panel

Prof. A.A. Adedeji – Department of Civil Engineering, University of Ilorin.
Prof. L.T. Ajibade – Department of Geography, University of Ilorin
Prof. V. A. Bello - Department of Estate Management, Federal University of Technology, Akure- Nigeria
Prof. N.B. Tanimowo – Department of Urban and Regional Planning, LAUTECH
Prof. A.D. Ibrahim- Department of Quantity Surveying, Ahmadu Bello University, Zaria
Dr. Ganiyu Amuda-Yusuf - Department of Quantity Surveying, University of Ilorin, Ilorin -Nigeria
Dr. I. O. Orire - Department of Geography, University of Ilorin, Ilorin - Nigeria
Dr. N. A. Bello - Department of Estate Management, University of Ilorin, Ilorin - Nigeria
Dr. Bolaji Sulaiman - Department of Quantity Surveying, University of Ilorin, Ilorin - Nigeria
Dr. A. I. Bako - Department of Urban & Regional Planning, University of Ilorin, Ilorin - Nigeria
Dr. A. B Ola - Department of Urban & Regional Planning, University of Ilorin, Ilorin - Nigeria
Dr. K. B. Bolayemi - Department of Estate Management, Federal Polytechnic, Ilaro - Nigeria
Dr. Ranti. T. Adebisi - Department of Quantity Surveying, University of Ilorin, Ilorin - Nigeria
Dr. O. O. Olanrele - Department of Estate Management, University of Malaya, Malaysia - Nigeria
Dr. I. E. Wallace - School of Architecture, Victoria University of Wellington, New Zealand
Dr. Ayo Babalola - Department of Surveying & Geo-Informatics, University of Ilorin, Ilorin - Nigeria

Peer Review Process

The papers submitted to this conference were subjected to a rigorous peer review process which involved an initial review of abstract. A total of 150 abstracts were reviewed and 72 accepted. Afterwards, the authors of accepted abstracts were provided with the reviewers' comments and were advised to proceed to full paper submission, incorporating all suggested amendments in the reviewed abstracts.

Blind reviews of full manuscripts by minimum of two reviewers were carried out on the submitted manuscripts. A total of 72 full papers were received and the reviewer's comments were then sent to the authors of accepted papers with the request that they should address all of the issues raised by the reviewers. Tracked changes made by reviewers on authors' original papers were also sent to authors to help with revising their papers. A compliance check of authors returned corrected papers was further done to ensure that all the reviewer's comments were followed.

During the review process, members of the paper review panel, editors and conference organisers were not involved with the review of any paper they authored or co-authored.

A total of 52 papers of all authors who have demonstrated sufficient evidence that all reviewers' comments had been addressed were accepted into the conference proceedings.

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CONFERENCE PROGRAMME

DAY 1

MONDAY 29TH APRIL, 2019

PROGRAMME FOR THE OPENING SESSION

8:00 am - 9:30 am	Registration <i>Venue: University Main Auditorium</i>
9:30 am - 9:40 am	National Anthem & Unilorin Anthem / Introduction of Guest
9:40 am - 9:50 am	Opening Remarks by the Conference Chair. <i>Dr. Maimuna O. Abdulraheem, Chairperson, Organizing Committee</i>
9:50 am - 10:00 am	Welcome Address by the Host. <i>Dr. Ganiyu Amuda - Yusuf -Ag. Dean Faculty of Environmental Sciences</i>
10:00 am - 10:20 am	Vice Chancellors Address. <i>Prof. Sulyman Age Abdulkareem - Vice Chancellor University of Ilorin</i>
10:20 am - 11:00 am	Keynote Address 1. <i>Prof. Adeniyi Gbadegesin - Professor of Geography, Immediate Past Vice- Chancellor, LAUTECH, Ogbomoso.</i>
11:00 am - 11:40 am	Keynote Address 2 <i>Prof. Ahmad Doko Ibrahim - Professor of Quantity Surveying, Ahmadu Bello University, Zaria.</i>
11:40 am - 12:00 pm	Questions/Contributions/Responses
12:00 pm - 12:10 pm	Address by the Special Guest of Honour <i>Arc. M. J Faworaja. (MICI Arb, MFIMS, FNIA, PPNIA) MD/CEO ARCHCON NIG. LTD</i>
12:10 pm - 12:30 pm	Launching of the Maiden Edition of Faculty of Environmental Sciences Journal - (Journal of Environmental Spectrum)
12:30 pm - 12:40 pm	Goodwill Messages
12:40 pm - 12:50 pm	Closing Remarks <i>Prof. N. B Tanimooowo - Pioneer Dean, Faculty of Environmental Sciences</i>
12:50 pm - 1:00 pm	Vote of Thanks <i>Dr. N.A Bello - Conference Secretary</i>

DAY 1

MONDAY 29TH APRIL, 2019

PROGRAMME FOR THE TECHNICAL SESSIONS

1:00 pm - 1:30 pm	Tea Break/Snacks/Small Chops
<u>PRE-CONFERENCE WORKSHOP</u> <i>Venue: University Main Auditorium</i>	
RESEARCH CLINIC	Chairperson: <i>Prof. Titilayo A. Alabi</i>
1:30 pm - 2:10 pm	Research Lecture:

*Prof. Ahmad Doko Ibrahim - Professor of Quantity Surveying,
Ahmadu Bello University Zaria.*

2:10 pm - 2:30 pm

Questions & Answers

2:30 pm - 3:00 pm

Lunch Break

FIRST PARALLEL SESSION

FIRST PARALLEL SESSION DAY 1 - MONDAY 29TH APRIL, 2019

VENUE: FACULTY OF COMMUNICATION AND INFORMATION SCIENCES [CIS]

GROUP 1

GROUP 2

INFORMATION TECHNOLOGY ADOPTION IN CONSTRUCTION

REMOTE SENSING & DIGITAL INFORMATION SYSTEMS

CHAIRPERSON: Dr. Saudat S. Baki

CHAIRMAN: Prof. J.F Olorunfemi

RAPPORTEUR: Dr. N. A Musa

RAPPORTEUR: Dr. Ayo Babalola

Paper 1:

Paper 1:

Bim Adoption Challenges in Malaysia:
Expert Opinion.

Assessment of Users' Satisfaction on Manual &
Digital Land Information System in Kwara State,
Nigeria

*Badiru, Y. Y.; R.B Tukur.; and Abdulazeez,
A.D*

Adekoya, A. A., and Bello. M. O.

Paper 2:

Paper 2:

Sustainable Architectural Practices in
Nigeria: Benefits of Adopting Building
Information Modeling

Spatio-Temporal Analysis of Bida Housing
Market Using Geographic Information System

Elimisiemon, Monday Chris

Mohammed, J. K. & Sulyman, A. O.

Paper 3:

Paper 3:

Factors Affecting Human Resource
Management in Small Construction Firms
in Lagos Metropolis, Nigeria

Establishment of Deformation & Subsidence
Monitoring Baseline in the Coastal Environment:
A Case Study of University of Lagos

*Oluwaseyi Modupe Ajayi; Oluwasegun
Emmanuel Akinsiku & Tajudeen Olufemi
Salami*

*Alademomi Alfred Sunday, Mayaki Anthony
Omeiza, Daramola Olagoke Emmanuel & Salami
Tosin Julius*

Paper 4:

Paper 4:

Influence of Web-based Project Management
System on Project Delivery

Design and Implementation of Sustainable Built
Environment: The Role of Surveying & Geo-
Informatics towards Effective Collaboration with
Other Professionals

A.S. Rasheed & R. T Adebiyi

3:00 pm - 5:00 pm

Paper 5:

Assessment of Readiness of Nigerian Construction Firms on Adoption of Lean Construction Principles

M.L Aisha & A.M. kasimu

Paper 6:

Perceptions of Career Development among Women in Nigeria Construction Industry

Adebiyi Ranti Taibat, Amuda-Yusuf Ganiyu, Rasheed Abdulkadir Shehu, Idris Soliu & Ola-Ade Esther Oluwafolakemi

Paper 7:

Effect of implementation of E-Procurement on Corrupt Practices in Nigerian Construction Industry

Odulana, A. O. & Oyewobi, L. O.

Paper 5:

GIS as a Tool for Sustainable Development in Public Secondary School Mapping

Ipadeola A. O., Abdulyekeen A.O., Olatunde G.

Paper 6:

A Review of Intelligent Transportation System: Adaptive Management

Busayo Adebiyi, Risikat Folashade Adebiyi, Ahmed Tijani Salawudeen & Abubakar Umar

5:00 pm -

CLOSING

5:10 pm

DAY 2

TUESDAY 30TH APRIL, 2019

SECOND PARALLEL SESSION

SECOND PARALLEL SESSION DAY 2 - TUESDAY 29TH APRIL, 2019

VENUE: FACULTY OF COMMUNICATION AND INFORMATION SCIENCES [CIS]

GROUP 1

GROUP 2

**ARCHITECTURE & HOUSING
DEVELOPMENT MANAGEMENT**

**CONSTRUCTION ECONOMICS & COST
MANAGEMENT**

CHAIRPERSON: Dr. Nasmat T. Surajudeen-Bakinde

CHAIRMAN: Prof. A.M Junaid

RAPPORTEUR: Dr. A.I. Bako

RAPPORTEUR: Dr. Ranti T. Adebiyi

Paper 1:

Paper 1:

8:30 am - 10:30 am

need for further empirical research on development of risk management model in PPP housing projects in Niger State.

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RISK FACTORS AFFECTING COST AND TIME PERFORMANCE OF CIVIL ENGINEERING PROJECTS IN KWARA STATE

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Abstract

The construction industry is known for being very poor compared to other industries in the identification, assessment and management of project related risks. Civil engineering projects in particular are more risky due to the nature, complexity and enormous amount of resources required conversely leading to cost and time overrun. This paper aimed at evaluating the potential risk factors associated with civil engineering projects with the view to achieving overall project objectives. A-31 risk factors were identified from the literature review and were used as basis for a questionnaire survey administered to the Architects, Quantity Surveyors and Engineers in Kwara State. Eighty (80) questionnaires were administered; fifty one (51) were retrieved and analysed using mean item score for the identified factors. Research findings showed that incomplete design, unstable inflationary trend, delay in progress payment, financial difficulties, improper project planning, inadequate programme planning and foreign exchange rate had greatest impact on civil engineering projects. Whereas factors such as Force majeure, labour dispute and strike and mistakes and discrepancies in contract documents has least impact. The study recommends that project team should identify and quantify project related risk at the initial stage and allocate the risks to party suitable to control them.

Keywords: *Civil engineering project, Construction industry, Construction project, Cost and time performance, Risk*

121.0 Introduction

It is virtually not possible to have a risk-free construction project. The inherent nature of construction risks contributes to the inability in achieving the tripartite project objectives of time, cost and quality. Although the construction sector with its myriad of activities arguably is embedded more with risks and uncertainties compared with other industries (Mohammed, 2016), the risks are not dealt with adequately, consequently leading to cost and time overrun (Oyewobi, Ibrahim & Ganiyu, 2012). According to Building and Engineering Standard Method of Measurement 4 (2015), construction project is a conglomerate of building, civil and heavy/industrial engineering work. Considering this, Houghton (2004) defined civil engineering as professional engineering discipline that concerns with the design, construction and maintenance of physical and naturally built environment, such as roads, bridges, dams and buildings. Similarly, Akinmusire and Ologunagba (2016), defined civil engineering project as special project due to its nature, complexity and enormous amount of resources required. This is in line with the view of Barbara (2004) who stated that civil engineering project requires special engineering skill and a great technical know how to execute. However, civil engineering projects come into existence in form of structures and buildings of different types, shapes and complexity. Projects of this nature usually has client as the initiator and major financier, while the Civil/Structural Engineer is shouldered with the responsibility of designing and supervision of the project.

Although a plethora of researches (Ling & Liu, 2005; Odeyinka 2006; Amani, 2007; Towner and Baccarini, 2008; Anood, 2014; Mohammed, 2016 and Amuda-Yusuf *et al.*, 2017) revealed

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that extensive research has been carried out globally on construction risks, and several risk factors have been identified but mainly focused on examining the impacts of risks with respect to project cost overrun (Joshua & Jagboro 2007), Risk impact on construction cash flow forecast (Odeyinka *et al.*, 2008) and Risk and Price in the Bidding Process of Contractors (Laryea & Hughes, 2011). Some researchers investigated risk management in construction projects holistically (Smith *et al.*, 2014; Ijigal *et al.*, 2013; Isimemen, 2014). While others focused on risk in Electrical and Mechanical services project such as; risk management for planning and use of building service system (Heimonen *et al.*, 2000), Managing building services maintenance risk with prediction theories (Lam 2006), and Risk factors impacting cost and time performance of mechanical and electrical services projects (Amuda-Yusuf *et al.*, 2017). On the flip side, there is a noticeable dearth of research that focuses on impact of risk on performance of civil engineering project. This research seeks to fill this gap in knowledge and the aim is to explore industry's practitioners' perception on the risk factors affecting cost and time performance of civil engineering projects. As part of a much larger project aiming to articulate and manage key risks associated with civil engineering projects, this research tend to identify and evaluate the potential key risks factors in civil engineering projects with a view to assessing relative importance of the risk factors affecting the cost and time performance of civil engineering project. Since project objectives are subject to risk and uncertainty. Therefore, it is important to examine the risk, risk factor; and their effect on projects in this area. This is with the aim of providing information that will enhance performance and efficient delivery of civil engineering project.

2.0 Literature Review

2.1 Construction Project Performance

Success of performance is a determinant of the success of construction projects (Akanni, Oke & Akpomiemie 2015). Construction project performance measurement is the process of appraising performance with project objectives in focus (Oke, Ogungbile, Oyewobi & Tengan, 2016). Traditionally, researchers and organisations have focused on the three critical project performance indicator of cost, time and quality (Dainty *et al.*, 2003, Chan & Chan, 2004; Swan & Khalfan, 2007). However, many studies have, also included other performance aspects, such as health and safety (Chan and Chan, 2004), environmental performance (Chan and Chan, 2004; Swan and Khalfan, 2007), customer satisfaction (Chan and Chan, 2004; Collins and Baccarini, 2004), and innovation (Harty, 2008); but the main client project objectives focus more on three factors critical to project success including cost, time and quality (Walker, 2007; Amuda-Yusuf *et al.*, 2017). The study of Chua (1999) cited in Oke *et al.* (2016) indicated that time, cost and quality objective together with project satisfaction have a tendency of becoming the most significant keys to measure the complete performance of a project. Furthermore, as remarked by many studies, most project records cost or time overrun during the period of execution (Oke *et al.*, 2016). Time is described according to Amuda-Yusuf *et al.*, (2017) as the time from the inception to completion of the project up to the point the project is added into client business. While cost on the other hand is the capital cost including all associated cost of the project. Quality performance measure seeks to ensure that projects achieve the quality standard set out in the contract. Quality of a project can be measured in terms of adherence with stated specification and this can be difficult at times to measures because it is subjective (Samuel, 2017). However, construction project cost and time were the most common performance measurement in project management studies (Walker, 2007; Amuda-Yusuf *et al.*, 2017).

2.2 Project Cost Performance

This has traditionally been seen as one of the most important aspect of construction project, if the economy of the project is off, the project can rarely be seen as a success (Oke *et al*, 2016). Project cost performance is used to indicate whether the project adhere to the agreed budget (Cheung *et al.*, 2004). Cost is the major considerations throughout the project management life cycle and can be refers to as the most important factor for a successful project delivery (Emmanuel & Anjiba, 2015). A project is successful if it is completed within predetermined sum. Project cost performance is measured in terms of cost overrun i.e. final sum minus initial contract sum divided by the initial contract sum multiplied by 100 (Odusami,2002). Cost overruns can be a source of problems for an unsuccessful project as contractors are criticized for the common occurrence of cost overruns in construction project (Chan & Chan, 2004). Cost overrun is almost associated with all projects in construction industry. Project with percentage cost overrun above 20% is regarded as a poor project in terms of cost performance, project that fall within 10% and 20% is regarded as average project in terms of cost performance, while project with cost overrun of less than 10% is regarded as an outstanding project (Kometa, Olomolaiye & Harris, 1996). Construction projects in developing countries are mostly completed above the initial budget as a result of improper management of project related risk and this require an early assessment and evaluation of potential risk to achieve an effective cost performance of construction project.

2.3 Project Time Performance

Monitoring Project time is one of the many challenges for project team. Time monitoring seeks to assess how well the project adheres to the time schedule during the project execution. Project duration is simply the number of days/weeks/months/years from inception to completion of the project (Oke *et al*, 2016). Since time can be a critical issue for many clients, project duration is often of primary interest. Projects completed in time is an important indicator of project success and the construction industry is frequently criticised for project delays due to inherent risks present in all construction project (Odeh & Battaineh, 2002; Faridi & El-Sayegh, 2006; Swan & Khalfan, 2007; Isimemen, 2014). Project schedule or time performance according to Samuel (2017) is calculated in terms of the percentage increase in the actual completion period over initial completion period. i.e. the difference between the actual completion time and planned completion time multiple by 100. The projects with percentage delay less than 10% is regarded as an outstanding in terms of time or schedule performance, those projects that falls between 10% to 20% is regarded as average project while those above 20% is regarded as poor project (Samuel, 2017).

2.4 Construction Risk Management

Construction projects are always unique and risks raise from a number of the different sources (Oyegoke, 2006; Pheng & Chuan, 2006). Construction projects are inherently complex and dynamic, and involving multiple feedback processes (Stermann, 2012; Uher & Loosemore, 2004). A lot of participant - individuals and organisations are actively involved in the construction project, and there interests may be positively or negatively affected as a result of the project execution or project completion (PMI, 2014). Different participants with different experience and skills usually have different expectations and interests (Dey & Ogunlana 2004). Given the importance of construction in measures of national output, it is not surprising that government and many stakeholders are interested in increasing and improving project performance through effective risk management in terms of estimated cost, time and quality (Abdullahi, 2011). In countries such as United Kingdom, United States of America and Canada, risk management has become universal management process involving quality of thought,

process and action (Sesel, 2003). In contrast, the adoption of the risk management concept in Nigeria has been largely part of the banking and financial sectors of the economy arising from responses to crisis that evolved within the financial sector of the economy in the early 1990s (Kehinde & Falilat, 2015). The outcomes of project are, however, uncertain and there are many parameters and variable over which a company has little or no control (Herman, Getz & Michael, 2003). The successful completion of any project is most times assessed on the basis of three parameters, which constitute risk: Time, Cost and Quality performance (Nworuh & Nwachukwu, 2004).

Risk management in construction project management context is a comprehensive and systematic way of identifying, analyzing and responding to risks to achieve the project objectives (ICE, 2005 & PMI, 2007). The benefits of the risk management process include identifying and analyzing risks, and improvement of construction project management processes and effective use of resources.

2.4.1 Identification of Risks Factors in Construction Projects

Several researchers (Ahmed *et al.*, 2001; Kartam *et al.*, 2001; Odeyinka *et al.*, 2008; El-Sayegh, 2008; Isimemen, 2014 and Emmanuel & Anjiba, 2015) have studied potential risks in construction projects in developed and developing countries, looking at a range of projects from small to large scale. Various studies have considered risks relating to the three main parties in the construction industry; clients, consultants, and contractors. Others have used sub-categories of related factors, grouping together risks based on their nature. Table 1 presents relevant studies related to the identification of risk in construction projects.

Table 1: Identification of Risk factors in construction projects.

S/N.	RESEARCHERS(S) WORK	IDENTIFIED CRITICAL RISK FACTORS
1	Prasanta kumar dey,(2002)	Improper project planning, incomplete design, conflict between project participant, statutory clearance and approvals.
2	Ghosh and Jintanapakanont, (2004)	Unclear responsibility, inflation, country economic condition unavailability of funds. Financial failure construction delays.
3	Laryea, (2007)	Contractor's experience, variation, site condition and unknown geological condition, inflation, country economic condition and rules and regulation, unavailability of funds, financial failure and unavailability of required resources.
4	Enhassi and Mosa, (2008)	Poor information dissemination, misunderstanding of client requirement, site condition, inflation, country policy, unavailability of funds, financial failure and unavailability of required resources.
5	Sun and Meng (2009)	Scope and design changes, technology, site condition and unknown geological condition, inflation, country economic condition and rules and regulation, unavailability of funds, financial failure, inadequate managerial skill, lack of coordination between the project team and lack required resources
6	Wang <i>et al.</i> , (2004)	Inflation, country economic condition, statutory clearance and approvals, construction delays.
7	Eybpoosh, (2011)	Complexity of design, technology, site condition, inflation, country economic condition and rules and regulation and lack required resources
8	Rezakhani, (2012)	Scope and design changes, technology, unavailability of fund, financial, weather and climatic condition, poor safety procedures.
9	Goh <i>et al.</i> , (2013)	Scope and design changes, technology, site condition and unknown geological condition, inadequate managerial skill, lack of coordination between the project team and lack required resources and construction delays.
10	Luka, and Ibrahim (2015)	Tight project schedule, design team experience, inadequate program planning, quality of material and labour performance and productivity.

2.4.2 Risk Classification

Risk classification is defined according to PMI (2014) as a structure that provides an exhaustive process of systematic risk identification to a constant detailing and which match its contribution to the quality and effectiveness to the risk identification process.

Project risk can be classified in various ways depending on the purpose as shown in Table 2. For instance, some risks are generally categorised into internal and external risks, while others are classified in more detail as client risk, financial risk, design risk, contractor risk, material risk, etc. (Mustafa, 1991; Akinci and Fischer., 1998; Raftery, 1999; Dey, and Ogunlana, 2004; Ghosh and Jintanapakanont, 2004; Enshasi and Mosa, 2008; El-Sayegh, 2008; Razakhani, 2012; Goh *et al.*, 2013; Renuka *et al.*, 2014 and Mohammed, 2016)

Table 2: Risk Classification in Construction Projects

CATEGORY	DESCRIPTION
MANAGEMENT	In project management there are two major aspects: the art and the science of the project. The art deals with the people involved in the project, while the science deals with defining and coordinating the work to be done; for example, it involves the knowledge, understanding, and skilful application of a project management process (Heerkens, 2001)
DESIGN	One of the most important requirements to minimise time delay and cost overrun is the allocation of sufficient time and money at the design phase (Koushki <i>et al.</i> , 2005). Design is one of the most critical categories because it related factors were identified as key risks in construction projects (Fereig and Kartam, 2006).
FINANCIAL	This category takes into account factors with respect to possible financial difficulties on the project, which may be due to cash flow problems, delayed payments, and external economic issues. (Alaghbari <i>et al.</i> , 2007). Delayed payment for executed projects is the key related risk factor that affect the financial category as concluded by various studies (Sweis <i>et al.</i> , 2008) and (Aibinu and Odeyinka, 2006).
MATERIALS	The effect of risk factors can have a direct bearing on tasks and the cost implication on the project can be serious (Manavazhi and Adhikari, 2002). Type of materials, their availability and the selection time are critical risk factors when it comes to material issues.
LABOUR- AND EQUIPMENT	Shortage of workforce and the existence of unskilled labour are risk factors in relation to Labour issues. (Sweis <i>et al.</i> , 2008)
EXTERNAL	External risks are usually ranked low and do not have a contributory role in the delay of the project (Sugiharto and Keith, 2003). Most of the studies show that external risks, including weather and site conditions, have the lowest impact on the completion of a project (Alaghbari <i>et al.</i> , 2007).

The leading six categories related to risk factors were management, design, financial, materials, labour and equipment and external. The selection of the categories was based on the most often included categories in the relevant literature. However, these categories were presented to the practitioners to evaluate them and approved.

3.0 Materials and Methods

This section of the study describes in detail the research design, population and sampling method, in addition to the data collection and method of data analysis.

This study employed survey research design approach to achieve the objectives of the study. Since the study sought to find the risk factors and their impact on cost and time performance of civil engineering project, the survey research method was deemed appropriate (Emmanuel and Anjiba, 2015). Based on the review of extant literature, a preliminary list of risk factors in civil engineering project was prepared to investigate and evaluate the potential risk factors affecting the successful delivery of civil engineering projects. Considering the number of registered construction practitioners in the study area, this study purposively sampled 80 respondents resulting in 51 valid structured questionnaire. A total of 31 risk factors were

obtained from previous studies and the respondents were asked if they consider the risk factors identified as contributing to poor cost and time performance of civil engineering project. Data were collected using a structured questionnaire on 31 previously identified risk factors from preliminary investigations. This study applied the weighted mean score which involves assigning numerical value to respondents' ratings of factors with respect to their probability and severity e.g. Very High, 5 points, High, 4 points, Moderate, 3 points, Low, 2 points and very low 1 point. The data collected were analyzed using SPSS version 20.0 and mean ranking technique was used to determine the most ranked risk factors affecting the cost and time performance of civil engineering projects.

4.0 Data Analysis and Research Findings

Table 3 indicated that 37.3% of the respondents are from consulting organization, 35.3% are from contracting, while 21.6% are from government ministry/parastatal and very few (5.9%) are from academia. In term of profession, about 26% are Architects, 24% Quantity Surveyors while 51% of the respondents have Engineering background. Majority (74.5%) are Associate members, while 21.6% are Fellow and very few are (3.9%) are probationers. About 15.7% of the respondents have between 11-16 years working experience, while 23.5% have spent between 16-20 years in the industry and the remaining 60.8% of the respondent have spent more than 20 years in practice.

Table 3: Summary of Demographic Information of the Respondents

CATEGORIES	CLASSIFICATION	NUMBER	%
Type Of Organisation	Consulting	19	37.3
	Contracting	18	35.3
	Government Ministry	11	21.6
	Academia	3	5.9
Academic Qualification	HND	4	7.3
	B.Sc/ B.Tech	19	37.3
	M.sc	22	43.1
	Ph.d	6	11.8
Profession	Architect	13	25.5
	Quantity Surveyors	12	23.5
	Engineer	26	51
Professional Qualification	Probationer	2	3.9
	Corporate	38	74.5
	Fellow	11	21.6
Years Of Experience	11-15	8	15.7
	16-20	12	23.5
	Above 20	31	60.8
Age Of Respondents	41-50	9	17.6
	51-60	11	21.6
	61-70	31	60.8

Source: Field Survey (2018)

The result of the analysis shown in Table 4 revealed that based on the practitioners' perception, incomplete design was ranked highest with impact mean score of 4.57, follow by unstable inflationary trend and delay in progress payment with mean score of 4.47 and 4.37 respectively. Financial difficulties, improper project planning and Inadequate programme planning were ranked next with mean score of 4.35, 4.18 and 4.09 respectively, while foreign exchange rate, delay in material delivery and design team experience were ranked seventh, eighth and ninth with mean score of 4.08, 4.07 and 4.02 respectively.

On the flip side, Force majeure, labour dispute and strike and mistakes and discrepancies in contract documents were the factors ranked least by the respondents with mean score of 1.63, 1.97 and 2.00 respectively.

Table 4: Summary of Respondent's perceptions of Risk Factors affecting Cost and Time performance of civil engineering projects.

S/N	RISK FACTORS	RISK PROBABILITY	RISK SEVERITY	RISK IMPACT	RANK
1	Inadequate programme planning	4.59	3.61	4.09	6
2	Incomplete design	4.57	4.57	4.57	1
3	Delay in material delivery	4.53	3.67	4.07	8
4	Unstable inflationary trend	4.51	4.43	4.47	2
5	Financial difficulties	4.41	4.31	4.35	4
6	Delay in progress payment	4.39	4.35	4.37	3
7	Improper project planning	4.29	4.08	4.18	5
8	Design team experience	4.25	3.82	4.02	9
9	Foreign exchange rate	4.24	3.94	4.08	7
10	Variation	4.00	3.98	3.99	10
11	Change in government policy	4.00	3.78	3.88	11
12	Poor information dissemination	3.96	3.44	3.69	13
13	Project duration	3.88	3.62	3.75	12
14	Misunderstanding of client requirement	3.75	2.57	3.10	18
15	Site condition	3.65	3.41	3.52	15
16	Conflicts between project participants	3.57	3.57	3.57	14
17	Scope of the project	3.55	3.17	3.35	17
18	Shortage of material	3.55	3.37	3.46	16
19	Unclear responsibilities	3.47	2.35	2.86	19
20	Discrepancy between the designs	3.19	2.00	2.53	22
21	Contractor's experience	2.96	2.75	2.85	20
22	Availability of material in market	2.86	2.39	2.61	21
23	Unclear and inadequate information in the drawings	2.59	2.00	2.27	26
24	Civil disturbance	2.57	1.59	2.02	28
25	Poor specification	2.57	2.39	2.48	23
26	Inclement weather condition	2.56	1.98	2.25	27
27	Change in material specification and type	2.39	2.39	2.39	24
28	Poor communication and information dissemination between the design team	2.39	2.36	2.36	25
29	Force majeure	2.18	1.22	1.63	31
30	Mistakes and discrepancies in contract documents	2.02	2.00	2.00	29
31	Labour dispute and strike	2.01	1.94	1.97	30

5.0 Discussion of Findings

The study evaluates the risk factors affecting cost and time performance of civil engineering projects. Based on the research findings, 9 key risks factors were uncovered and 'Incomplete design' was ranked highest. Incomplete design may result from issues such as insufficient time allocated to designer, design team experience, Unclear and inadequate information during briefing; this may leads to Conflicts between project participants, Variation, Mistakes and discrepancies in contract documents and may subsequently lead to poor cost and time performance of civil engineering projects. To avoid incomplete design, the design team need not only to fully understand what the clients want during the project briefing, but also to establish efficient communication scheme among the designer (Luka & Ibrahim, 2015). Closely followed rated factor is 'Unstable inflationary trend' this is not surprising considering

the uncertainty nature of Nigeria construction industry coupled with high degree of instability in predicting economic and market condition in Nigeria. There is tendency that the price of material may increase before the completion of the project especially a project with long completion period and will no doubt affect the cost and time performance of civil engineering projects. This factor also reinforced by Lashinde, Ogunsemi & Awodele (2015), who lectured that the price of construction material mostly depend on foreign component and may lead to high degree of forecasting inflation rate and currency exchange rate which has multiplier effect on infrastructural projects in Nigeria. Closely followed factors ranked were delay in progress payment, financial difficulties, improper project planning and inadequate programme planning. All these factors can be avoided by ensuring payment on time, engage experience project manager and making use of relevant financial forecasting tools.

On other side, Force majeure, labour dispute and strike and mistakes and discrepancies in contract documents were the factors ranked least by the respondents, this indicates that these factors do not have significant effect on cost and time performance of civil engineering projects. Other factors ranked by the respondents based on their perception are between these extreme as shown in Table 4. This shows that the practitioners' perceived incomplete design and inadequate programme planning as the major factors affecting cost and time performance of civil engineering projects which may subsequently lead to cost and time overrun or even abandonment of the projects. The result also educated that when the financial need of the project is not align with programme, it can have serious implication on both cost and time performance of civil engineering project

6.0 Conclusion

This study investigated the risk factors affecting cost and time performance of civil engineering projects from the view of construction practitioners in Kwara State. The study established that the risk factors affecting cost and time performance of civil engineering projects are inherent within and outside the project environment. The risks can be categorized as management risk factors, design risk, finance, labour and external risk factors. The study conclude that the major risk factors affecting cost and time performance of civil engineering projects include incomplete design, unstable inflationary trend, delay in progress payment, financial difficulties, improper project planning and Inadequate programme planning, foreign exchange rate, delay in material delivery and design team experience. These factors are very critical to achieve overall project objectives of civil engineering projects. Apart from the fact that these factors are responsible in differential in the construction of civil engineering project, other factors could be variation, poor information dissemination, conflicts between project participants and change in government policy which may lead to project failure. However, the highly rated risk factors in this study may likely be ranked least in other clime; this is possible as a result of heterogeneous nature of construction industry. The practical implication of this study is that, the initial identification of the risk factors serves as a watch list of risk that the project team should watch out for, secondly, the evaluation of probability of occurrence and severity enables the project team to determine the level of impact the risk can have on cost and time performance of civil engineering projects. This study therefore recommends that the project team should identify and quantify the risks and allocate these risks to a party or parties suitable to control them. Competent contractor who can see the incident of these risks as an important aspect that requires quick attention and who can control them should be awarded the contract.

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