

# BROCHURE AND BOOK OF ABSTRACTS



WEST AFRICA BUILT ENVIRONMENT RESEARCH CONFERENCE

Editors  
Sam Laryea  
Eziyi Ibem

16-18 August  
University of Ghana  
Accra, Ghana



WEST AFRICA BUILT ENVIRONMENT RESEARCH (WABER) CONFERENCE  
*Knowledge, Interaction, People & Leadership*

## BROCHURE AND BOOK OF ABSTRACTS OF THE WABER 2017 CONFERENCE

16<sup>th</sup>-18<sup>th</sup> August 2017  
University of Ghana, Accra, Ghana

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**WABER**  
**conference**

*West Africa Built Environment Research Conference*

*Knowledge, Interaction, People & Leadership*

Accra, GHANA

**2017**

16-18 AUG.

University of Ghana



Brochure and Book of abstracts of the WABER 2017 Conference

16th - 18th August 2017

University of Ghana, Accra, Ghana

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Declaration

All papers in this publication have been through a review process involving initial screening of abstracts, review of full papers by at least two referees, reporting of comments to authors, revision of papers by authors and re-evaluation of re-submitted papers to ensure quality of content.



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NEA ONNIM NO SUA A, OHU

*"He who does not know can know from learning"*

This is the Adinkra symbol of knowledge, life-long education and continued quest for knowledge. The Akan people in West Africa believe that the search for knowledge is a life-long process. This is evident from the Akan saying "Nea onnim sua a, ohu; nea odwen se onim dodo no, se ogyae sua a, ketewa no koraa a onim no firi ne nsa" which translates into "He who does not know can become knowledgeable from learning; he who thinks he knows and ceases to continue to learn will stagnate"



# FOREWORD

It is my pleasure to welcome each of you to our 7th West Africa Built Environment Research (WABER) Conference taking place on the campus of University of Ghana in Accra, Ghana.

Thank you for coming and a very warm welcome to Accra and the beautiful campus of the University of Ghana. When you have some time, I recommend a visit to the upper campus of University of Ghana to enjoy the full beauty of this university. You will find buildings of architectural significance and you will also be able to see from there an aerial view of parts of Accra.

The delegates at this year's conference come from Chad, Ghana, Ethiopia, Hong Kong, Kazakhstan, Nigeria, South Africa, Sweden, Uganda, UK and USA. I welcome each of you personally. Please take every opportunity to interact, exchange ideas and develop collaborations with colleagues from other places. To everyone who has come from outside Ghana, we extend a very special welcome to you by saying "*Akwaaba*" which means "*Welcome*" in our local language.

I know many of you have travelled long distances to get here. I also know that many of you have made considerable sacrifices by drawing on your own resources in order to be at this conference. We appreciate your efforts and hope your expectations will be met as we progress through the conference programme. It is always my hope that this conference provides each of us with a valuable professional development experience and opportunities for a productive and rewarding career.

I am delighted that we have three excellent keynote speakers this year who will interact with delegates on a range of important topics on the programme but also on issues that you may wish to discuss with them during breaks. Feel free to discuss professional issues on your mind with them. It is a credit to our three keynote speakers that all of them kindly agreed to come and share their time, knowledge and expertise with us. So I would like to welcome and honour our three keynote speakers: Professor Jason D. Shaw (Chair Professor of Management at Hong Kong Polytechnic University & Editor-in-chief of Academy of Management Journal); Professor Oluwale Morenikeji (Professor of Urban and Regional Planning & Deputy Vice Chancellor (Academic) at Federal University of Technology, Minna, Nigeria) and Professor Will Hughes (Professor of Construction Management and Economics at University of Reading, UK). I thank each of you profoundly for accepting our invitation. I hope everyone here benefits from the illumination your presence provides. Have a nice stay in Ghana and enjoy your interaction with delegates.

From an initial submission of 181 abstracts, we eventually accepted 98 papers for publication in the conference proceedings. About 84 of the accepted papers have been scheduled for presentation at this conference. Some authors opted for the publication only route and their papers have not been scheduled for presentation. We congratulate all authors of published papers in our WABER 2017 conference proceedings. Thank you for your commitment to scientific research, professional development, and the hard work put into doing the research and writing of the papers.

I look forward to the paper presentations. Some of you would have noticed that we have introduced a new format into our paper presentation system. In previous years, all paper presentations were done using traditional conference style presentation. This year, we have a combination of traditional conference style presentation and poster presentation which we are adopting for the first time. We have designed the format of the poster presentation session to be as interactive as possible for authors and the audience. We want every presentation to be seen, every author to be heard, and audience interaction with each author. That is the basis for our design of the poster presentation session. This change has not been easy for some authors to accept. I know some authors still prefer traditional style conference presentation. However, I ask for your cooperation and support in making the poster presentation session a success. Please embrace the change we have introduced in order to realise and enjoy its benefits. I can assure you that your poster presentation will be seen by



everyone in the audience and you will be fully heard. A poster presentation is one of the most effective and most widely used ways to present research. I hope that all of us adapt well to this new system and we use our poster presentation session as an opportunity to enjoy an alternative way of presenting our research.

I turn my attention now to the invaluable members of our scientific committee and review panel. Peer review is essential to good science; credit must be given to our expert reviewers from 17 countries who have so generously given their time and knowledge to contribute to the peer review process for this year's conference. I wish to thank each reviewer personally for your effort, contribution and essential service as gatekeepers for the scientific integrity of published research papers. Without the expert contribution of our referees, this conference will not enjoy its high reputation. So thank you once again to all reviewers particularly Assoc. Prof. Eziyi Ibem, Dr Carmel Lindkvist, Assoc. Prof. Emmanuel Essah and Prof Will Hughes for your significant contributions in this regard.

Organising a conference of this scale successfully requires the backing and support of some sponsors and partners. I would like to say a big thank you to Pinsent Masons who have provided us with significant support this year. Pinsent Masons supported us to initiate our Construction Law Seminar in April (26-27) this year. The April event was attended by more than 200 people. We just finished a 2<sup>nd</sup> Construction Law Seminar (14-15 August) and that one too was attended by more than 200 people. Rob Morson who represents Pinsent Masons at this conference was instrumental in the planning and success of the Construction Law Seminars. Rob, thank you so much for your contribution to the work we are doing here. I hope you enjoy your time at this conference. Our other sponsors/partners have also been extremely supportive and generous. Procurement and Project Management Consultancy (PPMC) Ltd have been regular sponsors of WABER Conference – Thank you for your financial support over the years. Dataware Consult became our official IT partner earlier this year – Thank you for providing various forms of IT support for our events. McOttley Capital are our newest partner. We appreciate your financial contribution and look forward to the start of a great relationship between WABER and McOttley. Finally, special thanks to EPP Books Services for sponsoring prize items for the Gibrine Adam Award which we introduced two years ago to recognise and encourage promising young researchers. Last but not least, I thank Excelsis Ghana who are doing video recording and documentation of this conference.

I must conclude by acknowledging and appreciating the roles and efforts of the following people for the significant contributions you have made towards the successful organization of the conference: Florence Laryea, Assoc. Prof. Eziyi Ibem, Solomon Kwofie, Emmanuel Ansah, Georgina Bediako, Assoc. Prof. Emmanuel Essah and Dr Afolabi Dania. Organising a conference of this scale is always a enormous task so I thank each of you for your dedication and important contribution. I thank Florence and Eziyi for their work regarding the production of this publication. This publication contains useful and interesting content that is indicated on the contents page. I hope you will enjoy reading the content.

On the whole, I am pleased to say that this year has been a successful and productive one for WABER Conference. To all of you who have contributed in various ways, I thank you very much. To all delegates at this year's conference, I thank you once again for your participation. Enjoy the conference, engage in the exchange of ideas and knowledge, interact and build new relationships for the future, and have a safe journey back home.

We wish everyone at this conference the very best for all of your endeavours and hope to see you again in the future.

Sam Laryea, PhD, PGCAP, FHEA, MSCLA, MASAQS, MRCIS, MCIOB, PrCPM  
Chairman of WABER Conference

Accra, Ghana, 16th August 2017

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WABER Conference. 16 August 2017



# PEER REVIEW AND SCIENTIFIC PUBLISHING STATEMENT



16th August 2017

## TO WHOM IT MAY CONCERN

The scientific information published in peer-reviewed outlets carries special status, and confers unique responsibilities on editors and authors. We must protect the integrity of the scientific process by publishing only manuscripts that have been properly peer-reviewed by scientific reviewers and confirmed by editors to be of sufficient quality.

I confirm that all papers in the WABER 2017 Conference Proceedings have been through a peer review process involving initial screening of abstracts, review of full papers by at least two referees, reporting of comments to authors, revision of papers by authors, and re-evaluation of re-submitted papers to ensure quality of content.

It is the policy of the West Africa Built Environment Research (WABER) Conference that all papers must go through a systematic peer review process involving examination by at least two referees who are knowledgeable on the subject. A paper is only accepted for publication in the conference proceedings based on the recommendation of the reviewers and decision of the editors.

The names and affiliation of members of the Scientific Committee & Review Panel for WABER 2017 Conference are published in the Conference Proceedings and on our website [www.waberconference.com](http://www.waberconference.com)

Papers in the WABER Conference Proceedings are published open access on the conference website [www.waberconference.com](http://www.waberconference.com) to facilitate public access to the research papers and wider dissemination of the scientific knowledge.

Yours Sincerely,

A handwritten signature in black ink, appearing to read 'Sam Laryea', with a horizontal line drawn underneath it.

Sam Laryea, PhD  
Chairman of WABER Conference



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WABER Conference is very grateful to each the following persons for your contribution to the peer review process. Thank you so much.

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# **PRIZES TO BE AWARDED AT THE WABER 2017 CONFERENCE**

- **Best Research Paper**

This prize is awarded to recognize the author(s) of an original piece of research which contributes a better understanding of the research question/problem investigated and demonstrates a high degree of scientific quality and innovative thought. This prize was created to acknowledge the continuing importance of high quality research to academic institutions, a researcher's reputation and the development of the built environment field.

- **Best Oral Presentation**

This prize is awarded to recognise the presentation which is the most coherent, clearly enunciated, well-paced, easy to understand, and effective. The award is given on the basis of quality of the presentation and not the written paper. It recognizes the best presentation based on communication of the content of a paper and the ability of the speaker to deliver an impactful, authoritative and engaging presentation. The award looks to encourage researchers to put as much effort as possible into the presentation of their work.

- **Best Poster Presentation**

This prize is awarded to recognise the poster which presents the most effective snapshot of the work being reported. The award is given on the basis of the quality of the poster presentation and not the written paper. The award is to be presented to the poster that provides the best snapshot of researcher's work, which engage colleagues in a dialogue about the work, and provides a summary that will encourage the reader to want to learn more about the study. The award looks to encourage researchers to put as much effort as possible into their poster presentation.

- **Gibrine Adam Promising Young Scholar Award**

This prize is awarded to recognize and encourage exceptional young researchers. The recipient should be a young academic who demonstrates promise, such that he/she is likely to become established as a research leader. The prize is provided by Mr Gibrine Adam – President of Zenith University College and CEO of EPP Books Services – who has made significant contributions to the education sector through his educational establishments and philanthropic work. Awarding this prize each year will serve as an important inspiration for young African built environment academics.



## WABER INTERACTS WITH WINNER OF BEST PAPER PRIZE IN 2015

We are constantly interested in the development of each and every WABER Conference delegate. We always aim to make the conference a valuable experience and developmental opportunity for each delegate regardless of where you are on the career ladder.

We recently interacted with the most recent winner of our Best Paper Prize, Dr Joy Maina, about her experiences and current activities. We are delighted to share the interview with Dr Joy Maina from Ahmadu Bello University with you in this section.

We wish Dr Maina success in her future endeavours. We hope she continues to be a shining example of academic and professional excellence and sustain her contribution to the development built environment research on our continent.

### **Dr Joy Maina**

*Department of Architecture, Ahmadu Bello University, Nigeria*



Dr Joy Maina receiving her Best Paper Prize in August 2015.

The title of her paper that won the award was “Architects and interdisciplinary research: reflections from ethnographic and measured fieldwork”.

*Q. Can you please tell us a bit about yourself – including where you work, academic background, research interests, and personal interests?*

A: I am an architect trained at Ahmadu Bello University (ABU) and the University of Nottingham, UK. I lecture at ABU where I teach mainly Research Methods and Basic Design at undergraduate and postgraduate levels alongside managing other administrative posts. My research interests include Spatial qualities of the Built Environment, Human behaviour and spatial cognition, Housing research as well as Architecture Education. I enjoy music and sewing.



*Q: How would you describe your academic/professional experiences so far? How did you get into academia? What courses do you teach and what does your job entail? What is your typical day in the office like?*

A: My academic experiences have been interesting but slow by my personal yardstick. I underestimated the amount of hard work one needs to truly become grounded in research after the doctorate. Am still learning.

I got into academia by serendipity I guess. I should however mention that my mother was an English teacher, so I sort of grew with an academic background.

As mentioned earlier, I teach Basic Design Studio in the first year and Research Methods in the final undergraduate class. This is further extended and refined in the MSc Thesis Design Report class. I also teach Quantitative research approaches for PhD. The main thrust of my work involves postgraduate supervision at both MSc and PhD levels.

My typical day in the office: I go in between 7:30-8:00am when I have lectures, otherwise it's an hour later as I use the morning to catch up on my personal research. The rest of the day usually proceeds with either supervisory or administrative meetings until closing time at 4pm. There's rarely a proper break in between. To keep from burning out, I usually take an academic day off each week.

*Q: How did you first hear about the WABER Conference and why did you decide to attend?*

A: I learnt about the conference from colleagues on returning from my doctorate in 2013. I decided to attend because of the high accolades it received from previous participants.

*Q: What was your experience of attending the WABER Conference? How did you benefit from attending the conference? How was the experience of arranging funding to attend the conference?*

A: I had a fabulous time. I learnt a lot from listening to other participants. It's amazing what one learns when open to new ideas. It also reveals the depth of intelligent people around. My experience with funding was personal . . . My colleagues and I self-sponsored ourselves. My mom was travelling to Ghana so that made things a bit easier as I detest travelling alone.

*Q: You won the best paper prize. Can you describe how you felt when you won the prize?*

A: To be honest, it was a complete surprise! I didn't see that coming. It is humbling to think what I wrote had that much merit. Interestingly, the paper accrues from discussions with my external examiners during my viva. In essence it wasn't part of my initial thesis. Am forever indebted to Dr. Ian Cooper and Dr. Nicole Porter who insisted that was perhaps one of my greatest contributions to knowledge. I acknowledge this at the end of the paper. It was also so gratifying to have my mother with me in Accra. Parents, I find are deeply sentimental about such achievements. It's my first paper prize, and I cherish it a lot.

*Q: What impact has it had on you? How has the recognition and winning the prize influenced your academic development since the award?*

A: Impact . . . I can't rest on my oars. So much is expected. The influence on my academic development has been gratifying in that one's colleagues take you seriously. It has also meant that am given more responsibilities because of the perception of a high capacity to deliver quality work especially in teaching and admin work involving production of technical reports and editorial reviews. Am currently a reviewer of several journals/conferences as well as the secretary and assistant editor of ARCHISEARCH, International Journal of Architecture and the Built Environment.

*Q: What current research papers / projects are you working on at the moment?*

A: Am currently looking into qualities of informal learning spaces, human movement and behaviour patterns around complex institutional buildings as well as human behaviour in terms of energy savings in housing.

*Q: What are your future aspirations and what do you need to do to get there?*

A: I aspire to mentor and pass on as much as I've learnt to my students and younger colleagues. This has often meant taking on more work and going the extra mile to prod students in writing good quality research papers which I review and scrutinise. I find that writing papers with younger colleagues exposes them faster to the tenets of research. It is also a beautiful way to mentor someone in life away from academic pursuits. As my way of mentoring, one of my students usually presents a joint paper at any conference I attend.

*Q: What advise will you give to early career academics aspiring to develop their academic profile to an international level?*

A: Know your onions, know your stuff... Obtaining a higher degree especially a doctorate isn't the end of the world. In fact, it's just the beginning. Ground yourself firmly in the research area of your choice as soon as possible because the higher one goes, the less time one has for research and personal development. It's embarrassing to reach the top empty where it matters.

*Q: From your experience what are the most difficult challenges facing you and other built environment academics in Africa?*

A: Lack of adequate sponsorship and mentoring. The first is unfortunate, truly a crippling factor. Most of the conferences I have attended were from personal savings and effort. I find it very sad that Africa is yet to fully recognise and embrace research as the key to national development in part because of the second issue, poor mentoring. Those ahead of us can only give what they have in ways they've been taught. The onus rests with us the younger generation to blaze paths for the future generation in terms of high quality research and forays into policies at national levels that influence better funding for research.

*Q: Can you suggest some of the practical ways you have used to overcome the challenges?*

A: Writing research proposals for national grants, ensuring high quality research in international journals, networking with other like minded professionals.

*Q: What is your idea of good research and how can our universities in Africa support their academics in doing and publishing good research?*

A: My idea of good research is one that is underpinned by theory from literature and offers practical/pragmatic recommendations towards the improvement of daily life. Good research ought to be well grounded in existing literature, otherwise, how does one justify the problem? My problem with many papers I review from Nigeria in particular and Africa in general is that the problem statement is not made clear in part because of weak theoretical and literature reviews. Consequently, we often miss important theoretical implications and practical recommendations. Hopefully, we will improve in this regard...

-End-

## PROFILE OF KEYNOTE SPEAKERS

We would like to thank our keynote speakers for accepting our invitation to come and interact with delegates at the WABER Conference 2017. A brief profile of each keynote speaker is given in this section.

### PROFESSOR JASON D. SHAW

Editor-in-Chief, Academy of Management Journal  
Yeung Kin Man Professor of Business Administration  
Chair Professor and Head of Department  
Director, Centre for Leadership and Innovation  
Head of Department of Management and Marketing, The Hong Kong Polytechnic University,  
Hung Hom, Kowloon, Hong Kong



PROF JASON D. SHAW is Chair Professor of Management, Head of Department of Management and Marketing, and Director of the Centre for Leadership and Innovation in the Faculty of Business at The Hong Kong Polytechnic University. He received his Ph.D. from the University of Arkansas in 1997. He is the Editor-in-chief of Academy of Management Journal (2016-2019). His research has appeared or been accepted for publication in the Academy of Management Journal, Academy of Management Review, Journal of Applied Psychology, Organization Science, Strategic Management Journal, Organizational Behavior and Human Decision Processes, Personnel Psychology, and Journal of Management, among other scientific outlets. He has served or is serving on the editorial boards of Academy of Management Journal, Academy of Management Review, Journal of Applied Psychology, Personnel Psychology, and Journal of Management, among others. He has been invited for visiting scholar positions and other speaking engagements in China, Finland, Austria, Denmark, Norway, England, Germany, Hong Kong, Spain, Israel, Macau, Taiwan, Singapore, Australia, Canada, Belgium, Thailand, and the USA. Prior to his appointment at PolyU, he was the Curtis L. Carlson School-wide Professor in the Carlson School of Management at the University of Minnesota, the Clark Material Handling Company Professor at the University of Kentucky, an assistant professor at Drexel University, and an analyst for the Boeing Company.



## **PROFESSOR OLUWOLE MORENIKEJI**

Commonwealth Fellow, Professor of Urban and Regional Management & Deputy Vice Chancellor (Academic) at the Federal University of Technology, Minna, Nigeria



PROF OLUWOLE MORENIKEJI joined the Federal University of Technology, Minna in 1990 as an Assistant Lecturer and rose to become a Professor of Urban and Regional Planning in 2006. He obtained his B. Sc in Geography and Regional Planning from the University of Calabar in 1983 and M. Sc Urban and Regional Planning from the University of Benin in 1998. He enrolled for his Ph.D in Transport Planning in 1992 at FUT Minna and won a Nigerian-Italian Ph.D scholarship which enabled him to do part of his Ph.D work at the University of Trieste, Italy. He bagged his Ph.D in 1998 and utilized his post-doctoral Commonwealth Fellowship at the Instrumented City, Institute for Transport Studies, University of Leeds, UK (2004/2005). Morenikeji served as the Head of Department of Urban and Regional Planning from 1995 – 2002 and later, Director of the Centre for Human Settlements and Urban Development established in collaboration with the UN-Habitat in FUT, Minna. He was also the Dean of the School of Environmental Technology from 2008-2012. He has also participated in a number of internationally funded research projects and published several papers in learned journals. His areas of interest include transportation planning, human development studies, spatial analysis and Research Methods. He is currently participating in a collaboratory research between The Construction and Property Research Centre, University of the West of England (CPRC-UWE), Bristol, UK and the Federal University of Technology (FUT), Minna being funded by DFID. He was appointed in April 2016 by the West African Science Centre on Climate Change and Adapted Land Use (WASCAL) as a visiting Professor teaching Research Methodology at the Joint Facility for Language and Common Courses (JFLCC) 2016 which is a collaborative programmes for Masters (MRP) and Doctoral Research Programme (GRP) students from 10 participating Universities.



## PROFESSOR WILL HUGHES

Professor of Construction Management and Economics, University of Reading, UK



PROF WILL HUGHES is Professor in Construction Management and Economics in the School of Construction Management and Engineering, University of Reading, UK. He was Editor-in-chief of Construction Management and Economics for many years. He is also former Head of the School of Construction Management and Engineering. He is widely acknowledged as a leading academic in the built environment field and has an international reputation in the field of procurement and commercial management in construction. His PhD was on organizational analysis of building projects and he has researched and published extensively in this topic. His research interests include the control and management of building contracts, the management of design in construction, the analysis of organizational structure, and the analysis of procurement systems. The focus of his work is the commercial processes of structuring, negotiating, recording and enforcing business deals in construction. He has co-authored several books on construction management and contractual issues, including a best-selling text book, *Construction Contracts: Law and Management* that is an essential text in most universities running such courses. He is editor of the international refereed journal *Construction Management and Economics*, a member of the editorial boards of the *Journal of Construction Research* and the *Journal of Asian Architectural and Building Research*, as well as an editorial adviser to Taylor and Francis. He is an active member of ARCOM (Association of Researchers in Construction Management), having completed two years as chairman 1998-2000. Professor Hughes has recently contributed an entry to the *Oxford Encyclopaedia of Economic History* and to a book on *Procuring Complex Performance*.





# PROGRAMME FOR WABER 2017 CONFERENCE

## WEDNESDAY 16 AUGUST 2017 (DAY 1)

<b>07:30-9:00</b>	<b>REGISTRATION</b>
<b>09:00-10:05</b>	<b>OPENING SESSION (AUDITORIUM)</b>
09:00-09:05	Welcome remarks, acknowledgment of sponsors and partners, Introduction of speakers and invited guests – Sam Laryea, Chairman of WABER Conference & Associate Professor at Wits University, Johannesburg, South Africa
09:05-09:15	An address on current developments in the West African higher education sector and what it means for us as researchers – Professor Oluwole Morenikeji, Deputy Vice Chancellor (Academic), Federal University of Technology, Minna, Nigeria
09:15-09:25	Remarks by a representative of Pinsent Masons, Partners of WABER 2017 Conference and sponsors of collateral materials for WABER 2017 Conference (USBs, notepads, pens, lanyards, name badges) – Mr Rob Morson, Partner, Pinsent Masons (Africa)
09:25-09:45	Address by the Guest of Honour
09:45-09:55	Presentation of a Citation to Prof Kabir Bala (Deputy Vice Chancellor (Admin), Ahmadu Bello University, Nigeria) in recognition of his distinguished contribution to the development and mentoring of early career built environment academics in Nigeria
09:55-10:00	Vote of thanks
10:00-10:05	Official WABER 2017 Group Photograph
<b>10:05-10:30</b>	<b>REFRESHMENTS AND NETWORKING BREAK</b>
<b>10:30-10:55</b>	<b>KEYNOTE SESSION (AUDITORIUM)</b> <b>Professor Will Hughes, Professor of Construction Management and Economics, University of Reading, UK</b> <b>TOPIC: CONCEPTUALISING A RESEARCH PROJECT</b> <b>Chairperson: Prof Oluwole Morenikeji, Deputy Vice Chancellor (Academic), FUTA, Minna, Nigeria</b>
<b>11:00 – 13:00</b>	<b>PRESENTATION AND FEEDBACK SESSION (AUDITORIUM)</b> PhD/Early career researchers present their work and receive constructive feedback from panel of experienced academics. The issues discussed by the panel often have relevance for all researchers <b>Panel: Prof Jason Shaw, Prof Oluwole Morenikeji, Prof Will Hughes</b> <b>Chairperson: Dr Cynthia Adeokun, Colman Architects Ltd, UK</b>

11:00-11:10	An international experts' opinion on the objectives of stakeholder management in construction projects - Goodenough D. Oppong, Albert P. C. Chan, Ernest E. Ameyaw, D. Owusu-Manu	
11:10-11:20	Client relationship management in architectural firms in southwest Nigeria - Adedeji Adebola Adepeju, Eziny Offia Ibem, Adedapo Adewunmi Oluwatayo	
11:20-11:40	Feedback / Q&A session	
11:40-11:50	Comparative analysis of investment attributes of commercial and hotel properties in South-Western Nigeria - Nurudeen Akinsola Bello, Babatunde Jolaoso, Olusegun Olaopin Olanrele	
11:50-12:00	Power sector development reforms in Nigeria: the roots to the challenges - Abdullahi D, Suresh S, Renukappa S, Oloke D	
12:00-12:20	Feedback / Q&A session	
12:20-12:30	Influence of power on client-contractor relationships in collaborative construction procurement - Ladi Kevin and Samuel Laryea	
12:30-12:40	Effects of quadriceps muscle fatigue on balance control and falls injuries following repetitive squat lifting task in construction workers - Maxwell Fordjour Antwi-Afari, Heng Li, Joon Oh Seo, Arnold Yu Lok Wong	
12:40-13:00	Feedback / Q&A session	
<b>13:00 – 14:00</b>	<b>LUNCH BREAK</b>	
<b>14:00 – 15:15</b>	<b>RESEARCH SKILLS WORKSHOP (AUDITORIUM)</b>  <b>Professor Jason D. Shaw, Editor-in-chief of Academy of Management Journal (AMJ)    Chair Professor and Head of Department of Management and Marketing    Director, Center for Leadership and Innovation at The Hong Kong Polytechnic University</b>  <b>TOPIC: DOING AND PUBLISHING HIGH QUALITY RESEARCH : A LOOK AT ISSUES PERTAINING TO THEORY, RESEARCH DESIGN, GROUNDING HYPOTHESES/RESEARCH QUESTIONS</b>  <b>Chairperson: Prof Kabir Bala, Deputy Vice Chancellor (Admin), Ahmadu Bello University, Nigeria</b>	
<b>15:15 – 15:30</b>	<b>REFRESHMENTS AND NETWORKING BREAK</b>	
<b>15:30 – 17:00</b>	<b>PARALLEL SESSION (AUDITORIUM)</b>  <b>Theme: Sustainability / environment / Building Science</b>  <b>Chairperson: Dr Emmanuel Essah, School of Construction Management and Engineering, University of Reading, UK</b>	<b>PARALLEL SESSION (SEMINAR ROOM)</b>  <b>Theme: Architecture &amp; Design</b>  <b>Chairperson: Prof GWK Intsiful, Department of Architecture, KNUST, Kumasi, Ghana</b>

15:30-15:40	A critical evaluation of the sustainable building assessment tool (SBAT) - Jeremy Gibberd	Designing for old age in Nigeria - Folake Ekundayo
15:40-15:50	Thermal climate and residents' perceptions in part of southwest Nigeria - Eludoyin Oyenike Mary	Rethinking design solutions to homelessness: A review of planning space standards - Cynthia Adeokun, A. Pearl Opoko
15:50-16:00	Analysis of green building strategies for hot-dry climatic conditions in north-western cities in Nigeria; Lesson from Botswana, Burkina Faso & South Africa - A. A. Yakub, A.O Salawu, S.D Gimba, Abubakar Ahmad, Abdulhakim Jolaoye	Assessment of light levels and visual comfort in a lecture hall of a university in Akure, Nigeria – Afolami, A. J., Akeremale, I. D. and Ikudayisi, A. E. - 3
16:00-16:15	Q&A	Q&A
<b>16:15-17:00</b>	<b>Chairperson: Dr Jeremy Gibberd, Council for Scientific and Industrial Research (CSIR), South Africa</b>	<b>Chairperson: Dr Folake Ekundayo, NHS Estates Design and Technical Services Department, UK</b>
16:15-16:25	Are LEED® certified buildings better in performance? A comparison of LEED® v. non-LEED® certified institutional buildings - Erika Crews, Salman Azhar, Amna Salman	Design of an automated staircase climber trolley for general hospitals in developing countries: case of an anonymous hospital in Zimbabwe - Tawanda Mushiri, Tariro Kadzunge, Charles Mbohwa
16:25-16:35	Impact of rating systems on the construction of green buildings in South Africa - Masego Leburu, Christopher Allen	Design innovation in structural engineering - Olawale, Simon O, Ogunbiyi, Moses Adebawale
16:35-16:45	An evaluation of indoor thermal conditions of residential buildings with different fabric finishes at Okigwe, Nigeria - Marcellinus U. Okafor	Implications of social practices and literacy on wayfinding design strategies in Nigerian hospitals Joy Joshua Maina, Abdulhamid Dauda
16:45-17:00	Q&A	Q&A
<b>17:00</b>	<b>CLOSE</b>	

## THURSDAY 17<sup>TH</sup> AUGUST 2017 (DAY 2)

08:45-08:55	VIDEO HIGHLIGHTS OF DAY 1 (AUDITORIUM)	
09:00 – 10:15	<b>RESEARCH SKILLS WORKSHOP (MAIN AUDITORIUM)</b>  <b>Professor Jason D. Shaw, Editor-in-chief of Academy of Management Journal (AMJ)    Chair Professor and Head of Department of Management and Marketing    Director, Center for Leadership and Innovation at The Hong Kong Polytechnic University</b>  <b>TOPIC: DOING AND PUBLISHING HIGH QUALITY RESEARCH: A LOOK AT ISSUES PERTAINING TO CRAFTING THE METHODS AND RESULTS, DISCUSSING THE IMPLICATIONS, MAKING A CONTRIBUTION</b>  <b>Chairperson: Associate Professor Eziyi Ibem, Department of Architecture, Covenant University, Nigeria</b>	
10:15-10:30	REFRESHMENTS AND NETWORKING BREAK	
10:30-13:00	<b>PARALLEL SESSION (AUDITORIUM)</b>  <b>Theme: Real Estate and Housing</b>  <b>Chairperson: Mr Sammy Amegayibor, Executive Director Ghana Real Estate Developers Association (GREDA)</b>	<b>PARALLEL SESSION (SEMINAR ROOM)</b>  <b>Theme: Construction Materials / Technology</b>  <b>Chairperson: Prof. Dr. Abid Nadeem, Department of Civil Engineering, Nazarbayev University, Kazakhstan</b>
10:30-10:40	Analysis of residents' preference for residential neighbourhood in Ilorin, Nigeria - Adeogun, A.S., Raheem, W.M., Shittu, W. O., Bako A.I.	Effect of granite, washed and un-washed gravel aggregate sizes on engineering properties of concrete - Moses Adebawale Ogunbiyi, Simon O. Olawale, Oluwaseyi Ajayi
10:40-10:50	Socio-economic determinants of housing satisfaction among middle-income households in Owerri, Nigeria - Chinwe Ugochi Okpoechi	Evaluation of cocoa pod ash on the characteristic strength of sandcrete block produced in Oshogbo, Nigeria - Simon O. Olawale Moses Adebawale Ogunbiyi
10:50-11:00	Challenges of public-private partnership (PPP) in urban housing in Nigeria - Paschal C. Onyemaechi	Effects of sugar as admixture in concrete made with different brands of cement in Nigeria - Lawal Aliyu Muhammad, Musa Aminu Alhaji, Tukur Almustapha Lailaba
11:00-11:15	Q&A	Q&A
11:15-11:25	Valuation for compensation purpose: the need for global uniformity - Rosli Said, Anuar Alias, Olusegun Olaopin Olanrele, Nurudeen Akinsola Bello	Lessons learnt from the 2012 flood disaster: implications for building design and construction in high-risk flood prone areas of Bayelsa State, Nigeria - Warebi Gabriel Brisibe

11:25-11:35	Home equity capitalisation: analysis of influencing factors - Stephen Ameyaw, Elvis Attakora-Amaniampong, Frederick Polukuu, Alhassan Tahiru, Victor Azindow Wumboribi	An assessment of building collapse characteristics and suspected causes of collapse in Lagos State and Abuja - Nigeria - Okosun Blessing, Abdulganiyu Oke, R. E. Olagunju
11:35-11:45	Identifying the factors influencing real estate pricing in Kumasi metropolis - Aloysius Sam, Sarfo Mensah	Study of wood as a sustainable material for climate change mitigation using Athena EcoCalculator and System Dynamic Models - Bernard Effah
11:45-12:00	Q&A	Q&A
<b>12:00-13:00</b>	<b>Chairperson: Dr Olusegun Olanrele, Department of Estate Management and Valuation, Moshood Abiola Polytechnic, Nigeria</b>	<b>Chairperson: Dr Moses Ogunbiyi, Osun State University, Nigeria</b>
12:00-12:10	The impact of the Van Stadens wind farm on the surrounding community – a case study - Nicole O'Connor, Christopher Allen	Investigating the quality of rice husk ash produced using locally fabricated incinerator in concrete mix - Dadu, D. W., Stanley, A. M., Ehoche, E. P.
12:10-12:20	Intangible assets valuation in Nigeria: a review of the concept and practice - Abiodun K. Sodiya, Olaseni O. Adetokunboh, Samson E. Agbato	Improving the water resistance of compressed earth blocks enhanced with natural fibres - Humphrey Danso
12:20-12:30	Market fires and risk accumulation in Ghana's built environment - Ebenezer Owusu-Sekyere, Elvis Attakora-Amaniampong, Robert Adjuik Yakubu	Effect of small transverse service holes on flexural strength of reinforced concrete slender beams - Olanitori Lekan Makanju, Tifase Taiwo Oladayo
12:30-12:40	The shared ownership tenure and its applicability to the African affordable housing market - Cynthia Adeokun, Folake Ekundayo	Effect of plasticizers on properties of concrete with pit sand: case study from Akure, Nigeria - Olanitori Lekan Makanju, Otuaga Moses Philips
12:40-13:00	Q&A	Q&A
<b>13:00-13:45</b>	<b>LUNCH BREAK</b>	
<b>13:45-15:45</b>	<b>POSTER PRESENTATION SESSION (AUDITORIUM)</b>  The poster presentation session is an opportunity to showcase some of our interesting research papers and provide an opportunity for our authors to share their research with a combined audience of conference delegates and industry practitioners.  We have designed this session to be as interactive as possible and we will ensure that everyone's work is seen and discussed by those assigned to the papers in each cluster/theme. Members of the audience will be divided into groups. Time will then be allocated for each group to view and discuss the poster presentations in each cluster/theme and also complete a feedback sheet that will be provided to everyone in the audience. The completed feedback sheets will be given to authors.	

## **POSTER PRESENTATION SESSION MODERATORS**

**Dr Cynthia Adeokun, Colman Architects Ltd, UK**

**Dr Obinna Ozumba, School of Construction Economics and Management, Wits University, South Africa**

## **THEMES AND PAPERS**

### **Real estate / housing / facilities management**

- Challenges in the management of hostel accommodation in higher institutions of learning in north-western Nigeria – A. A Yakub, Z.M Zaid
- Factors affecting adoption of computerized maintenance management system among public organisations in Nigeria - AbdulHafeez, Ibrahim, Mustapha, Tasiu
- Alternative dispute resolution techniques in real estate commercial and contractual disputes: the case of Akure, Nigeria - M. B. Ogunleye, U. Y. Ajani

### **Sustainability / environment**

- A critical evaluation of the built environment sustainability tool (BEST) - Jeremy Gibberd
- Review of theories; methodologies and analytical tools applied in sustainable construction research - K. Agbesi, T. Adjei-Kumi, F.D.K Fugar
- A conceptual framework for ethical sourcing of construction materials in Nigeria - Kabir Ibrahim, Winston M. W. Shakantu, Ibrahim Saidu
- Investigation into green attitudes towards shopping malls' design in Minna, Nigeria - R. E. Olagunju, O. K. Akande, J. N. Metu, S. C. Aremu
- Challenges and opportunities of sustainable infrastructure development in developing economies - Sitsabo Dlamini
- Key elements for sustainable infrastructure design in developing countries - Denamo A. Nuramo, Theodore C. Haupt

### **Construction industry organisation and development / procurement**

- An investigation into the efficiency of classification of construction firms in Ghana - Alex K. Eyiah
- A review of public procurement act and its implementation in Ondo State, Nigeria - Abimbola Omotola, Timothy 'Seyi Odeyale, Kayode Fagbemi
- A conceptual model for mediating the effects of conflict of interest in construction procurement tendering processes in Nigeria – Zadawa, A. N., Dahiru, A., Jimoh, A. A. and Muhammed, M. A.

	<p><b>Project Management</b></p> <ul style="list-style-type: none"> <li>• Influence of project management tools and techniques on performance of building construction projects in Lagos State - Olajide Julius Faremi, Barakat Temitope Lawal, Iniobong Beauty John, Kudirat Ibilola Zakariyyah, Aderemi Aderogba</li> <li>• Readiness of Nigerian contractors to adopt Building Information Modeling (BIM) technologies - Abdulfatai Salawu Oyeboode, Idowu Faruq Ayobami</li> <li>• Readiness of Nigerian construction firms to adopt lean construction principles – O. Olamilokun, T. Samuel Fawale</li> <li>• Review of critical success factors for the implementation of total quality management in the construction industry - Ansah S.K., Aigbavboa C.O., Thwala W.</li> <li>• Ascertaining importance of project team performance to construction project success - Godfred Fobiri, Sarfo Mensah, Ayirebi Dansoh</li> <li>• An assessment of cost impacts of building elements on the overall contract sum - Victor Ikechukwu Opara, Emmanuel O. Fatoye, Raymond C. Enenmoh</li> <li>• The prevalence of leadership over management features amongst construction project managers in the UAE Hamad A AlShamisi, Ezekiel Chinyio, David Oloke, Sabah Mushatat, Paul Wilson, Nii Ankrah, Zoya Evans Kpamma</li> <li>• Challenges and remedies of application of cost planning techniques in construction projects in Nigeria – Enenmoh, R. C. and Anosike, N. M.</li> </ul> <p><b>Urban Planning and Governance</b></p> <ul style="list-style-type: none"> <li>• Framework for integration of community squares in urban governance of emerging cities in Nigeria - Agoha, Basil Onyekozuru</li> <li>• Impact of soil erosion on farmers livelihoods in Iwaro Oka Akoko, Ondo State, Nigeria - Olorunlana, Folasade Aderonke</li> <li>• Influence of socio-spatial factors on traditional markets in Kano State, Nigeria - Muhammad Abdulazeez Abba, Joy Joshua Maina, Musa Lawal Sagada</li> </ul> <p><b>Waste Management</b></p> <ul style="list-style-type: none"> <li>• Material waste causes and cost overrun in Abuja, Nigeria: a materials-procurement stage perspective - Ibrahim Saidu, Winston MW Shakantu, Kabir Ibrahim</li> <li>• Predicting the volume of material waste: a case of ongoing building projects in Abuja, Nigeria - Ibrahim Saidu, Winston MW Shakantu</li> </ul> <p><b>Professional Practice</b></p> <ul style="list-style-type: none"> <li>• Challenges facing construction professionals' compliance with Continuing Professional Development (CPD) in South Africa</li> </ul>
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	<p>- Titus Ebenezer Kwofie, Clinton Ohis Aigbovboa, Johannes Siabatho Mpambela</p> <ul style="list-style-type: none"> <li>Contemporary architectural practice in Nigeria: A review of issues and challenges – Abdullahi Abubakar</li> </ul> <p><b>Human Resources / Ergonomics / Construction education</b></p> <ul style="list-style-type: none"> <li>Development of framework for application of ergonomics in building construction in Nigeria - AbdulHafeez, Ibrahim</li> <li>Perceptions of construction management students about their career paths to become construction superintendent - Darrian Robinson, Salman Azhar, Abid Nadeem</li> <li>Informal space-use in formal learning environments: case study of architecture department at Ahmadu Bello University - Joy Joshua Maina</li> </ul> <p><b>Organisational Management</b></p> <ul style="list-style-type: none"> <li>An assessment of organizational culture for total quality management implementation in the Nigerian construction industry - Yetunde Olanike Olaleye, Yahaya Mohammed Ibrahim, Ahmed Doko Ibrahim, Kolomri Jaule Adogbo</li> <li>Succession planning and continuity of family-owned business: perception of owners in the Wa municipality, Ghana - Rhoda Saan, Remy Faadiwie Nyewie</li> <li>An assessment of organisational culture of construction organisations in Nigeria - Yetunde Olanike Olaleye, Yahaya Mohammed Ibrahim, Ahmed Doko Ibrahim, Kolomri Jaule Adogbo</li> </ul>
<b>15:45-16:00</b>	<b>BREAK</b>
16:00 – 16:10	Brief remarks by a representative from McOttley Capital
<b>16:10-17:00</b>	<p><b>KEYNOTE SESSION (AUDITORIUM)</b></p> <p><b>Professor Will Hughes, Professor of Construction Management and Economics, University of Reading, UK</b></p> <p><b>TOPIC: PRACTICAL APPROACHES TO REVIEWING RESEARCH PAPERS FOR YOUR RESEARCH</b></p> <p><b>Chairperson: Dr Gabriel Nani, Department of Building Technology, KNUST, Kumasi, Ghana</b></p>
<b>17:00</b>	<b>CLOSE</b>
<b>17:00 – 18:30</b>	<b>COCKTAIL AND SOCIALISATION</b>

## FRIDAY 18<sup>TH</sup> AUGUST 2017 (DAY 3)

08:30-08:40	VIDEO HIGHLIGHTS OF DAY 2 (AUDITORIUM)	
08:45-12:30 (Refreshments break is at 10:30 – 10:50)	<p><b>ACADEMIC WRITING AND PUBLICATON WORKSHOP (AUDITORIUM)</b></p> <p>The purpose of this workshop is to provide opportunity for experienced academics to provide international guidance on current developments in the academic publication space and how to prepare and get manuscripts successfully published in good journals and research publication outlets</p> <p><b>Topics</b></p> <ul style="list-style-type: none"> <li>• Overview of current international developments in academic research and publication practices</li> <li>• What can we learn from the best research papers in elite journals?</li> <li>• Key elements of a good academic writing style</li> <li>• Becoming an established researcher and internationally cited author</li> </ul> <p><b>Speakers</b></p> <p><b>Prof Jason Shaw, Editor-in-chief of Academy of Management Journal</b></p> <p><b>Prof Will Hughes, University of Reading, UK</b></p>	<p><b>WORKSHOP FOR RESEARCH SUPERVISORS (Supervisors of Bachelors, Masters and PhD research projects) (SEMINAR ROOM)</b></p> <p>The purpose of this workshop is to provide opportunity for experienced international academics to share their knowledge and experience from Supervising students with colleagues who are also involved in the supervision of bachelors, masters and doctoral students. The primary goal is capacity building and knowledge sharing on effective supervision practice</p> <p><b>Topics</b></p> <ul style="list-style-type: none"> <li>• Key issues pertaining to getting students started and developing the art of listening</li> <li>• Guiding students on issues pertaining to conceptualisation and application of theory</li> <li>• Guiding research design and execution</li> </ul> <p><b>Speakers</b></p> <p><b>Prof Will Hughes, University of Reading, UK</b></p> <p><b>Prof Jason Shaw, Editor-in-chief of Academy of Management Journal</b></p>
12:30-13:20	LUNCH BREAK	
13:30-15:30	<p><b>PARALLEL SESSION (AUDITORIUM)</b></p> <p><b>Theme: Construction economics / Cost and financial management</b></p> <p><b>Chairperson: Prof Kwabena Anaman, Institute of Statistical, Social and Economic Research (ISSER), University of Ghana, Ghana</b></p>	<p><b>PARALLEL SESSION (SEMINAR ROOM)</b></p> <p><b>Theme: Procurement / risk / contract management</b></p> <p><b>Chairperson: Prof John Smallwood, Department of Construction Management, Nelson Mandela Metropolitan University, South Africa</b></p>

13:30-13:40	The relationship between construction sector and economic growth in Nigeria: 1981-2013 - Moses A. Ogunbiyi, Simon O. Olawale, Rasheed Oyaromade	Risk management framework for Build Operate and Transfer (BOT) infrastructure projects in Nigeria - Baba Shehu Waziri, Yusuf Isa
13:40-13:50	A conceptual framework for promoting economic growth in crude oil dependent economies - a model for Nigeria - Nuruddeen Usman, Ahmadu S. Bustani, Nuru Gambo, Gambo Ibrahim	Unethical professional practices in tendering of public building procurement in Bauchi Metropolis, Nigeria - Ibrahim Ibrahim Inuwa, S.M. Maleka, S.U. Kunya
13:50-14:00	Comparison between construction projects cost overrun in public and private sectors of Lagos State, Nigeria - Emmanuel O. Fatoye, Nwabueze M. Anosike	Using Analytic Hierarchy Process (AHP) to assess effectiveness of competitive tendering process - Dr Sazoulang Douh
14:00-14:10	IFC schema extensions for construction cash flow management: a proposed methodology - M. Abdullahi, Y.M Ibrahim, A.D. Ibrahim, P.G. Chindo	A study of the factors causing delay of rural roads and bridge construction projects in Ghana - Theophilus Adjei-Kumi, Gabriel Nani, Isaac Mensah
14:10-14:25	Q&A	Q&A
14:25-15:20	<b>Theme: Quality management / Health and Safety</b> <b>Chairperson: Mr Christopher Allen, Nelson Mandela Metropolitan University, South Africa</b>	<b>Theme: Procurement / risk / contract management</b> <b>Chairperson: Associate Professor Salman Azhar, College of Architecture, Design and Construction, Auburn University, USA</b>
14:25-14:35	Quality culture orientation of construction firms as driver of project performance in Nigeria - Godwin Iroakpo Idoro, Olutayo Ajibola Akinkumi	Comparative study of causes of Variations in Public Building Projects in Tanzania and Uganda - Yusuph Mhando, Ramadhan Mlinga, Henry Alinaitwe
14:35-14:45	Assessment of fire safety provisions in selected public buildings in Minna, Nigeria - Shittu, Abdullateef Adewale; Okechukwu, Blessing Ijeoma; Tsado, Abel John; Shehu, Muhammad Aminu	Methods of duration estimation at the rural road agency in Ghana - Theophilus Adjei-Kumi, Gabriel Nani, Isaac Mensah
14:45-14:55	The significance of health and safety of construction industry personnel in Lagos State (CCECC case study) - Adesanya Adekunbi, Amusu O.R.O., Salvador K. A.	"Evaluating delays in execution of public sector construction projects: a study of roads and highways in Ghana - Natasha Narh, Corrine Shaw, Abimbola Windapo
14:55-15:05	Construction Health And Safety Agents' (CHSAS') contribution to health and safety in South Africa - John Smallwood, Claire Deacon	Expatriate and indigenous consultants' involvement in construction project delivery in Nigeria - Godwin Iroakpo Idoro, Emmanuel Olutide Bamidele
15:05-15:20	Q&A	Q&A
15:20-15:45	<b>REFRESHMENTS AND NETWORKING BREAK</b>	

<b>15:45-16:30</b>	<p><b>PANEL DISCUSSION AND CONCLUDING THOUGHTS OF KEYNOTE SPEAKERS (AUDITORIUM)</b></p> <p><b>Theme: Striving for methodological rigour, theoretical consistency and industry impact in our research</b></p> <p><b>Panel: Professor Will Hughes &amp; Professor Oluwole Morenikeji</b></p> <p>(Main points of speakers will be summarized and highlighted as part of the conference outcomes)</p> <p>Chairperson: Sam Laryea</p>
<b>16:30-17:00</b>	<p><b>CLOSING SESSION (AUDITORIUM)</b></p> <p>Conference Summary – 5 minutes</p> <p>Presentation of certificates and prizes – Sam Laryea (20 minutes)</p> <p>Vote of thanks –5 minutes</p>
<b>17:00</b>	<b>CLOSE</b>



# PROGRAMME

## ACADEMIC WRITING AND PUBLICATION WORKSHOP

Date: 18<sup>th</sup> August || Venue: Auditorium || Time: 08:45am – 12:30pm

The purpose of this workshop is to provide opportunity for experienced academics to provide international guidance on current developments in the academic publication space and how to prepare and get manuscripts successfully published in good journals and research publication outlets.

### PROGRAMME

Time	Topic	Speaker(s)
08:45 – 09:00	Overview of current international developments in academic research and publication practices	Prof Jason D. Shaw
09:00 – 10:30	What can we learn from the best research papers in elite journals?	Prof Jason D. Shaw
10:30 – 10:50	REFRESHMENTS BREAK	
10:50 – 11:45	Key elements of a good academic writing style	Prof Will Hughes
11:45 – 12:00	Becoming an established researcher and internationally cited author	Prof Will Hughes
12:00 – 12:30	General Q&A on matters covered	Prof Will Hughes & Prof Jason D. Shaw
12:30 – 13:20	LUNCH	

### ABOUT THE SPEAKERS

**Professor Jason D. Shaw**, Editor-in-chief of the Academy of Management Journal (AMJ) || Chair Professor and Head of Department of Management and Marketing || Director, Centre for Leadership and Innovation at The Hong Kong Polytechnic University

**Professor Will Hughes**, Professor of Construction Management and Economics, University of Reading, UK & Former Editor-in-chief of Construction Management and Economics journal

The speakers will provide participants with certain keys that that you can use to “open the door” to success and increase your effectiveness in the area of academic writing and publication



## PROGRAMME

### WORKSHOP FOR RESEARCH SUPERVISORS

Date: 18th August || Venue: Seminar Room || Time: 08:45am – 12:30pm

This workshop provides an opportunity for experienced international academics to share their knowledge and experience from Supervising students with colleagues who are also involved in the supervision of bachelors, masters and doctoral students. The primary goal is capacity building and knowledge sharing on effective supervision practice.

#### PROGRAMME

Time	Topic	Speaker(s)
08:45 – 09:30	Key issues pertaining to getting students started and developing the art of listening	Prof Will Hughes
09:30 – 10:30	Guiding students on issues pertaining to conceptualisation and application of theory	Prof Will Hughes
10:30 – 10:50	REFRESHMENTS BREAK	
10:50 – 12:00	Guiding research design and execution	Prof Jason D. Shaw
12:00 – 12:30	General Q&A on matters covered	Prof Jason D. Shaw & Prof Will Hughes
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## **SECTION 1: KEYNOTES**





# **CURRENT DEVELOPMENTS IN THE WEST AFRICAN HIGHER EDUCATION SECTOR AND WHAT IT MEANS FOR US AS RESEARCHERS**

**Professor Oluwole Morenikeji<sup>1</sup>**

*Commonwealth Fellow*

*Professor of Urban and Regional Planning*

*Deputy Vice Chancellor (Academic), Federal University of Technology, Minna, Nigeria*

This keynote address will be delivered during the opening session of the conference. The purpose is to provide delegates with some high level insights into current developments in the higher education sector in West Africa and the adaptation researchers must embrace in order to stay relevant and succeed in a dynamic and changing higher education environment. Ongoing changes and future directions in the higher education sector requires an informed, innovative and appropriate response from researchers. Appropriate ways of responding positively to current and future directions in the higher education environment will be highlighted by Professor Morenikeji.

Keywords: higher education

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<sup>1</sup> wolekeji@yahoo.com

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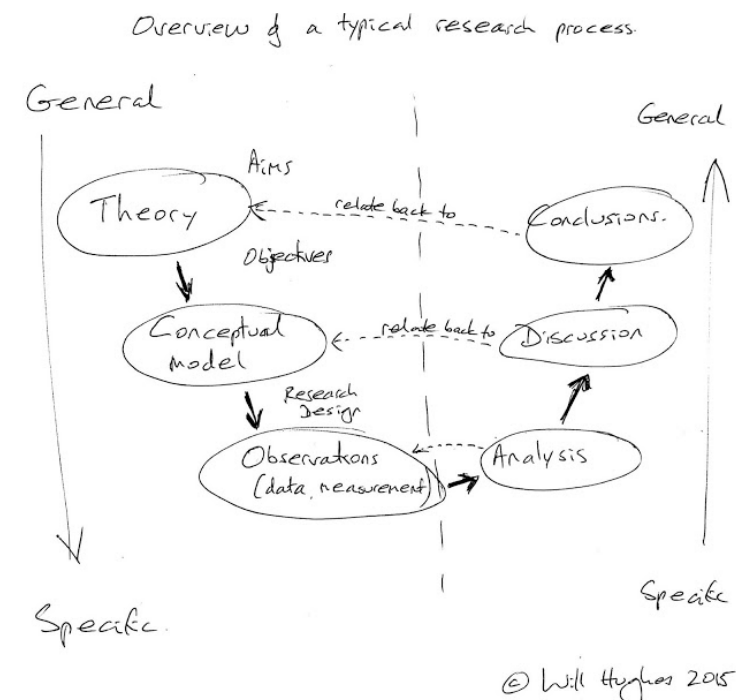
# CONCEPTUALISING A RESEARCH PROJECT

**Professor Will Hughes<sup>1</sup>**

*Professor of Construction Management and Economics*

*School of Construction Management and Engineering, University of Reading, UK*

This keynote address will provide guidance on conceptualising research projects. Without conceptualising a research project properly, it would be hard to ground it appropriately in theory and make a contribution. The keynote address is organised around the pen-sketch graphic below which can be seen at [will-hughes.blogspot.com](http://will-hughes.blogspot.com)



The diagram shows how the conclusions of a research project relate back to the theory, how the discussion chapter relates to the conceptual model and how the analysis relates to the observation. It also shows how the aims inform the theory, the theory informs the objectives, the objectives drive the literature review to provide the conceptual model, the conceptual model leads to the research design and so on. Finally we can also see how the general issues lead to increasingly specific issues in the first half, and the second half involves moving back to generalized statements for the conclusions.

Keywords: conceptualising research projects

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# DOING AND PUBLISHING HIGH QUALITY RESEARCH - A LOOK AT ISSUES PERTAINING TO THEORY, RESEARCH DESIGN, GROUNDING HYPOTHESES/RESEARCH QUESTIONS

**Professor Jason D. Shaw<sup>1</sup>**

*Editor-in-Chief, Academy of Management Journal*

*Yeung Kin Man Professor of Business Administration*

*Chair Professor and Head of Department*

*Director, Centre for Leadership and Innovation*

*Department of Management and Marketing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong*

Every academic practitioner should aspire to publish high impact research papers that will be cited by peers in their field all over the world. That is one measure of academic leadership. To be able to do this successfully, it is important to use theory appropriately, craft appropriate research designs, and ground research questions in appropriate theoretical frameworks. The Academy of Management Journal has long been a focal point for rigorous and high impact research. Professor Jason Shaw who is the current Editor-in-chief will talk delegates through key issues that need to be addressed in the foundational stages of scientific research, and how to address them, in order to produce high quality research papers that will generate international recognition and impact. We will also be able to apply some of the guidance when supervising our own research students.

Keywords: theory, research design, research question

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# DOING AND PUBLISHING HIGH QUALITY RESEARCH - A LOOK AT ISSUES PERTAINING TO CRAFTING THE METHODS AND RESULTS, DISCUSSING THE IMPLICATIONS, MAKING A CONTRIBUTION

**Professor Jason D. Shaw<sup>1</sup>**

*Editor-in-Chief, Academy of Management Journal*

*Yeung Kin Man Professor of Business Administration*

*Chair Professor and Head of Department*

*Director, Centre for Leadership and Innovation*

*Department of Management and Marketing, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong*

This second session by Professor Jason Shaw builds upon the first session on dealing effectively with the foundational stages of high quality research. In this second session, Professor Jason Shaw will proceed and speak on other issues pertaining to the appropriate use of research methods, generating meaningful research results, and being able to discuss the theoretical and practical implications. Making a useful contribution to the existing literature and getting published in strong journals requires competence and know-how for dealing with all of the six areas addressed by Professor Shaw. The keynote sessions will essentially provide some of the keys required to open the doors to success.

Keywords: crafting research methods, crafting research results, discussing research results, making a research contribution

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# PRACTICAL APPROACHES TO REVIEWING RESEARCH PAPERS FOR YOUR RESEARCH

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In this keynote session, Professor Will Hughes will take delegates through a few papers and show some practical ways to review and make critical evaluations of published papers. The most essential prerequisite for a successful piece of academic research is the establishment of what is already known about the topic. While it is important to be able to produce a critical review of a research paper, it is just as important to be able to string together all the bits of information from the individual readings into a coherent critique of what previous research has shown, and where we are up to, collectively, in our understanding of the issues.

Keywords: literature review, reviewing research papers.

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## **SECTION 2: CONFERENCE PAPERS**



# **‘CHOOSING BY ADVANTAGES’ TO SELECT CONCRETE TASKS: A PROJECT TEAM’S PERCEPTION**

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In most cases, the project team’s decision-making outcomes are criticized for failing to meet client needs when working with concrete task. The purpose of this study was to examine how Choosing by Advantages (CBA) would affect the choice of concrete alternatives for civil engineering and building projects. Case study research design was used in this study and three case projects were identified to discover the project team’s decision-making process when choosing concrete type in civil engineering and building projects. The research question is, *‘how can the project teams use CBA decision-making mechanism to choose a concrete task?’* The project teams are the key driver of CBA mechanism when choosing concrete type from two alternatives: ready mixed concrete and site batched concrete. The results showed that ready-mixed concrete has less probabilities of causing concrete defects and rework when used or applied per the correct specifications or methods which are detailed in the structural or engineering drawing. CBA mechanism could be introduced and applied by the project teams during the initial stage of the construction project. The study proposes that the project teams should try CBA to improve their decision-making process on site when working with concrete. The CBA Frame Model would help the project teams to make sound decision when choosing alternatives.

**Keywords:** choosing by advantages concrete, decision-making, performance, project teams

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# A CONCEPTUAL FRAMEWORK FOR ETHICAL SOURCING OF CONSTRUCTION MATERIALS IN NIGERIA

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The construction industry has been noted to have impacts on the ecosystem and human survival. On the positive side, it has provided humans with basic infrastructure not limited to buildings, dams and roads. However, there are negative impacts of human activities on the environment such as pollution, waste generation, resources depletion, global warming and climate change. In addition to these, is the high rate of energy consumption resulting in the loss of biodiversity. This has increased the interest over the way countries achieve their development targets with respect to sustainable development. On the review of peer group studies, there is a dearth of literature relating to ethical sourcing of materials in the construction industry particularly in developing countries. The question is therefore how can an ethical sourcing framework be used to source construction materials in a sustainable manner? As such, the research studied materials sourcing in the Nigerian construction industry with a view to improve sustainability practise. The paper discussed the conceptual framework for ethical sourcing of construction materials. The conceptual framework is expected to improve sustainability practices in the Nigerian construction industry.

**Keywords:** corporate social responsibility, ecological footprint, ethical sourcing, sustainability reporting

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Ibrahim, K., Shakantu, W. M. W. and Saidu, I. (2017) A conceptual framework for ethical sourcing of construction materials in Nigeria *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 25-37.*

# A CONCEPTUAL FRAMEWORK FOR PROMOTING ECONOMIC GROWTH IN CRUDE OIL DEPENDENT ECONOMIES - A MODEL FOR NIGERIA

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Many countries are currently faced with adverse economic challenges. The situation is more pronounced on economies that solely depend on crude oil. However, among the countries, those that adopt flexible managerial policies cope better under these dwindling economic conditions. The study aims at developing a conceptual framework that can depict how economic challenges of crude oil dependent economies (*CODE*) can be improved through deliberate intervening and moderating measures. The method adopted was based on Baron and Kenny causal steps approach. It was observed that *CODE* countries employed different strategic policies in overcoming current economic challenges especially when prices of crude oil collapse in the global market. The proposed framework was developed based on Big Push theory and Causal theory, in conjunction with the concept of Baron and Kenny. The framework takes into account the different strategic policies used by these countries and considered how diversification and innovativeness (mediating measures) can promote better economic growth alongside effective and efficient managerial system (moderating measures) which ultimately can lead to more efficient resource management hence, a growing sustainable economy especially in a country like Nigeria where there are other abundant resources that can support the economy.

**Keywords:** Conceptual Framework, economy, intervening measures, moderating measures

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Usman, N, Bustani, A. S., Gambo, N. and Ibrahim, G. (2017) A conceptual framework for promoting economic growth in crude oil dependent economies - a model for Nigeria *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 38-48.*



# A CONCEPTUAL MODEL FOR MEDIATING THE EFFECTS OF CONFLICT OF INTEREST IN CONSTRUCTION PROCUREMENT TENDERING PROCESSES IN NIGERIA

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Conflict of interest among construction procurement stakeholders and project parties has been identified as one of the core factors affecting compliance with procurement guidelines in Nigeria. Tendering and bid evaluation stages of construction project development are the stages most vulnerable to conflict of interest, mainly due to non-compliance with procurement guidelines. This paper proposes a conceptual model intended for mediating the effects of conflict of interest factors affecting tendering and bidding processes of construction procurement practices in Nigeria. Existing literature has pointed at conflict of interest factors as some of the major causes of non-compliance with the procurement guidelines which subsequently provide room for conflict of interest occurrences. Yet, the mediating influence of procurement guidelines enforcement on conflict of interest affecting tendering process has not been well investigated. The model was developed in accordance with the concept of mediation analysis, it was framed based on an extensive review on conflict of interest factors, tendering and bidding processes, and enforcement of procurement guidelines as the major construct in the model. The model can be applied to mediate the effects of conflict of interest affecting tendering processes of construction procurement through Causal step approach and Sobel test mediation methods with an empirical data. The study serves as a foundation for future empirical research in order to test and validate the model. Also, it serves as an analytical instrument to procurement entities seeking for ways of controlling conflict of interest in tendering aspects of construction project development.

**Keywords:** conflict of interest factors, mediation model, tendering process, Nigeria

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Zadawa, A. N., Dahiru, A., Jimoh, A. A. and Muhammed, M. A. (2017) A conceptual model for mediating the effects of conflict of interest in construction procurement tendering processes in Nigeria In: Laryea, S. and Ibem, E. (Eds) *Procs West Africa Built Environment Research (WABER) Conference*, 16-18 August 2017, Accra, Ghana, 49-61.

# A CRITICAL EVALUATION OF THE BUILT ENVIRONMENT SUSTAINABILITY TOOL (BEST)

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There is increasing consensus that the configuration and characteristics of neighbourhoods will be a key factor in achieving more sustainable cities. Environments and facilities within neighbourhood can be used to promote more sustainable living and working patterns. For instance, pleasant walking and cycling paths encourage increased walking and cycling. Similarly, well-located waste sorting and storage provision makes it easier to recycle. It is therefore important to understand this type of 'supportive' environment and facilities within neighbourhoods. As many neighbourhoods already exist, it is also important to assess existing situations and envisage how these can be transformed to become more sustainable. This objective is addressed by the Built Environment Sustainability Tool, or BEST. The tool provides a framework for assessing existing neighbourhoods in terms of sustainability. It also can be used to address assessments of existing situations by identifying, and testing, proposals which could be used to improve local sustainability performance. Once an optimum set of proposals have been identified through this process, local sustainability plans can be developed which sequence, and integrate, interventions to improve sustainability performance in a structured way, over time. This paper reviews the BEST and critically evaluates this as a means of assessing and improving the sustainability performance of neighbourhoods. It includes a critique of the criteria used to measure sustainability performance and the process by which the tool is applied. The paper concludes the tool can play a valuable role in supporting sustainability improvement as it enables a responsive, long term approach to be developed that is based on partnerships and community action, which is lacking in existing approaches. The paper also identifies number of areas within the tool that could be improved and makes a number of recommendations in this regard.

Keywords: Africa, assessment, BEST, Built Environment Sustainability Tool, neighbourhoods, sustainability

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# A CRITICAL EVALUATION OF THE SUSTAINABLE BUILDING ASSESSMENT TOOL (SBAT)

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Very rapid urban growth rates have meant that now 40 % of the Africa's population live in cities. A large proportion of this growth has been in informal settlements which accommodate over 60% of the urban population Sub Saharan African cities. Continued growth and climate change has meant that it is becoming increasingly important to address these informal settlements and develop improved housing. The Sustainable Building Assessment Tool (SBAT) for housing has been developed for this context. The tool has a focus on developing countries and provides a way of assessing sustainability performance. The paper reviews the SBAT to understand the theoretical basis for the approach. An application of the tool in a housing case study is also evaluated to determine the value of the tool as a means of measuring the sustainability performance of buildings. The review finds that the SBAT provides useful sustainability guidance for built environment projects is more responsive to developing country issues than conventional green building rating tools such as BREEAM and LEED. It also finds that it may possible to strengthen the tool and makes a number of recommendations in this respect.

Keywords: Africa, assessment, SBAT, Sustainable Building Assessment Tool, sustainability housing

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# A REVIEW OF PUBLIC PROCUREMENT ACT AND ITS IMPLEMENTATION IN ONDO STATE, NIGERIA

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In most developing countries across Africa, the adoption of good governance practices has taken considerable long time to take root, even though good governance mechanism promises enhanced rapidity of economic growth and sustainable development. This seems to be the experience of Nigeria and her federating states in the case of the public procurement reform agenda. While the Federal government of Nigeria has tried to adopt a public procurement regime to achieve the goal of good governance, most of the 36 federating states seem uninterested. The study is an expository analysis on the problems of adopting public procurement processes by federating states in Nigeria using Ondo State as case study. This study also traces the evolution of Nigeria’s public procurement systems from the pre-existent traditional till the Public Procurement act 2007 and charting the way forward for domestication by the federating units (States). The study used a methodology based on case study analysis, it focuses on the problems of adopting public procurement processes by federating states in Nigeria. It employed both primary and secondary sources of data. The primary data were sourced through informal random opinion survey targeted mostly at the stakeholders, using the opportunity of the Tenders Days in selected Government MDAs. The secondary data were primarily government publications, Treasury Circulars, Daily Newspapers, Public Procurement Act and Manual. Finding from the study revealed that some federating states have out-rightly refused to adopt public procurement regime as a good governance mechanism due to lack of political will, negligence and corruption which are bane towards the full adoption of best practice and sustainable development. It concludes by encouraging a competitive environment for public procurement and ensuring maximal autonomy of the procurement process regulators.

**Keywords:** built environment, good governance,, public procurement, sustainable development goals, tendering, transparency,

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Omotola, A., Oyedale, T. and Fagbemi, K. (2017) A review of public procurement act and its implementation in Ondo State, Nigeria In: Laryea, S. and Ibem, E. (Eds) *Procs West Africa Built Environment Research (WABER) Conference*, 16-18 August 2017, Accra, Ghana, 90-105.

# A ROAD TRAFFIC SAFETY MANAGEMENT ROADMAP FOR THE MANAGEMENT OF THE ZION CHRISTIAN CHURCH EASTER WEEKEND PILGRIMAGE

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The Zion Christian Church (ZCC) hosts one of the biggest mass gatherings (MG) on the African continent and pilgrims travel from all the corners of the country as well as neighbouring countries mainly by cars, buses and mini buses to Zion City Moria for spiritual fulfilment. The rationale for the study is to highlight that South Africa policy makers need to review their vehicle centric approach to transport planning with the view to promoting a sustainable transport system during the ZCC Easter Weekend pilgrimage. A single-question questionnaire consisting of 21 sub-questions with one open ended question was administered to (35) ZCC members who are studying at the following South African universities in the Gauteng Province: The University of South Africa (UNISA); University of Pretoria; Tshwane University of Technology; University of Johannesburg, and the University of the Witwatersrand. The members have travelled to Limpopo on the N1 freeway from Johannesburg, and the R101 feeder road from Pretoria to Zion City Moria. The researcher went to the libraries of these universities and identified the ZCC members by star pointed insignia. The aim as well as the objectives of the study were discussed with all the respondents. Twenty-five (25) responses were received from the respondents. The questionnaire consisted of two sections. The first section aimed to establish if respondents have personally experienced travelling towards the Limpopo Province during the Easter period and what their experiences had been. The study showed that traffic congestion is the major issue during the ZCC Easter pilgrimage and that alternative ways should be explored to deal with the high volume of traffic during the pilgrimage. For example, 88% of respondents strongly agreed that a train as a supplementary mode of transport with the view to reducing road accidents and traffic congestion during the pilgrimage. The study recommended that there should be a paradigm shift in transport planning from a vehicle centric approach to an integrated or intermodal approach. The state of safety during the Easter Weekend is mainly measured by road fatalities and other factors are not considered. It is highly recommended that injuries should also be measured as well as the travel time index, percentage lane kilometres under traffic monitoring, and the buffer index. The general conclusion of the study was that the ZCC Easter pilgrimage is a very big event and vehicular traffic is not enough to manage the pilgrimage; other modes of transport should be introduced to bring about the synergy.

Keywords: mass gathering, public health, transport planning

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Mathebula, A. M. and Smallwood, J. (2017) A road traffic safety management roadmap for the management of the Zion Christian Church Easter weekend pilgrimage *In: Laryea, S. and Ibem, E. (Eds) Procs West Africa Built Environment Research (WABER) Conference*, 16-18 August 2017, Accra, Ghana, 106-120.

# A STUDY OF THE FACTORS CAUSING DELAY OF RURAL ROADS AND BRIDGE CONSTRUCTION PROJECTS IN GHANA

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Time overrun is a major problem to the rural road agency in Ghana as it leads to increased costs and in some cases abandonment of projects. The purpose of this study is to ascertain the factors causing delay or time overrun of rural roads and bridge construction projects in Ghana. A self-administered questionnaire was sent to 29 civil engineers and 37 quantity surveyors at the Department of Feeder Roads (DFR) to indicate their views on factors identified from literature and experience of the authors on a five point likert scale. The data was analyzed using the relative importance index and the principal component analysis. The results show that payment difficulties by the road agencies, type of funding, approval of variation order from road agency, errors in design, shortage of materials and equipment availability are the six main causes of delay on rural road and bridge construction projects in Ghana. In addition to the above factors, the principal component analysis also indicated that location of project is also a significant factor. Recommendations were then made to reduce or eliminate the impact these factors would have on the success of projects.

Keywords: bridges, delay, Ghana, relative important index, rural roads.

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Mensah, I, Nani G. and Adjei-Kumi, T. (2017) A study of the factors causing delay of rural roads and bridge construction projects in Ghana In: Laryea, S. and Ibem, E. (Eds) *Procs West Africa Built Environment Research (WABER) Conference*, 16-18 August 2017, Accra, Ghana, 121-139.

# ACCESS TO LAND AS A CONSTRAINT TO HOMEOWNERSHIP IN KADUNA STATE, NIGERIA

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Access to land is fundamental to homeownership. It is especially relevant to households in housing markets in which households build rather than buy their homes. The study evaluated the role of access to urban land as a constraint to homeownership in Kaduna State, Nigeria. The objective was to determine the ways access to land poses constraint to homeownership such that households who desire homeownership are constricted from accessing it. The research design was a mixed method design, the explorative sequential method. It involved interviews and cross-sectional survey in which the outcomes of the interviews were used to design the survey instrument. The survey questionnaire structured on 5-point Likert model was administered on 450 urban households in the state. Data analysis employed descriptive statistics and one-sample t test. The results showed that access to land measured by affordability and ease of transaction poses constraint to homeownership. High cost of land is the most important constraining factor. Purchase from private landowners is the most common method of land acquisition. The study concluded that difficulties in access to land constitute an important contributor to delays in accessing homeownership by urban households. Further, access to land poses constraints to homeownership but its impact differs between markets. Accordingly, to improve urban homeownership, government should invest in providing serviced land in form of site and services to households at subsidised prices. Measures to improve access to urban land for homeownership should have regard to the peculiarities of particular land and housing markets.

**Keywords:** access to land, homeownership, housing markets, land markets, urban housing problems

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# ALTERNATIVE DISPUTE RESOLUTION TECHNIQUES IN REAL ESTATE COMMERCIAL AND CONTRACTUAL DISPUTES: THE CASE OF AKURE, NIGERIA

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It is inevitable that disputes arise in real estate matters considering the nature and complexities of real estate matters involving various parties, entities and often involving large sums of money. The aim of this study is to examine alternative dispute resolution (ADR) techniques in real estate commercial and contractual disputes with a view to identifying the causes of real estate disputes and the ADR techniques mostly used in resolving such dispute. The sampled populations for the study were the practicing Estate Surveying & Valuation Firms and the occupants of residential properties in Akure, Nigeria. Data was collected through administration of structured questionnaires and analysed using descriptive statistical tools and factor analysis. The research revealed that the major causes of real estate disputes are evictions by land owner; multiple sales/allocations of land; illegal/improper uses of land; disputes over the payment for using/buying land; violent land acquisitions, clashes and wars over land; leasing, subleasing and sales as opined by the respondents. The research also revealed that the most widely used methods of dispute resolution by the respondents are negotiation, conciliation and arbitration. The research concluded that adoption of ADR in the resolution of real estate cases would reduce the complexity of court litigation; reduce costs and ensure timely resolution of conflicts with all parties been satisfied based on the verdict.

**Keywords:** alternative dispute resolution, real estate cases, mediation

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# AN ASSESSMENT OF BUILDING COLLAPSE CHARACTERISTICS AND SUSPECTED CAUSES OF COLLAPSE IN LAGOS STATE AND ABUJA - NIGERIA

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The spate of building collapse in Nigeria has continually been on the increase over the years. This study assessed collapsed building characteristics (such as location, usage, number of floors, and number of casualties/fatalities) and suspected causes of building collapse in Lagos State and Abuja. Charts and percentages were employed as descriptive analysis while Spearman correlation was used to determine the relationship between variables. A sample of 55 cases of building collapse was drawn from the study area. The study found out that residential and commercial buildings were more prone to collapse, the numbers of collapsed buildings have been on the increase, and that structural failure was a major cause of building collapse. It was concluded that suspected causes of building collapse have a significant impact on characteristics of collapsed buildings. It was recommended that advanced laboratory facilities should be made available to conduct autopsies on collapsed buildings which would reveal the minute details of the collapse.

**Keywords:** buildings, characteristics, collapse, structural failure, suspected causes

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# AN ASSESSMENT OF COST IMPACTS OF BUILDING ELEMENTS ON THE OVERALL CONTRACT SUM

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Cost is an important player in measuring the successes of any construction project and building elements form part of this cost. Ignorance of the cost implication of these elements can lead to project not fulfilling its goals. The aim of this research is to determine the cost impacts of building elements on the overall contract sum with a view to establishing the likely percentage of cost escalation of the elements of future proposed projects. The objectives are to identify the factors affecting cost of building elements on the overall contract sum and to determine the impacts of cost of such building elements on the overall contract sum. Data were collected from both secondary and primary sources. The primary data were from structured interviews administered on Consultant Quantity Surveyors while the secondary data were from archival information retrieved from past successfully executed building projects like residential buildings, students' residential hostels, warehouses, and high-rise office complex. The data collected were analysed using statistical tools. The study revealed that fluctuation tops the list of factors affecting cost of building elements. About 99.6% of the difference between initial and the final contract sum was due to the variations in the cost of the building elements while the remaining 0.4% could be explained by other unseen or unknown variables. The building element that has the highest impact on final cost of construction project was Services with an average of 16.74% increase. The findings of this study will be beneficial to construction cost management stakeholders in predicting overall cost of future construction projects with little or no cost escalation. It is recommended that Initial Contract Sum of construction projects should be estimated based on the model provided in this study.

Keywords: building, building elements, contract sum, cost, projects

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# AN ASSESSMENT OF ORGANISATIONAL CULTURE OF CONSTRUCTION ORGANISATIONS IN NIGERIA

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Understanding of Organisational Culture is fundamental to understanding what goes on in organisations, how to run and improve them. What differentiates successful organisations from others is their organisational culture. This study is aimed at diagnosing the cultural profile of construction organisations in Nigeria. This was carried out using the competing values framework developed by Cameron and Quinn to establish which of the four major culture types (Clan, Adhocracy, Hierarchical or Marketing cultures) is dominant in the Nigerian Construction Industry. Data was collected from contracting organisations registered with the Corporate affairs Commission of Nigeria using a structured questionnaire developed and administered by the researchers. A total number of 200 firms were selected for the study, 97 of them participated. Data collected was analysed using descriptive statistics. The findings of the study revealed that the dominant culture of construction organisations is the hierarchical culture with a mean of 4.01. Organisational leadership is the major characteristics being exhibited by construction organisations. The findings further revealed that is no significant difference in the organisational culture of large and medium construction firms. To be effective, the adoption of some elements of the culture types is necessary, however, the dominant culture has an extensive impact on the character, behaviour and is likely to be a determinant of the success of improvement programs.

**Keywords:** adhocracy, clan, hierarchical, marketing, organisational culture

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# AN ASSESSMENT OF ORGANIZATIONAL CULTURE FOR TOTAL QUALITY MANAGEMENT IMPLEMENTATION IN THE NIGERIAN CONSTRUCTION INDUSTRY

**Yetunde Olanike Olaleye<sup>1</sup>, Yahaya Makarfi Ibrahim<sup>2</sup>, Ahmed Doko Ibrahim<sup>3</sup> and Kulomri Jipato Adogbo<sup>4</sup>**

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Quality and quality systems are topics which have been receiving increasing attention worldwide. Quality management is critically required for a construction company to sustain in current construction market which is highly challenging and competitive. Construction in Nigeria is characterized by lack of adherence to standard and lack of implementation of Quality management practices. The research is aimed at examining the relationship between organisational culture and Total Quality Management., and establishing the culture type(s) that could be strengthened to support TQM practices. The research was carried out by administering structured questionnaires to managers of construction organisations in the Federal Capital territory of Nigeria. A total number of 200 questionnaires were administer and 97 returned giving a response rate of 49%. The research was analysed using descriptive statistics using Pearson correlation coefficient to establish the relationship between organisational culture types and TQM and also by using multiple linear regression to investigate the culture type that could be strengthened to support TQM. The findings of the study revealed that the clan and marketing culture has the strongest relationship with TQM and also has a positive direct effect on TQM. Strengthen the clan culture in organisations will aid TQM implementation. The study recommends that any efforts that can be made to increase the presence of Clan culture and marketing culture prior to commencing the formal implementation of TQM would be highly beneficial

**Keywords:** organisational culture, quality, total quality management

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# AN EVALUATION OF INDOOR THERMAL CONDITIONS OF RESIDENTIAL BUILDINGS WITH DIFFERENT FABRIC FINISHES AT OKIGWE, NIGERIA

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Building forms and materials differ in type and quantity with climates, cultures and traditions. In the search for ways to reduce internal heat gain and moisture content in residential buildings, this paper investigated indoor air temperature and relative humidity values of residential buildings at Okigwe, Nigeria, with the aim of determining differences between indoor thermal conditions of residential buildings with different fabric finishes. Observations and field measurement research design methods were adopted. Data were obtained through primary and secondary sources. Primary data were from observations of physical characteristics of the buildings selected through stratified sampling: 'plastered painted' and 'not plastered not painted' strata and field measurement through hourly and simultaneous monitoring of indoor environmental variables of air temperature and relative humidity from 1 November 2015 to 31 October 2016 (366 days), using Tinytag Explorer 4.9 model data loggers. The secondary data on outdoor temperature and relative humidity were got from the nearest Meteorological Station at the Imo International Cargo Airport. The mean annual outdoor temperature and relative humidity values were 29.00C and 69.9% respectively. The annual mean and standard deviation of indoor air temperature and relative humidity values of 'plastered painted' and 'not plastered not painted' buildings were (M = 29.30C, SD = 1.587; M = 69.1%, SD = 18.53) and (M = 29.00C, SD = 1.818; M = 66.8%, SD = 17.45) respectively. The z and t tests conducted at  $\alpha = .05$ , between mean daily indoor air temperature and relative humidity values of 'plastered painted' and 'not plastered not painted' residential buildings showed significant differences: air temperature ( $z = 2.0465$ ,  $p = 0.0204$ ) and relative humidity ( $z = 1.7380$ ,  $p = 0.0411$ ). There was no significant difference between outdoor and indoor values. The paper, therefore, recommends that efforts should be geared towards improving the materials and composition of the building fabrics to enable modification of the external environment internally for thermally comfortable environment.

Keywords: air temperature, building fabric, finish, indoor thermal conditions, Okigwe-Nigeria, relative humidity

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# AN INTERNATIONAL EXPERTS' OPINION ON THE OBJECTIVES OF STAKEHOLDER MANAGEMENT IN CONSTRUCTION PROJECTS

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One paramount issue in construction project management is the acknowledgement and management of the multitude of stakeholders who are related to projects. This is due to the fact that stakeholder management (SM) is a determinant of the success or failure of construction project delivery. Over the years, SM has performed poorly in construction projects, which could have resulted from the lack of comprehensive SM performance management tool. Even though SM objectives form the basis of such a tool for its management purpose, there is lack of corresponding empirical study. The study aims at evaluating the important objectives that project managers (PMs) consider in managing construction stakeholders. On this premise, an international survey was conducted on experts (academics and practitioners) around the world to elicit their opinions on the objectives for managing construction stakeholders. Through purposive sampling technique based on predefined qualification criteria, the experts were identified from related publications; the local chapters of Project Management Institute (PMI); regional and country affiliates of International Project Management Association (IPMA); and the yahoo platform of Co-operative Network for Building Researchers (CNBR). Upon analysis of 67 duly completed responses by the experts, 13 objectives are found to be very important in managing construction stakeholders. Amongst them, "satisfy the needs, interests and objectives of stakeholders" was ranked highest. The findings are useful as they inform PMs on the relevance of the stakeholders in projects and how project success is more likely to be achieved by meeting the important SM objectives. Hence, projects could be more successful if the stakeholders are placed on the same pedestal as cost, time and quality requirements. Moreover, stakeholder and organizational satisfaction depends heavily on the fulfilment of the important SM objectives in project delivery. Future research should focus on establishing the relationships between the objectives, critical success factors and key performance indicators, which will be useful in managing (evaluating, benchmarking, monitoring and improving) SM performance in the industry.

**Keywords:** construction projects, stakeholders, stakeholder management, objectives, project management

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# AN INVESTIGATION INTO THE EFFICIENCY OF CLASSIFICATION OF CONSTRUCTION FIRMS IN GHANA

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The construction industry is one of the highly-regulated industries. There are reported cases of negative impact of regulatory policies on the performance of contractors both in developed and developing countries. The classification of construction firms is an attempt to regulate which contractor can do which type of work at any given period. The study investigates whether the rules and procedures outlined in the guidelines for classification of construction firms in Ghana are being adhered to when issuing certificate to contractors. The guidelines for classification and registration of contractors by the Ministry of Works and Housing is examined. A questionnaire is designed with a view to generating information on contractors relating to classification exercise. The questionnaires were targeted at fifty construction firms based in five district assemblies in the central region. A response rate of 60 percent was achieved. The findings suggest that the classification system is inefficient. Many contractors are categorized under financial classes but they do not possess the prescribed number of equipment and personnel as stated in the guidelines for classification. The system has the potential of preventing very able professionals from entering the industry if they are unable to meet the high requirement standards. It is also an avenue for corrupt practices as contractor would do anything to ensure the smooth operation of the businesses.

**Keywords:** classification, construction firms, developing countries, Ghana, regulations

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# ANALYSIS OF GREEN BUILDING STRATEGIES FOR HOT-DRY CLIMATIC CONDITIONS IN NORTH-WESTERN CITIES IN NIGERIA; LESSONS FROM BOTSWANA, BURKINA FASO AND SOUTH AFRICA

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Inadequacies in the Nigerian housing sector pose a great challenge and have propelled the present government to embark on mass housing development alongside most of the low-income earners who would not be able to afford the public housing thus indulging in acquiring land and constructing their desired houses. These activities have significant negative environmental impacts. To address this problem, green/sustainable housing is advocated as these have less toxic materials and in most cases, promote use of local materials to suit climatic conditions. Borrowing a leaf from the Botswana, Burkina Faso and South African experience, the research examined green building strategies for these areas taking into consideration the locally available materials that could be used, its prospects and implementation difficulties. Structured Questionnaires were distributed to 150 purposively selected property developers and tenants in the selected metropolitan cities with 125 retrieved. Adopting the Likert scale ranking and the descriptive method for the purpose of analysis, the collated data were analyzed and the study found out that if local materials such as timber, compressed earth block, earth plastering and stones are adopted in housing construction, the housing shortages will be greatly reduced and the effect on construction on the environment would also be reduced. Thus, while canvassing for the improvement and adoption of local building materials for effective housing, it is recommended that public awareness should be created.

Keywords: green building, indigenous materials, Nigeria, sustainable development

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# ARE LEED® CERTIFIED BUILDINGS BETTER IN PERFORMANCE? A COMPARISON OF LEED® V. NON-LEED® CERTIFIED INSTITUTIONAL BUILDINGS

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The US Green Building Council's (USGBC) LEED® assessment system has been a dominate name in the U.S. green/sustainable design and construction market since 2000. LEED® is a points-based system that allows buildings to receive certain levels of certification based on multiple performance categories, all of which strive to make the building operate as sustainable as possible. Though LEED® is viewed to be a successful program, its full effectiveness is still in question. The common argument is that the LEED® certification is based on projected consumptions rather than on actual data from the occupied building and therefore may not yield promised performance. The purpose of this research is to compare the performance of LEED® and Non-LEED® certified buildings of similar size and use in order to determine the validity of this argument. The study analyzed three buildings at Auburn University's main campus. The two LEED® certified buildings were the M. Miller Gorrie Center (LEED® Gold) and the Kinesiology Building (LEED® Silver). The one non-LEED® certified building being used as a baseline was the Science Center Classrooms. The main focus was on each building's energy and water consumptions. When all three buildings' performance were compared, the LEED® certified buildings did not perform the best. In some cases, there was not a significant difference between all buildings' energy and water consumptions. In addition to the energy and water consumption data, a short questionnaire was given to the buildings' residents. The questionnaire survey investigated the participant's knowledge of LEED® and determined if they were comfortable and happy with their respective buildings. Results showed that the majority of participants were very satisfied with their respective building's performance irrespective of its LEED® certification. Based on the limited data collected, this study did not find out any conclusive evidence that suggests the LEED® certified institutional buildings are better in performance and comfortness as compared to the Non-LEED® certified buildings.

**Keywords:** cost, green building, human comfort, LEED®, sustainability,

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# ASCERTAINING THE IMPORTANCE OF PROJECT TEAM PERFORMANCE TO CONSTRUCTION PROJECT SUCCESS

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Traditionally, a construction project is said to be successful when it meets the project objectives of time, cost and quality. Creation of a very effective project team is necessary for achieving successful project outcomes. The objectives of this study are to 1) find out important project team performance measurement criteria; and 2) ascertain the importance of project team performance to project success. Seven (7) main factors constituting project team performance measurement criteria were identified. Using survey approach, 70 questionnaires were distributed to project team members on newly completed and ongoing construction projects selected via purposive sampling method. Data collected were analyzed using the Relative Importance Indices (RII) technique. To ascertain the importance of the identified project performance to project success, a newly completed 5-storey hostel was selected as a case study. The study revealed that performance of an individual project team member is very important to the overall performance of a project team. Consequently, there was an indication that improvement in project team performance improves overall project success. The relevance of project team performance to the overall project success has been verified empirically in this study. Attention has been drawn to the need for establishing a project monitoring system that evaluates individual project team member's performance as well as overall team performance in order to secure construction project success from the beginning to the end.

**Keywords:** case study, construction project success, project team performance, relative importance indices

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# ASSESSMENT OF FIRE SAFETY PROVISIONS IN SELECTED PUBLIC BUILDINGS IN MINNA, NIGERIA

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In Nigeria, there have been several forms of serious disaster confronting homes, lives and properties of people and the government. The most common ones are flood, building collapse and fire, of which fire outbreak is the most frequently recorded. This study addressed the problem of fire incidents which were reported to always occur more in public and private residential buildings as a result of non-compliance of building clients and occupants to the requirements of fire safety regulations. To solve this problem, the study assessed the level of fire safety provisions in public buildings in Minna, Niger State of Nigeria. In view of this, data were collected from both primary and secondary sources. T – Test was used to determine the differences between the stipulated requirements of fire safety regulations and the available fire safety measures provided in the selected public buildings. Regression analysis was employed to determine the relationship between population of building occupants and number of fire escape routes, and building floor area respectively in the selected public buildings. A significant difference was found between stipulated and available requirements of fire safety regulations with respect to fire extinguishers, firefighting equipment and fire escape routes in public buildings. The relationships between population and number of fire escape routes, and building floor area in public buildings were found to be significant. It was concluded that fire safety requirements are not adequately provided or complied with in public buildings in Minna. It was recommended that building occupants or owners should always comply with fire safety regulations.

Keywords: escape routes, fire safety provision, public buildings, population

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# ASSESSMENT OF LIGHT LEVELS AND VISUAL COMFORT IN A LECTURE HALL OF A UNIVERSITY IN AKURE, NIGERIA

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The challenge of having a well-lit auditorium at 200lux - the international lighting association recommended light level suitable for lecture halls was brought to the fore in this paper. The aim of the work was to determine typical light levels in the 750-capacity lecture theatre, compare with international benchmarks the current light level in the building towards definition of baseline characteristics of lecture theatres. Artificial and natural light levels was assessed in the 750-capacity lecture theatre in the Federal University of Technology, Akure, Nigeria in July 2017 between 7am and 7pm hourly, through the use of Precision Gold N21FR, a hand held multimeter, it was discovered that the average illumination in the hall around 7pm was as low as 0.01lux on 22<sup>nd</sup> July. The average artificial light level was also determined using calculation method and it recorded 3.14Lux. The result from the work would serve as input for possible redesign of the lighting system of the lecture theatre under study.

Keywords: compact fluorescent bulbs, lamp holders, light levels, visual comfort.

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# ASSESSMENT OF PRECEDENT ANALYSIS PROCESS IN ARCHITECTURAL DESIGN PEDAGOGY IN NIGERIAN UNIVERSITIES

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In architectural design pedagogy, precedent studies (also commonly referred to as case studies) are employed as educational tools to deliver information on the completed building, the design process or challenges faced by the architect and the solutions proffered. However, the manner of reporting on cases studies has been criticised as being oftentimes anecdotal and offering an incomplete picture, lacking an appropriate precedent assessment format. In this regard, this study seeks to explore if precedent analysis is engrained in the method used to analyze existing buildings by students of architecture in Nigerian universities. The students' format of analyzing existing buildings is studied and compared to Alexander Tzonis widely employed' framework for precedent analysis. Consequently, a case study using mixed research method was adopted. In the process, data was collected via questionnaire survey and document study of archived students' theses. The results show that the students' approach to precedent analysis is partially thorough and falls short of the acceptable standards. In addition, the outcome indicates that students receive minimal guidance from design mentors which contributes to under-studying existing buildings. Consequently, students face challenges that include the lack of access to the buildings' drawings particularly construction floor plans and sections that leads to incomprehensive assessment. Afterwards, the study established that students of architecture in Nigerian universities require more tangible guidance for proper precedents' analysis. Also, there is the need to facilitate access to building drawings or access into the buildings. Professional bodies and regulatory agencies such as Nigerian Institute of Architects and Architects' Registration Council of Nigeria should assist in enabling online documentation of certain buildings' drawings for study purposes. The findings suggest the need for operational guidelines in conducting precedent studies by students in Nigerian universities.

**Keywords:** architectural design, pedagogy, case studies, Nigerian universities, precedent analysis

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# CHALLENGES AND OPPORTUNITIES OF SUSTAINABLE INFRASTRUCTURE DEVELOPMENT IN DEVELOPING ECONOMIES

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The development of sustainable infrastructure is a key-factor for addressing the challenges of finite resource availability, ecological deterioration and climate alteration. The global environmental system can no longer support carbon-intensive infrastructure with the energy consumption and carbon emissions they trigger. Therefore, sustainable infrastructure development is demanding a different approach that safeguards the environment and its finite resources within the context of an ethically, culturally and socially valuable development process. This study investigated the challenges and opportunities that lie at the nexus of climate change and infrastructure development. A sectoral analysis of the infrastructure sector was undertaken to understand this in the context of developing economies. The sectoral analysis method studies the size, demographic, pricing, competitive and other economic dimensions of a sector. Using secondary data sourced from various global reports, the study revealed that half of global GHG emissions were associated with the infrastructure sector. This may appear negative, but the developmental opportunities for mitigation and adaptation were found to be positive. Maximizing economic, social and environmental value in infrastructure development must guide investments. The study also identified the significance of prioritizing mitigation and adaptation-related infrastructure investment needs and the balancing of such needs with economic growth priorities for developing economies. The study concluded that there is need to implement cost-effective measures to climate-proof future baseline infrastructure, with the implication to effect changes to construction codes and climate-risk assessments at planning stage.

Keywords: development, economic growth, infrastructure, political economy, sustainability

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# CHALLENGES AND REMEDIES OF APPLICATION OF COST PLANNING TECHNIQUES IN CONSTRUCTION PROJECTS IN NIGERIA

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Several literatures specialized for the Built Environment have supported the view that the Construction Industry in Nigeria is currently fraught with challenges of cost overrun and other associated issues. Cost planning techniques was developed in Britain in the distance past to bring about effective cost control in the Industry. The techniques by all reasonable logic is supposed to have found space and application in the activities of the industry in Nigeria with attendant benefits yet the problem persist. Therefore, the paper aims at determining the level of use of these techniques, with a view to bring about improvement to the situation. The study adopted the multistage technique. This basically is purposive and simple random techniques tailored to draw up a 450 sample from a population of 8,000 built environment professionals. A 74% rate was recorded for data administration and retrieval. The respondents were made to rate their views on a 5-point scale. These views were analysed using Likert scale Relative Importance Index (RII). Focus group chart and telephone survey were both used as complementary instrument to draw up data from the field. The validity test centred on researchers and other expert in the field of Academics and industry for validation of the questionnaires. Reliability tests was carried out through pilot study. This was done using a test-re-test method. This test showed a correlation result of 0.79. The findings reveal that the inception activities of the cost planning techniques with a mean of 3.79 ranked highest. Poor remuneration/professional fees of consultants with a mean of 3.81 ranked the highest causal factor. Time overrun with a mean of 3.65 ranked the highest factor on the effect of poor use of identified cost planning techniques. The major recommendation for the legalization and enforcement of the National Building codes is predicated on the findings and analysis.

Keywords: constructions industry, cost planning techniques, Nigeria

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# CHALLENGES FACING CONSTRUCTION PROFESSIONALS' COMPLIANCE WITH CONTINUING PROFESSIONAL DEVELOPMENT (CPD) IN SOUTH AFRICA

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Continuous Professional Development (CPD) has globally been accepted as a veritable approach to acquiring new skills and knowledge as well towards improved performance of professionals in the industry. However, in spite of the numerous effort in CPD developments and regulation by professional bodies in the South African Construction Industry (SACI), the CPD process faces numerous challenges resulting in high incidence of compliance default among professionals. Ironically, identification of these challenges is yet to be subjected to any rigorous research and interrogation. By adopting a quantitative research design and a questionnaire survey, this study sought to delineate the key challenges to CPD compliance among construction professionals in the SACI. A total of sixty (60) questionnaires were distributed to professionals and leaders of professional bodies involved in CPD in South Africa, out of which 34 were received forming a 57% response rate. Data analysis involving the use of one sample t-test revealed '*Strong Work commitments often restrict participation*', '*Lack of structured CPD policy within practices*', '*Current CPD programme being expensive*' and '*Lack of understanding of CPD benefits by professionals*' as the major challenges facing practitioners. The findings from the study are considered vital towards engaging regulators and Stakeholders in CPD adherence in the SACI thus allowing them to chart new agenda, guide decisions, evolve modalities and formulation of strategic framework that will improve compliance of CPD programme aimed at the needs of construction professionals and the industry.

Keywords: CPD challenges, CPD compliance, professional development

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# CHALLENGES IN THE MANAGEMENT OF HOSTEL ACCOMMODATION IN HIGHER INSTITUTIONS OF LEARNING IN NORTH-WESTERN NIGERIA

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Hostel accommodation has been a major area of concern with growing student population as a result of increasing interest in higher education in northern Nigeria over the years. This is due to the gradual dissipation of the age-old perception that western education will negate their cultural and religious values as formerly believed by majority of the populace who are predominantly Muslims. This rise in population has led to various challenges in the management of hostel facilities, ranging from overcrowded rooms, to congestion of the hostel's sanitary facilities, which results in an increased pressure on the infrastructure and other social amenities, cutting short their useful life. These in turn rapidly affects the academic environment and in turn pose serious danger to the health of the student in terms of epidemics. Thus, the aim of this paper is to investigate the challenges encountered in the management hostels in north-western Nigeria which was done by identifying the types of hostel units provided, assessing the present situation of infrastructures provided and evaluating the management approach adopted in managing the hostels. Data was sourced through the administration of 30 questionnaires to the students and hostel administrators of each selected institution alongside a face to face discussion/interview. Data collected was subjected to analysis using descriptive statistics and presented in frequency distribution tables. It was found out that most of the hostels in these institutions are overcrowded with students; there is a shortage of facilities, thus increased pressure on available infrastructural facilities and other social amenities and the fact that there is a dearth of professionals in the maintenance of these facilities. Amongst the recommendations proffered include the fact that trained personnel should be engaged in the management of these hostels and their accompanied facilities and the need for Public Private Partnership (PPP) in the provision of additional hostels

Keywords: hostel accommodation, higher institution, management, Nigeria

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# CHALLENGES OF PUBLIC-PRIVATE PARTNERSHIP (PPP) IN URBAN HOUSING IN NIGERIA

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Although current public housing strategies in Nigeria place emphasis on partnerships between government agencies and private sector organizations, none of the known studies attempts to understand the challenges of public-private partners (PPP) in housing in urban areas in Nigeria. The aim of this study was to identify and analyse the challenges of PPP in urban housing from the operators of nine PPP housing projects in Nigeria. The data used in this paper were sourced from oral interviews with 27 experts drawn from public and private operators of PPP in housing in Nigeria and analysed using content analysis. Findings reveal that among several issues, the most critical challenges of PPP in urban housing in Nigeria were the lack of sustainable sources of housing finance for private developers and home seekers; poor access to developable land; and low level of compliance with PPP agreements by parties to PPP housing projects. These challenges were also found to be responsible for the poor performance of PPP in meeting the housing needs of a majority of urban residents in Nigeria who have critical housing needs. The paper ends by highlighting the various strategies that can be engaged in addressing these challenges and enhancing the outcomes of PPP in urban housing in Nigeria.

Keywords: public-private partnership, urban area, housing, oral interview, Nigeria

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# CLIENT RELATIONSHIP MANAGEMENT IN ARCHITECTURAL FIRMS IN SOUTHWEST NIGERIA

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This proposed research is premised on the need for the architectural profession to take radical adaptive actions, especially in the management of relationship with clients in order to improve business resilience in uncertain and constantly evolving business environment. Customer Relationship Management (CRM) is a current marketing concept and business strategy of many companies worldwide that enhance their capabilities to maintain long-term relationships with customers in order to ensure organizational resilience. Some studies on the relationship of architectural firms with their clients in Nigeria exist, but they tend to focus on some variables that influence the relationship rather than a comprehensive study. This study intends to fill this gap. Architecture though a relationship-based profession has never adopted conventional marketing. Hence, this study is not about adoption of CRM in the Nigerian architectural industry; rather, CRM is used as a conceptual foothold to understand the Client Relationship Management (CLiREM) techniques and tools engaged by architectural firms in the management of relationships with clients. The study would focus on architectural firms that are registered by the Architects Registration Council of Nigeria (ARCON) entitled to practice in the Federal Republic of Nigeria irrespective of the gender of the Principals. This research aims to investigate the Client Relationship Management (CLiREM) techniques and tools engaged in by architectural firms in southwest Nigeria in order to identify the strategies that contribute mostly to achieving clients' satisfaction and retention. What relationship management techniques and tools engaged by architectural firms (in southwest Nigeria) to manage their relationship with clients contribute most to client retention in spite of influencing factors? The following predictor variables (CLiREM techniques, types of service, client categories, CLiREM tools, influencing factors, perceived service quality, trust, client satisfaction, perceived switching costs, attractiveness of alternatives) and target variable (client retention) will be studied. The mixed method research paradigm will be adopted. A mix of validated questionnaires, non-participant observation guides and interview guides will be administered on architectural firms and their clients. The target population will be accessed using a disproportionate stratified random sampling of 325 licensed Nigerian architectural firms listed by Architects Registration Council of Nigeria (ARCON) and located in southwest Nigeria. Nominal, ordinal and interval data types will be collected during the study. Descriptive, inferential and predictive analyses that will be carried out on the dataset are, cluster analysis, Factor analysis, moderated multiple regression and Multivariate multiple regression. The outcome of this study is also expected to contribute empirical knowledge into the strategic resilience planning efforts of the Nigerian regulatory bodies in Nigeria (ARCON and NIA) thereby informing policy. The results are also expected to inform architectural practice and pedagogy.

**Keywords:** architecture, Client Relationship Management(CRM) , Client Relationship Management (CLiREM)

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# COMPARATIVE ANALYSIS OF INVESTMENT ATTRIBUTES OF COMMERCIAL AND HOTEL PROPERTIES IN SOUTH-WESTERN NIGERIA

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Technically, hotel investment especially the accommodation aspect is one of the breeds of real estate investment, but practically, this has been noted to be part of the breed of pure business investment. This empirical work therefore highlighted and compared the attributes of hotel investment and commercial property investment measuring their performance through occupancy rate analysis. From sample of 177 commercial properties and 70 hotel properties in the Central Business Districts (CBD) of Ikeja, Abeokuta, Ibadan, Osogbo, Akure and Ado-Ekiti; data were collected from investment managers of these two investment options in 2015 which was subsequently analysed with descriptive and inferential statistics. The research findings revealed that commercial and hotel properties have similarity in 4 of the qualitative variables (ownership mode, investment financing, renting pattern and renting purpose) and differ in the remaining 8 variables (investment rating, management, state of repair, owners' involvement, source of income, rental review determinants, rental review frequency and outgoings). The study further revealed that commercial property has higher occupancy rate of 0.89 than the hotel property of 0.80, nevertheless, there is no significant difference between the occupancy rates of these investment properties as reflected by the Kolmogorov-Smirnov (K/S) two sample test. Although this seemed to be the first comparative study of direct commercial property and direct hotel property investment attributes in Nigeria, it was recommended that subsequent study should extend to trend analysis of return on these investments. The study is limited to accommodation aspect of hotel investment, but due to its short-term advance payment attribute, hotel rate is more dynamic and can easily change with economic situation than the commercial property.

**Keywords:** CBD, commercial property, hotel property, investment attributes, occupancy rate

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# COMPARATIVE STUDY OF CAUSES OF VARIATIONS IN PUBLIC BUILDING PROJECTS IN TANZANIA AND UGANDA

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Detrimental variations in public building projects often have led to cost overruns, time overruns, project abandonment, rework, disruption and conflicts. Consequently, these have led to non-fulfilment of project objectives. This study was carried out to identify, evaluate and compare the most significant causes of detrimental variations in public building projects in Tanzania and Uganda. This could help in monitoring the trends of non-beneficial variations and safeguarding the anticipated value for money in such building projects. Pertinent literature was reviewed coupled with structured questionnaire administered to professionals to elicit relevant information with regard to causes of detrimental variations. Statistical analysis was used to analyse and synthesize data collected from questionnaires. Subsequently, the most significant causes of detrimental variation variables were ranked according to their importance and occurrence. The agreement among respondents in rating the factors of variations was found to be significant. The results suggest the top four highly ranked factors of detrimental variations in both countries as change of plans or scope by owners, design discrepancies by consultants, misinterpretation of contract documents by the contractors and weather conditions. These factors significantly contribute detrimental effect to construction projects performance and pose great risk to construction industry prosperity. Finding concludes that owner is the major source of detrimental variations in building projects and suggested that in order to avoid such scenario, owner should have adequate planning and resources before initiating a construction project. More importantly, project management teams must possess enough integrity, knowledge and skills to deal with the day-to-day management challenges of construction changes.

Keywords: causes, detrimental variations, public building projects, Tanzania, Uganda

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# COMPARISON BETWEEN CONSTRUCTION PROJECTS COST OVERRUN IN PUBLIC AND PRIVATE SECTORS OF LAGOS STATE, NIGERIA

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Despite proven importance of cost as a driving force of project success, construction projects in both government and private sectors may have been failing to achieve their objectives within budgeted cost. Hence, the research is aimed at making comparison between construction projects cost overrun in public and private sectors of Lagos State, Nigeria with a view to enhancing both sectors' effective project delivery. The objectives are to compare the level of occurrences and percentages of cost overruns between public and private sectors' construction projects, identify the causes of cost overruns in public and private sectors' construction and evaluate the degree of agreement/disagreement between any two groups of construction industry participants regarding the ranking of important causes of cost overruns. Using a well-structured 1-5 Likert Scale, a total of 130 questionnaires were administered to sampled respondents, out of which 92 were duly completed and returned, representing 70.77% response rate used for the analysis. Stratified multi-stage sampling technique was adopted to select respondents in study area. Statistical tools were utilized to analyse the data obtained. The result of the study revealed that frequency of occurrence of cost overrun ranges from 69.39% in public sector to 90.70% in the private sector while percentage of cost overrun ranges between 19.14% in public sector and 19.63% in the private sector indicating that cost overrun is more pronounced in private sector projects than in the public sector. The most important cause of cost overrun in both sectors is additional work to project'. A well-defined project scope from inception to completion is recommended for both sectors in order to reduce additional work and consequently, cost overrun.

**Keywords:** construction, cost overrun, Nigeria, private sector, projects, public sector

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# CONSTRUCTION HEALTH AND SAFETY AGENTS' (CHSAs) CONTRIBUTION TO HEALTH AND SAFETY IN SOUTH AFRICA

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Clients may appoint CHSAs in terms of fulfilling their requirements in terms of the South African Construction Regulations. However, previous exploratory research findings and anecdotal evidence indicate that CHSAs are lacking in terms of performance. The objectives of the study were to determine the contribution of CHSAs to health and safety (H&S), the frequency of client and designer interventions, and interventions that could contribute to an improvement in their contribution to H&S and construction. Registered CHSAs were included in the self-administered questionnaire survey. The salient findings include: CHSAs are generally appointed at project initiation and briefing, tender documentation and procurement, and construction documentation and management stages; CHSAs have contributed to and impacted on H&S; CHSAs rate themselves as good relative to most composite knowledge areas and composite skills areas; the contribution of CHSAs to H&S could be improved, and a range of interventions could contribute to an improvement in the contribution of CHSAs to H&S and construction. Conclusions include: CHSAs may not be viewed as being able to contribute during project initiation and briefing, concept and feasibility, and design development; H&S is not a project value; CHSAs have contributed to and impacted on H&S; inadequate knowledge and experience due to a lack of appropriate tertiary education lead to their limited status, exclusion from decision making and management of the project, and not being consulted. The conclusions underscore the findings of a previous exploratory study, and the current study's objectives related to client and designer interventions, and the potential of interventions to contribute to an improvement in CHSA's contribution to H&S and construction. Recommendations include: comprehensive holistic education and training is required for CHSAs; related continuing professional development (CPD) courses should be evolved; a formal tertiary education programme should be evolved, and CHSAs should be appointed at Stage 1 'Project initiation and briefing'.

Keywords: agent, construction, health and safety, performance.

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# CONTEMPORARY ARCHITECTURAL PRACTICE IN NIGERIA: A REVIEW OF ISSUES AND CHALLENGES

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Contemporary architectural practice in Nigeria is suffering from multifaceted problems. The paper reviews historical and contemporary architectural practice in Nigeria using secondary data from previous studies and also taps from the author's over twenty years of practice/experience in the Nigerian building industry and architectural education. Highlighting internal problems ranging from interrelationship between the architects themselves and between the architects and the Nigerian Institute of Architects (NIA)/Architects Registration Council of Nigeria (ARCON), and external problems ranging from threat of leadership of architects in the building industry and problems that are socioeconomic in nature, as some of the major problems affecting the practice. The paper recommends that schools of architecture be allowed to be independent to reflect their philosophy in order to create room for specialization and the elimination of quacks as the way forward. It concludes by emphasizing the need for all stakeholders to play their respective roles in accordance with contemporary architectural practice to overcome these problems.

Keywords: building industry, contemporary architectural practice, multifaceted problems, schools of architecture, stakeholders

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# DESIGN INNOVATION IN STRUCTURAL ENGINEERING

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This work examines how innovations could be factored into design of structural engineering systems to provide a deviation from the codified design approaches that grossly under-utilise engineering materials and lack of optimization and reliability considerations. The paper highlights some of the innovative approaches in design and innovative construction materials. The context in which innovation as a process or concept can be used effectively is dealt with in the paper. The use of innovative materials such as Fibre Reinforced Self Compacting Concrete could be beneficial for dry joint construction which provides solution to the construction in confined places such as congested city centres. In addition, the use of numerical analytical tools interfacing with optimization and reliability analysis such as Monte Carlo simulation is highlighted. This clearly leads to design optimization that leads to efficient system and reduction of construction cost.

**Keywords:** design innovation, dry joint construction,, numerical simulation,, structural engineering

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# DESIGN OF AN AUTOMATED STAIRCASE CLIMBER TROLLEY FOR GENERAL HOSPITALS IN DEVELOPING COUNTRIES: CASE OF AN ANONYMOUS HOSPITAL IN ZIMBABWE

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The transfer of equipment between floors in many institutions that are found in developing countries is a task that is greatly dreaded. There are no adequate, efficient means to make the task bearable. Often than not employers tend to use their human labour force to complete these transfers, it comes along with many complications that might include safety risk, health complications, and risk of damaging equipment among other disadvantages. In most developing countries, there are limited escalators and elevators. This leaves stairs as the most common route of movement. One such institution is the hospital in Zimbabwe and is one of the busiest hospital in Zimbabwe with stairs linking floors in each of its buildings. In this paper, the various options of lifting mechanisms were looked at and analysed. A system that utilizes small wheels attached to a chain moving around a sprocket was selected and further developed. A power source was also added to minimize effort used by operator in the trolley function. A battery and an electric motor would achieve this. The system was also automated to give the trolley a level of intelligence that it can use to tackle any circumstances as set by the designer. The paper has cost benefits as labour cost are minimized and also the environment is safer hence saves the institution from safety penalties. This paper aims to improve the day to day running of hospital institutions such that more effort is placed on the purpose of the institution and effort is minimized on everyday tasks like shifting equipment from one floor to another.

Keywords: automated, design, developing countries, general hospital, staircase climber, trolley

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# DESIGNING FOR OLD AGE IN NIGERIA

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Many Nigerians spend a considerable part of their working lives accumulating the finances to build a home to live in in their old age, and to pass on to their heirs upon their demise. However, if they were to develop some chronic illness, infirmity or disability in their latter years, there is a possibility that they could find the house they had intended to live in for the rest of their lives insupportable for their special needs, particularly if adaptability for disabled use was not part of the original design brief considerations. Using a sample of ten houses designed by Nigerian architects for private clients, the paper appraised the layouts using the Lifetime Homes standards, which was developed in the United Kingdom as a design checklist to develop homes that could be adapted to support the special needs of any resident for their lifetime. The study found that structural features such as internal steps, bath-tubs, width of corridors, and the solid blockwork walls; ironmongery – door and window handles, locking mechanisms; and water taps became obstacles in achieving successful adaptability of homes to meet the changing needs of disabled older people in Nigeria.

Keywords: accessible environment, ageing, disability, inclusive design, housing the elderly, universal design.

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# DEVELOPMENT OF FRAMEWORK FOR APPLICATION OF ERGONOMICS IN BUILDING CONSTRUCTION IN NIGERIA

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Construction work is physical in nature and ergonomic hazards are silently reducing the productivity of construction workers in the building industry. Work related musculoskeletal disorder has been identified as a drain to construction productivity which is threatening the existence of an industry already affected by shortage of skilled craftsmen. Studies have indicated that the building construction industry have not adopted ergonomics practices. The aim of the research is to develop a framework for application of ergonomic practices in building construction in Nigeria with a view to improving health and safety management. The objectives are to: (1) Identify and rank the ergonomically hazardous trades/activities in building construction. (2) Examine the ergonomics practices adopted by construction companies for preventing ergonomics hazards in building construction. (3) Impact of implementing ergonomics on workers' productivity. (4) Identify and evaluate the barriers to adoption of ergonomics in building construction process. (4) Identify and assess strategies to enhance the application of ergonomic in building construction in Nigeria. (5) Develop a framework for improving the application of ergonomics in building construction. The study will adopt both qualitative and quantitative methods with questionnaire, site observation and interview. Targeted respondents include designers, construction managers, craftsmen, and unskilled labourers working on construction sites in Nigeria. This paper concludes that ergonomics is still an emerging phenomenon in health and safety management in construction in both developed and developing countries. Therefore, there is a need for further promotion and adoption of ergonomic practices in health and safety management in the industry.

Keywords: application, building, construction site, ergonomics, framework

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# EFFECT OF GRANITE, WASHED AND UN-WASHED GRAVEL AGGREGATE SIZES ON ENGINEERING PROPERTIES OF CONCRETE

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This study shows clearly that concrete gives the highest compressive strength for 14mm and 19mm sizes of granite (coarse aggregates) considered by the study. Un-washed gravel exhibits the lowest compressive strength probably due to impurities imbedded therein that may lower the strength of the concrete. 14mm sized granite (aggregate) out-performed the 19mm sized aggregate; this signifies that the smaller the size of the aggregate, the higher the compressive strength of concrete. The study finds that fine and coarse aggregates in concrete should be evenly distributed. The fineness modulus for sharp sand, washed gravel, un-washed gravel and granite obtained are; 2.51, 3.12, 3.30 and 3.33 respectively. Conclusively, as noted above, this study recommends the use of 14mm (grain size) granite as coarse aggregate especially in structural concrete (1:2:4) for higher strength consideration.

Keywords: CS (Compressive Strength) , GRN (Granite), SG Specific Gravity) , UNWG (un-washed Gravel) , WG (washed gravel)

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# EFFECT OF PLASTICIZERS ON PROPERTIES OF CONCRETE WITH PIT SAND: CASE STUDY FROM AKURE, NIGERIA

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Concrete is a composite material made from sand, coarse aggregate, cement and water. The strength of concrete is affected by the type of the sand, coarse aggregate, cement and water/cement ratio. The lower the water/cement ratio, the higher the concrete strength. Therefore, the focus of this research work is making concrete at the lowest possible water/cement ratio while maintaining a high workability, with the usage of plasticizer. In this research work, Rheobuild 561M super-plasticizer was used. The nominal ratio of 1:2:4 concrete mix was used for mix proportioning of the concrete. The water cement ratio of 0.5 was used to study the effect of this super-plasticizer on various properties of concrete. The dosage of the super-plasticizer was increased from 5.5ml to 55ml per 13.88kg of cement at the rate of 5.5ml. The results of the various tests carried out showed substantial improvement in the properties of concrete after the addition of super-plasticizer into the concrete mix. The improvement in the properties of concrete such as the strength due to the usage of plasticizer, means that the cross-section of the structural members, such as slabs, beams and columns can be reduced, which will produce a lighter structure, therefore give way for the possibility of reduction in the size of the foundation. Hence the usage of plasticizers enhanced the production of economic structure, without compromising safety.

**Keywords:** cement, coarse aggregate, compressive strength, Rheobuild, sand, super-plasticizer

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# EFFECT OF SMALL TRANSVERSE SERVICE HOLES ON FLEXURAL STRENGTH OF REINFORCED CONCRETE SLENDER BEAMS

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The provision of both transverse and longitudinal openings in floor beams helps to facilitate the passage of utility pipes and service ducts. Researches into the behaviour of deep beams with holes were extensively carried out. However, research into the behaviour of slender beams is rare and attracts little attention. Hence, the focus of this research work is to investigate the effect of small service holes on the flexural strength of reinforced concrete slender beams. A total number of ten beams were cast, with concrete grade of C13.02. The cross-sectional dimensions of the beams were 100mm x 150mm, with an effective span of 560mm. The tested beam consisted of two control beams. The experimental beam consisted of eight beams, four of the beams are with 20mm service hole (two at the centre and two at 220mm from both ends), and while the other four had 25mm service holes (two at the centre and two at 220mm from both ends). The reinforced concrete beams were cured by immersion in water in curing tank and tested at 28<sup>th</sup> day. One of the control beams was subjected to point load at the centre, while the second one was subjected to load at third points. The experimental beam with hole at centre were subjected to point load at the beam centre, while those with holes at support were subjected to load at third points. The study shows that there was decrease in the flexural strength of the beams due to the effect of the holes. The decrease in the flexural strength of the beam with hole at the centre was between 39.62% and 42.64%, while that of the beam with the hole at support is between 6.0% and 14.67%. Hence it is recommended that service holes should be located near the supports as practicable as possible.

**Keywords:** slender beam, concrete, compressive strength, control beam, service hole

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# EFFECTS OF QUADRICEPS MUSCLE FATIGUE ON BALANCE CONTROL AND FALLS INJURIES FOLLOWING REPETITIVE SQUAT LIFTING TASK IN CONSTRUCTION WORKERS

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Quadriceps muscle fatigue has been perceived as a discomfort/pain injury associated with repetitive squat lifting task, however, its effect on balance control remains unexamined. The objective of this study was to evaluate the effect of quadriceps muscle fatigue on balance control following repetitive squat lifting task. Ten healthy male participants ( $27 \pm 3.4$  years) conducted an upright stance for 15 seconds with vision occlusion on a stable and an unstable support surface on a force plate before and immediately after the fatigue of the quadriceps muscles induced by repetitive lifting with 15% of participant's maximum lifting strength. Each participant's centre of pressure (CoP) parameters on the force plate [i.e., sway area, antero-posterior (A/P) and medio-lateral (M/L) directions of root mean square (RMS), A/P and ML mean velocity (MV), A/P and M/L median frequency (MF)] were measured to assess balance control. Our results showed that quadriceps muscle fatigue: (1) significantly increase all CoP parameters (i.e. poorer balance control); (2) has more profound adverse effect on maintaining the balance on an unstable surface as manifested by increased M/L and A/P directions of MV and MF. Overall, the current findings suggest that quadriceps muscle fatigue may impair balance control in the frontal and sagittal planes, which may increase the risks of fall injuries.

**Keywords:** balance control, construction worker, fall injuries, postural task, quadriceps muscle fatigue, repetitive squat lifting

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# EFFECTS OF SUGAR AS ADMIXTURE ON CONCRETE MADE WITH DIFFERENT BRANDS OF CEMENT IN NIGERIA

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Hot weather, which is characterized by high ambient temperature and low relative humidity causes rapid setting of cement paste and difficulties during concreting. Admixtures that retard rapid setting of cement paste and modify workability of concrete are necessary to prevent fresh concrete from the adverse effects of hot weather. However, in Nigeria the retarding admixtures are imported and also expensive. Sugar is another substitute that has been established to be a retarder, but its effects varies with the chemical composition of cement. This paper aims to investigate the effects of sugar as a retarding admixture on concretes made with different brands of Portland cement produced in Nigeria. The brands of Portland cements used in the experiment were Bua, Dangote, and Sokoto cements. The concrete specimens were prepared using 0%, 0.06% and 0.1% additions of sugar by weight of cement. A nominal mix of 1:2:4 with w/c of 0.5 was used. The results revealed that concrete specimens made with Dangote and Sokoto cement exhibit better results in compressive strength at 0.06% at 28 days hydration period, therefore 0.06% proved to be the optimum dosage. While Bua cement recorded the higher compressive strength results at 0.1%. The results also indicated that the setting time of the cement pastes made with the cement brands increased when the optimum dosage of sugar was used. It is concluded that when an appropriate dosage of sugar was used it had the potential of increasing the setting time and strength properties of concrete.

Keywords: compressive strength, hot weather, OPC brands, setting time, sugar

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# EMPLOYABILITY OF BUILT ENVIRONMENT GRADUATES IN NIGERIA: DETERMINANT FACTORS

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The Built Environment (BE) is a physical product of inputs from various professional fields and disciplines. Graduates from such fields were expected to have possessed the requisite skills leading to employment. Employability skills are very vital in today's labor market especially within the BE. These skills include basic skills, core skills, fundamental skills, soft skills and transferable skills etc., which enables them work within the BE under their experienced colleagues. However, such skills were in shortage, often inadequate and do not guarantee employment etc. Unemployment especially among graduates is worrisome to the Nigerian government and may be caused by two aspects: oversupply of graduates in the job market, and the inability of graduates to meet the skills needed by the industry. The research aim of this Paper is to identify and assess the impact of some factors that determine the employability of graduates in BE related fields and disciplines in Nigeria. Reviewed literatures were used to identify the factors which forms the main body of the questionnaire, structured using Likert scale and manually distributed to various experienced professionals. The result shows that graduates with employability skills who distinguish themselves during job interview/test were perceived as employable by the various organizations/firms/companies operating in the BE; during construction boom will have better chances of getting employed in BE related professions.

Keywords: built environment, discipline, employability, factors, graduate, Nigeria.

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# EVALUATING DELAYS IN EXECUTION OF PUBLIC SECTOR CONSTRUCTION PROJECTS: A STUDY OF ROADS AND HIGHWAYS IN GHANA

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Public construction projects such as highway construction are mainly funded with donor support in developing countries like Ghana. Timely completion of such projects is essential, however, delays in construction projects in Ghana has resulted in additional cost, time overrun, litigation and contractor abandonment of projects. The objectives of this study were to identify the causes of delays in the execution of public construction projects, analyze how the execution processes of these projects are affected by delay factors and find strategies that can avert the delays. A quantitative research design was adopted. Data was collected using self-administered structured survey questionnaires and analyzed with SPSS using the Spearman Correlation Analysis, Relative Importance Index (RII) and Chi Square Test. A sample size of 290 construction professionals was obtained from staff of the Ministry of Roads and Highways in Ghana. It emerged that the leading causes of construction delays included: lack of financial capacity improper planning by contractors during bidding. It was also revealed that delay factors led to reduced quality and standardization of projects, elongation of project duration and reduction in value of money received as payment. The study found delay averting strategies to include: educating the contractors, effective mobilization of resources, and effective supervision of construction activities. The recommendations proposed to address the delays included adequate and timely project resourcing, selection of competent contractors with adequate project understanding of construction projects. The need for further research on the impact of politicians on public construction projects and processes for contractor selection was also recommended.

**Keywords:** cashflow, delays, finance, project execution, public construction projects, quality

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# EVALUATING THE SUCCESS FACTORS FOR GREEN BUILDING PROJECTS IN THE NIGERIA'S BUILT ENVIRONMENT: THE PROJECT PROFESSIONALS' PERSPECTIVE

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Project success or failure is strongly related to the perceptions of each individual project stakeholder and their willingness and ability to act either for or against the project. Therefore, failure could be perceptions of expectations not met, or promises not delivered, or the belief that the support (resources) could be applied elsewhere. These perceptions are not necessarily based on logic, but often on the quality of the relationships between the project and its stakeholder's. Developing countries like Nigeria need green building projects to address sustainability issues. However, such green building projects' briefs, goals, designs and constructions are characterised by the problem of lack of shared perception and agreement on the objectives of the projects by the stakeholders involved especially the developers / clients and the end-users. The need and the cost for incorporating Green features varies among the various stake holders and by extension the various project professionals working and representing the stake holders' interests in the project. Going by these characteristics, each of them perceives the success according to a hierarchy of dimensions, which comply with his / her own agenda. The aim of this study is to assess the success factors for green building projects in the Nigeria's construction industry based on the project professionals' perceptions. Research primary data was obtained through the use of research questionnaires which were randomly distributed and were analyzed statistically using frequency counts tables, mean item score and inferential statistics. The result shows the major success factors to be convergent interests and views of success among stakeholders; end result achieved as envisioned by meeting GB project goals, performance, functionality specification, GB Technical Know How, Innovation and efforts among the built environment professionals in design and construction. In the overall analysis, the success factors significantly affect Green building developments in the Nigeria's Built Environment.

**Keywords:** green building, perception, professional, stakeholder, success factor

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# EVALUATION OF COCOA POD ASH ON THE CHARACTERISTIC STRENGTH OF SANDCRETE BLOCK PRODUCED IN OSHOGBO, NIGERIA

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This present work investigates the use of Cocoa Pod Husk Ash (CPHA) as an additive in sandcrete block production. The aim of this study is the evaluation of the effect of CPHA addition to the locally produced sandcrete blocks on its compressive strength characteristic. The compressive strength of the blocks produced using this additive was investigated. The critical problem is the non-uniformity of the production process practiced across the broad spectrum by manufacturers and the desire to improve profit in the face of dwindling resources and inflationary pressure of price of raw materials which leads to the production of sandcrete blocks of low quality. This study investigates the effect of using cocoa pod ash in a range of proportion of this additive (1%, 2%, 3%, 4% and 5% by weight of cement) and measuring the effect on the compressive strengths of various blocks produced. This study establishes the compressive strength at various curing ages of blocks with CPHA as additive; these were compared to the control samples from three sources within the locality. Result shows the improvement in the compressive strength of blocks produced, increased by more than 400%. This is encouraging and further work on developing the practice business model is being undertaken to completely convince the local manufacturers of the importance of using this additive to produce better sandcrete blocks, than presently available in the market.

**Keywords:** BS (British Standard) , CO<sub>2</sub> (Carbon Dioxide) , CPHA (cocoa od husk ash) , L,H,T (Length, Height, Thickness)

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# EXPATRIATE AND INDIGENOUS CONSULTANTS' INVOLVEMENT IN CONSTRUCTION PROJECT DELIVERY IN NIGERIA

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Studies have established that expatriates are generally given more patronage than their indigenous counterparts in project delivery in Nigeria. This assertion is based on the patronage of construction firms only. This study investigates the engagement of indigenous and expatriate consultants in project delivery in Nigeria. The objectives are to assess the levels of engagement of indigenous and expatriate consultants in project delivery and their relationship with project value and outcome. The objectives were achieved through a survey of 99 recently completed projects and 792 consultants consisting of eight prominent consultants in each project. Data were collected using structured questionnaires and analysed using percentage, ratio, t-test and Pearson correlation test. The results reveal that indigenous consultants are more engaged than expatriate consultants however; the engagement of indigenous consultants does not contribute to project time, cost and quality while that of expatriate consultants helps to minimise delay. The study also established that the relationship between project value and the engagement of indigenous consultants is negative while that of expatriate consultants is positive. It is concluded that indigenous consultants are more engaged in terms of number than their expatriate counterparts however; expatriate consultants handle the high value projects in Nigeria. It is further concluded that the engagement of indigenous consultants does not contribute to project outcome while that of expatriate consultants helps to reduce delay. It is recommended that clients generally should promote the involvement of indigenous consultants in high value projects in order to develop local capacity in the delivery of projects.

**Keywords:** construction projects, expatriate consultants, indigenous consultants, project delivery, project outcome

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# EXPLORING ICT EDUCATION IN SOUTH AFRICAN SCHOOLS OF THE BUILT ENVIRONMENT

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With growing demand to increase student enrolment and throughput in South African higher institutions, this paper explores the ICT footprint in Schools of the Built Environment curricula and reports the findings of two sequential studies. The research methods involved purposive selection of participants comprising students, academic staff and administrative staff of selected South African Schools of the Built Environment. Data were collected using questionnaires that incorporated open-ended questions, interviews and documents analysis. The data were analysed using descriptive statistics and content analysis of textual data. A comparison of results from the two studies shows considerable increase in the ICT footprint in the schools' curricula between the two studies. There were however strong suggestions of disparity in the participants' perceptions of the adequacy of ICT content in curricula across the different schools. The findings further show misalignment between the perceptions of students and lecturers; existence of information and knowledge related deficiencies, and capacity and resource related challenges. The findings are indicative of a need to improve teaching and learning delivery for ICT education within the BE schools through focused and immersive theoretical and practical content delivery. This would require increased interaction with industry professionals in order to facilitate a balanced approach to teaching and learning with ICT in the BE schools.

**Keywords:** academia, built environment, curriculum, ICT, ICT education, ICT content, ICT footprint.

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# FACTORS AFFECTING ADOPTION OF COMPUTERIZED MAINTENANCE MANAGEMENT SYSTEM AMONG PUBLIC ORGANISATIONS IN NIGERIA

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Advancements in information and communication technology (ICT) have influenced every facet of life and have made it possible for changes in how industries and organizations work today. A Computerized Maintenance Management System (CMMS) is one of the approaches to implement information technology in maintenance and facility management. The study is to assess the adoption of Computerized Maintenance Management System (CMMS). It also examines the challenges and drivers in adopting CMMS in maintenance management. A structured questionnaire was administered to Maintenance Department of selected Federal owned institutions in Nigeria. Data was analysed using Percentage and Mean and Relative Importance Index (RII). A total of Fifty-four (54) questionnaires were distributed while Thirty-six (36) were returned, giving response rate of 67%. Findings from the study revealed that 62% (majority) of responding organisations still use the manual method of maintenance management. Difficulty in tracking maintenance activities, lack of ease and accuracy of updating maintenance records and difficulty in sorting work request and work order are the challenges organisations are facing in operating a manual maintenance system. The study concludes that lack of awareness of CMMS capabilities, high cost of software and infrastructure, lack of management commitment to implement CMMS and inadequate power supply are the factors militating against the adoption of CMMS in maintenance management among institutions in Nigeria.

Keyword: adoption, computerized maintenance management system, maintenance, Nigeria

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# FACTORS INFLUENCING SUSTAINABILITY OF RURAL SANITATION PROJECT OUTCOMES: A PILOT STUDY ON THE PERCEPTIONS OF IMPLEMENTERS

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The paper reports on findings from a pilot study to explore factors affecting the sustainability of sanitation projects in rural communities in South Africa, with a focus on the perceptions of implementers within the OR Tambo District, Eastern Cape Province. Concepts explored include Environmental health, sanitation, sustainability, rural community development, project management, project life cycle, and the water – sanitation nexus. On the basis of deductions from literature review a survey research strategy was utilised for field work. Questionnaires were administered to a randomly chosen sample of implementers from the target area. An analytical procedure, designed for robustness was applied, which included categorization; the use of means, medians, interquartile ranges, and proportioning; Spearman's Rho chi square; and analysis at both individual item and category levels. Findings reveal key factors that are critical to the sustainability of rural sanitation facilities, their relative significance, and possible associations with various groups of respondents, and the possibility of other deterministic factors which are not included in the criteria for the current research. The study highlights very significant sustainability factors for such development projects for rural communities and patterns of ranking for relative severity of the factors.

Keywords: development, health, project, rural, sanitation, sustainability, South Africa.

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# FRAMEWORK FOR INTEGRATION OF COMMUNITY SQUARES IN URBAN GOVERNANCE OF EMERGING CITIES IN NIGERIA

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In traditional settlements, community squares have been used as meeting places for all sorts of public interactions, gatherings and decisions on governance. However, the decimation of these facilities in emerging cities is closing up this avenue and may lead to increased agitation and discontentment as cities grow. The research sought to develop a framework for the integration of community squares in emerging cities to improve urban governance using Owerri capital territory. Owerri Capital Territory has 7 Local Government Areas and 39 community squares out of which 4 and 13 respectively were randomly selected. The research collected data on indicators of public meetings in community squares in Owerri Capital Territory using questionnaires, maps, Geographic Information System, (GIS) and Geographic Positioning Systems, (GPS) and interviews. The data were analysed with Analysis of Variance, (ANOVA) and Pearson statistical tools and it was found that location, sizes of community squares, hierarchy of the open spaces and green and forest areas in them if legally integrated into the emerging Owerri Capital Territory would provide avenues for social interaction, meetings, formal and informal consultations, advocacy, decision-making and public opinion vent that could reduce agitation, discontent and provide avenues for feedback to improve urban governance in the emerging city of Owerri Capital Territory in particular and cities in Nigeria in general.

**Keywords:** community squares, feedback system, heritage, public opinion, urban governance.

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# HINDRANCES TO THE DEVELOPMENT OF GREEN RESIDENTIAL BUILDINGS: THE END-USERS' PERCEPTIONS IN ABUJA, NIGERIA

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The demand for decent and qualitative housing has been increasing annually in Nigeria. Despite many residential estate developments by the public and the private sectors, dissatisfaction with some features still exist among the end-users; which is further compounded by sustainability issues. The construction industry responded with new initiative/concept/practice in design and construction called Green / sustainable buildings to ensure and promote sustainability within the built environment. Despite all these glaring challenges and the need for drastic measures, green building developments are embraced very slowly and practiced at a slow pace in the Nigeria's built environment. This is worrisome and is due to some factors hindering such pace. The aim of this paper is to identify, examine and assess the factors that are hindering green building (GB) developments based on the end-users' perceptions with a view of exposing the impacts of such hindrances on the Nigeria's built environment. Reviewed literatures were used to identify the various factors that hindered the adoption of green measures and practices within the Nigeria's built environment. A questionnaire survey was used to obtain primary data; administered to end-users selected randomly. The results show that GB is strongly affected by its stakeholders such as the negative attitude of developers towards incorporating GB features in residential developments; lack of consideration for end-users' preferences; Divergent and Incompatibility of interests and views of success of GB developments among stakeholders; Lack of Sufficient information regarding GB costs and performances.

**Keywords:** built environment, end-user, green building, hindrance, housing sector

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# HOME EQUITY CAPITALISATION: ANALYSIS OF INFLUENCING FACTORS

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It is argued that a significant number of home owners in the developing world with low incomes are asset-rich. The problem is that they hold these assets in defective forms. Strong property rights and titling are posited to be the means for unlocking the potentials of these assets as collateral for investment capital. There is however insufficient evidence to show how title/lease registration per se unlocks the potentials of these assets for enriching the lives of their holders. This study sought to find empirical evidence for or against this in Wa; an emerging city in a poverty endemic region where land documentation is reasonably practiced. The study adopted a cross-sectional design. Five communities and five financial institutions were randomly and purposively selected, respectively. The study reports a massive (88.7%) lease registration in among the respondents but few properties (14.7%) used as security for loans. Strong bequeath motive, unwillingness to access loan, risk aversion, prestige attached to ownership and bureaucratic nature of mortgage loans were the top five factors that hindered most property owners with registered leases to access equity release loans. Title/lease registration was found not to be the most important hindrance nor requirement for borrowing against an asset. Lenders requirements for legal documentation of a property was not limited to registered title/lease but included site plans. The main reason for lease registration was found to be the security of tenure and not for loan purposes. Therefore, the respondents who thought that their ownership rights were very secured by mere physical occupation on the land did not find any reason to register their leases. The concept of borrowing against an asset as poverty alleviation tool should be reconsidered by development advocates. Financial institutions and development advocates should invest in financial education as a step to increase the understanding of home ownership as an asset that can be safely traded. Further study is recommended to provide further evidence of the possibility of securing loans with property documentations other than registered lease (title).

**Keywords:** equity release loans, lease registration, investment capital, Wa

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# IDENTIFYING THE FACTORS INFLUENCING REAL ESTATE PRICING IN KUMASI METROPOLIS

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Real estate developers have stepped up business efforts to close up the housing deficit in Ghana. However, affordability of houses remains a mirage to most low and middle-income earners. Pricing of these houses need investigation. This paper identifies the main factors that influence the pricing of real estate houses in the Kumasi Metropolis in Ghana, a developing country. Using snowball and purposive sampling methods, 29 members of the Ghana Real Estate Developers Association (GREDA) in Kumasi were involved in the study. Data obtained were analysed using descriptive statistics techniques. The results indicate that foreign exchange, cost of materials, location or proximity to city centre, access to land, interest rate on loans and types of buildings are the main factors affecting the pricing of real estate housing in the Kumasi Metropolis. Real estate housing providers need to consider reducing the frequency of use of imported products in housing delivery. Significant shift to the use of local construction materials, after adding value to them, would play an important role in reducing the demand for foreign currencies, which has been found to be a major contributor to non-affordability of real estate houses in the study area.

**Keywords:** affordability, Ghana, Kumasi, pricing, real estate housing.

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# IFC SCHEMA EXTENSIONS FOR CONSTRUCTION CASH FLOW MANAGEMENT: A PROPOSED METHODOLOGY

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Previous studies have explored the automation of construction cash flow analysis and management process and have developed several software applications that eliminate the manual exercises attributed to previous methods through automated spreadsheet solutions, cost-integration methods, Artificial intelligence techniques and more recently using 5D Building Information Models. However, these diverse CFM software applications which are based on different data formats do not directly or automatically exchange information heterogeneously due to interoperability challenges. This is fundamentally due to lack of standardization, and while the BuildingSMART Industry Foundation Classes (IFC) data model is currently the widely adopted data standard for information sharing and exchange in the AEC/FM industry, it's scope does not capture data specifications that support cash flow management, hence the lack of interoperability among this CFM applications. This study reports the methodology for a proposed PhD research underway to develop Industry Foundation Classes Data Schema for Construction Cash Flow Management (CFM). The study will adopt the BuildingSMART IFC development methodologies for the schema extensions and development. Information requirement identification and analysis for CFM will first be conducted and subsequently, process and information requirement models would be developed and finally schema extensions are developed and tested. The proposed data schema extensions will cover the entire CFM process; planning, forecasting, monitoring and controlling of construction cash flows.

**Keywords:** BuildingSMART, cash flow management, IFC

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# IMPACT OF RATING SYSTEMS ON THE CONSTRUCTION OF GREEN BUILDINGS IN SOUTH AFRICA

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The built environment is a major contributor to global carbon emissions and the substantial negative environmental impacts of buildings has led to the concept of green building. Amongst the challenges that the industry is faced with is that green building techniques are voluntary and can be highly variable. In South Africa, the Green Building Council of South Africa has created the Green Star SA rating system in order to standardise green building practices, allowing for the objective assessment of just how green a building is. The tools serve as a mechanism to drive the adoption and uptake of green buildings, however, the process involved in achieving a rating is perceived to be negatively impacting the wider uptake. The aim of the research was thus to determine how the use of a rating system influences the mind-set of a project team and the overall process of certification. Furthermore, the research investigated the added advantages that certified projects may have whilst exploring alternative rating systems that could be used in the local industry. A quantitative research method has been employed, using questionnaires sent to a random selection of eighty-five accredited professionals across South Africa registered with the Green Building Council. Twenty-six responses were included in the results that indicated aspects of the rating process, including additional documents, commissioning and document review, contribute negatively due to the lengthy nature required to comply. Furthermore, project teams are resistant to adopt the additional tasks associated with procurement of green materials which affect the procurement strategy and contribute to its complexity. Purchasing these materials is hindered by the lack of available, reliable knowledge about them, limited availability from suppliers and a lack of certification provided. The shift away from conventional design and construction exposes project teams to new risks and a lack of knowledge and training with green building means that project teams face unfamiliarity regarding green practices. Conclusions include a great need for increased education and training of project teams with respect to the rating system and an increased exposure of them to green projects, specifically involving the procurement and certification process for materials.

**Keywords:** assessment, certification, green building, green materials, green star rating

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# IMPACT OF SOIL EROSION ON FARMERS LIVELIHOODS IN IWARO OKA AKOKO, ONDO STATE, NIGERIA

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This study was carried out in Iwaro Oka Akoko, Ondo State, Nigeria. The general objective of the study was to assess the causes of soil erosion and to determine how these affect the livelihoods of farmers in Iwaro Oka Akoko. The specific objectives of the study were to determine the major causes of soil erosion and its effect on agricultural productivity and livelihoods as well as identify the methods used to control soil erosion in the study area. The study used both primary source of data collection and secondary sources. Primary sources included use of interviews, field observations and questionnaires, whereas secondary sources included literature materials from various journals and publications. The sample population was 151 households which were selected using simple random sampling techniques. Key findings of the study indicated that soil erosion is a major problem which negatively affect agricultural productivity and also affect the livelihoods of farmers. It also reduced the goods and services that the community had access to and thereby negatively affecting their standard of living. From the findings of the study, there is need to create awareness at all level on the negative effects of soil erosion which affect the livelihoods of farmers and also to educate farmers on better methods of soil conservation and farming technologies so as to reduce problem of soil erosion.

Keywords: farmers, land degradation, livelihoods, soil erosion

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Olorunlana, F. A. (2017) Impact of soil erosion on farmers livelihoods in Iwaro Oka Akoko, Ondo State, Nigeria *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 843-852.*



# IMPACT OF TENDERING PROCEDURE ON PRICE FORMATION IN CONSTRUCTION CONTRACTS: CASE STUDY OF THE COMPETITIVE NEGOTIATION PROCEDURE

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There are different types of tendering methods used to secure tender offers from contractors. This paper argues that the type of tendering procedure used by a client is one of the significant determinants of pricing levels of contractors particularly the risk component. A competitive negotiation tendering procedure was shadowed in South Africa for six months using participant observation. Six contractors submitted tenders based on bill of quantities in the first round of the tender process and three were selected to submit final tender offers in the second round based on activity schedule. The average of tender prices in the first round was R58,646,712 compared to R57,151,509 in the second round which translates to 2.5% reduction in the overall pricing levels of contractors. Despite minor additions in the tender addenda and the fixed price nature of the final tenders, the winning contractor's final tender was 0.25% lower than their price in the first round, although the average of the final three tender prices was 0.69% higher than their first round tender prices. The monetary value of the tender addenda could not be quantified because of access. This would have enabled a more direct comparison of pricing levels in the first and second rounds. Clearly, a number of variables influence pricing levels and not all of them have been controlled for in this study. However, two preliminary conclusions are presented. The first one is that the type of tendering procedure is a significant determinant of pricing levels. The main variable dictating the influence of the tendering procedure on pricing levels seems to be the extent to which the tendering procedure enables tenderers to clarify their uncertainty about the proposed work. Tendering procedures that enable greater interaction between contractors and the client's professional team will generally lead to more accurate risk pricing. The second observation relates specifically to impact of the competitive negotiation tendering procedure on price formation. The stages and activities of this tendering procedure promoted clarity for the contractors and thus reduced their risk pricing. The winning contractor's tender price was 0.25% less than the first round tender offer despite minor additions to the original project information and its fixed price nature. Their fee percentage of 6.65% remained unchanged. Hence, the reduction in pricing levels should be linked with the cost estimate. Assuming resources is a fixed cost, risk contingencies would be the variable cost element that came down.

Keywords: competitive negotiation procedure, participant observation, price formation, risk pricing, tendering

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Laryea, S. (2017) Impact of tendering procedure on price formation in construction contracts: case study of the competitive negotiation procedure *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference*, 16-18 August 2017, Accra, Ghana, 853-869.

# IMPLICATIONS OF SOCIAL PRACTICES AND LITERACY ON WAYFINDING DESIGN STRATEGIES IN NIGERIAN HOSPITALS

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This study set out to establish ways of improving wayfinding in Nigerian hospitals due to the rise of trauma cases resulting from insecurity and insurgency. This is important because such scenarios complicate wayfinding for local residents within hospital environments designed along western healthcare standards. Unique Adequacy approach was employed to generate responses to wayfinding needs in Northeast Nigeria, the most vulnerable region to terrorist attacks in the country. Two surveys were conducted in four large regional hospitals to explore existing features and wayfinding components of physical features, coded information and social practices obtained from literature. Results via visual observations and interviews reveal extensive incorporation of wayfinding features with little or no guidelines resulting to poor design, confusing signs and high dependency on social practices. Questionnaire responses from 364 respondents analysed for means (M), relative importance index (RII) and differences of means using ANOVA reveal physical features notably entrances and exits, staircases, ramps and courtyards recorded significantly higher ratings for wayfinding cues. These were followed by the social practices of verbal communication and lastly, coded information in form of signage, a common design solution to wayfinding. These results imply that users will find it tasking to find their way out of complex hospitals in the event of a security or fire emergency by relying on designed wayfinding strategies. Specifically, users rely on the social practice of verbal instructions to supplement physical building features during wayfinding in part due to low educational levels in the study area. The implication on practice is that architects and construction professionals need to differentiate finishes, structures and landscaping elements, project clear building entrances and sidewalks as well as design colour guides on walls and not floors to improve wayfinding. Urgent improvement, implementation and monitoring of basic education delivery are also required in the northeast to meet global best practices to aid wayfinding.

Keywords: education, hospitals, northeast Nigeria, social practices, wayfinding

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Maina, J. J. and Dauda, A (2017) Implications of social practices and literacy on wayfinding design strategies in Nigerian hospitals *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 870-885.*

# IMPROVING WATER RESISTANCE OF COMPRESSED EARTH BLOCKS ENHANCED WITH NATURAL FIBRES

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Studies have shown a great potential for the use of CEBs as a sustainable building material due to its economic, environmental and social benefits. This study investigates the water resistance characteristics of CEBs reinforced with natural fibres. The fibres were sourced from coconut husk, sugarcane bagasse and oil palm fruit at 1 wt% added to two soil samples. The CEB specimen size of 290 × 140 × 100 mm were made at a constant pressure of 10 MPa and dried in the sun for 21 days. Accelerated erosion test was conducted to determine the resistance of the specimen to continuous rainfall condition. It was discovered that the fibres helped in reducing the erodability rate of the blocks, though there were some degree of damage. The difference between the water resistance of the unreinforced and fibre reinforced CEBs were found to be statistically significant. Furthermore, the surface of the fibre reinforced blocks eroded rapidly in depth than the internal part, and there was reduction in the depth difference of the erosion with increase time of water spraying on the specimens. The study concludes that though the addition of fibres in soil blocks does not completely prevent the block from erosion, the impact of the fibres on the blocks significantly reduce the erosion.

**Keywords:** Compressed earth blocks (CEBs) , natural fibres, water

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# INFLUENCE OF POWER ON CLIENT-CONTRACTOR RELATIONSHIPS IN COLLABORATIVE CONSTRUCTION PROCUREMENT

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Over the past two decades, there has been an increasing adoption of collaborative procurement practices such as partnering, alliancing and framework agreements. Thus, a growing research interest in the area collaborative procurement practices in the construction industry. Collaborative relationships among project participants are said to provide a means for achieving better performance, value creation, 'no-blame' culture, win-win scenario and other tangible benefits. Previous studies and anecdotal evidence indicate that power is generally a key factor which significantly influences commercial relationships. Power is an important dynamic in organizational behaviour. However, there is no comprehensive study reported on how power influences client-contractor relationships in collaborative construction procurement, considering the central roles clients and contractors play in construction contractual relationships generally. Clients and contractors have their sources of power which needs to be systematically understood in the context of collaborative procurement and contracting arrangements. This study proposes to determine the influence of relative power between clients and contractors on collaborative procurement arrangements. A phenomenological approach is being considered to examine power in collaborative contractual relationships. The following questions should be examined and analysed: What factors create power for the main parties in a construction contract? What is the nature of the balance of power between the client and contractor in different stages of the project lifecycle? How does the power position of the parties influence collaboration in construction projects/contracts? Clients and contractors engaged in collaborative construction contracts in South Africa will be interviewed to explore the research aim and questions. It is anticipated that a better understanding of the relationship between power and collaboration in construction projects will offer essential insights for improving collaborative working practices in construction, and ultimately project performance. This study is an ongoing doctoral research which is in the initial stage.

Keywords: collaboration, collaborative procurement, power, relative power

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# INFLUENCE OF PROJECT MANAGEMENT TOOLS AND TECHNIQUES ON PERFORMANCE OF BUILDING CONSTRUCTION PROJECTS IN LAGOS STATE

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The underperformance of building construction projects remains a major issue in the Nigeria's construction industry despite the availability of numerous project management tools and techniques. For building construction projects, effective control of cost, time and quality are success factors. This study investigates the extent to which the use of project management tools and techniques influence building project performance. A survey of professionals managing construction projects in Lagos, Nigeria was conducted through the use of structured questionnaires. A total of 85 questionnaires were administered out of which 72 were duly completed, returned and found useful representing 84.7% response rate. With the aid of Statistical Package for Social Sciences (SPSS) version 20.0, descriptive and inferential statistical tools including, bar chart, mean, frequency tables, Kendall's tau\_b correlation and independent samples T-test were used to analyse the data. The results showed that there is significant correlation between the use of Gantt chart and cost performance of projects. This study recommends amongst others regular and adequate training of construction project managers and construction site managers on the use of appropriate tools and techniques for effective control of building projects with a view to achieving optimum cost, time and quality performance.

**Keywords:** building, management, performance, projects, tools and techniques

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# INFLUENCE OF SOCIO-SPATIAL FACTORS ON TRADITIONAL MARKETS IN KANO STATE, NIGERIA

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Traditional market being a place meant not only for economic activities but also a place for entertainment, political and social interaction. Due to rapid urbanization, stereo-typed shopping malls have constantly replaced traditional markets with little or no considerations of socio-cultural activities in their designs; this has led to the decline in activities of traditional markets making them a place for final sales only. The purpose of the study is to determine the influence of socio-spatial factors in Kurmi and Kantin Kwari Markets. The methodology employed a mixed methods approach; participant observation and survey questionnaires to determine the influence of socio-spatial factors of wayfinding, context, functionality, users' interaction, safety/security, and culture/identity in the study areas. 250 questionnaires were administered, 177 (71%) were valid. The findings reveal important outcomes notably that wayfinding is a significant missing factor in the two study areas, functionality is also a vital missing factor in Kurmi market while culture and identity is an essential missing factor in Kantin Kwari Market. The findings imply that in future, architects and other allied professionals need to pay much attention to these factors in designing markets in order to attract more users while supporting their needs.

**Keywords:** Kantin Kwari market; Kurmi Market; spatial; socio-cultural; traditional market

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# INFORMAL SPACE-USE IN FORMAL LEARNING ENVIRONMENTS: CASE STUDY OF ARCHITECTURE DEPARTMENT AT AHMADU BELLO UNIVERSITY

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Recent changes in higher education (HE) has led to the evolution of learning activities taking place in virtually every space on campus-from formal environments such as classrooms, libraries and lecture theatres to informal settings such as spaces in between buildings, cafes and social spaces. Few studies report the way students employ informal spaces for formal learning purposes in Sub-Saharan Africa, a region with increasing rates of HE enrolment. To this end, the study, conducted in a design related discipline at the oldest department of Architecture in Nigeria employs documentation of space use via participant observation, interviews and a questionnaire survey to establish ways students integrate informal spaces in HE learning. Results reveal that studios, classrooms and lobbies are employed for informal individual and group learning purposes. Such informal spaces are not designed nor optimally modified to cater to informal learning in terms of comfortable seating, natural lighting and ventilation, Internet connectivity and availability of electrical charging points. Additionally, traditional media such as textbooks, notebooks, drawing sheets, modelling materials and jotters are still relevant in a technological era for design related disciplines. The paper recommends that such features be carefully integrated within formal academic buildings during design as well as refurbishments and renovations of already existing structures to adequately enhance sustainable HE learning and educational environments in future.

Keywords: architecture, environments, informal spaces, learning, space use

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Maina, J. J. (2017) Informal space-use in formal learning environments: case study of architecture department at Ahmadu Bello University *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 930-944.*

# INTANGIBLE ASSETS VALUATION IN NIGERIA: A REVIEW OF THE CONCEPT AND PRACTICE

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Asset valuation is an important aspect of valuation in Nigeria but little or nothing have been heard about the way and manner in which intangible components in such valuations are handled in Nigeria most especially at this time that debate about its value measurement and reporting to external user is gaining renewed interest. This study assesses rate of asset valuation relative to other valuation instructions received by Valuers in the study area, the level of familiarity of the real estate practitioners with various classifications of intangible assets as well as identification criteria, approaches and methods adopted. Structured questionnaire was administered on 300 registered Estate Surveying and Valuation firms in Lagos and Federal Capital Territory out of which 227 were retrieved and found good for analysis. The data obtained were analysed using simple descriptive and weighted mean score. The findings revealed that much importance is not attached to intangible assets in value creation process. Some practitioners are unfamiliar with the criteria for identifying intangible assets while some considered it convenient to summarize intangible assets as goodwill therefore avoiding conduct of in-depth analysis using appropriate valuation approaches and methods. It is therefore suggested that expertise development and specialization should be encouraged in the profession to ensure valuations involving such volatile form of assets are handled by competent and experienced valuation analysts.

**Keywords:** estate surveyors, non-physical asset, valuation approaches, valuation methods, valuers

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Sodiya, A. K., Adetokunboh, O. O. and Agbato, S. E. (2017) Intangible assets valuation in Nigeria: a review of the concept and practice *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 945-960.*



# INVESTIGATING THE QUALITY OF RICE HUSK ASH PRODUCED USING LOCALLY FABRICATED INCINERATOR IN CONCRETE MIX

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The immense inevitability in this age is to achieve the sustainability of the environment by substituting Ordinary Portland Cement (OPC) with quality Supplementary Cementitious Materials (SCM) as partial cement replacements in concrete production mix designs; this can be realized by the use of rice husk, industrial by-products of agricultural waste. The research thus, investigated the environmental sustainability of rice husk ash (RHA) produced by a Locally Fabricated Incinerator (LFI); and the study of its quality when used in concrete mix designs. The RHA was produced by burning the rice husk under controlled conditions during which expelled Carbon Dioxides (CO<sub>2</sub>) emitted were measured. Chemical and mechanical characteristics of the RHA were also analyzed to ascertain its quality. The results showed that the CO<sub>2</sub> released was 280ppm indicating that the production of the RHA was not harmful to the environment. The sum addition of Silicon, iron and Aluminum oxides from the chemical analysis totalled 78.73% by weight. The durability of the concrete was increased by 100% while the maximum compressive and tensile strengths of 34.66N/mm<sup>2</sup> and 3.44N/mm<sup>2</sup> respectively were recorded at 10% replacements at 56 days. It is thus concluded that the quality of RHA produced by the LFI met the minimum requirements for its use in concrete production; this guided the production of concrete which resisted abrasion and permeability. Thus, to increase the durability of the concrete and the production of environmentally friendly SCM, the incorporation of RHA at 10% in partial replacement in OPC production is recommended.

**Keywords:** cementitious materials, locally manufactured incinerator, partial replacements; rice husk ash; supplementary; sustainability

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Dadu, D. W., Stanley, A. M. and Ehoche, E. P. (2017) Investigating the quality of rice husk ash produced using locally fabricated incinerator in concrete mix *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 961-977.*

# INVESTIGATION INTO GREEN ATTITUDES TOWARDS SHOPPING MALLS' DESIGN IN MINNA, NIGERIA

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In Nigeria, the growing human population and its consequent demand for commercial activities have contributed to the design of numerous shopping arenas and complexes. This in turn has its force on the ecological status of the built environment; the phenomenon, which, has led to the quest for 'energy conscious', 'eco-friendly' and 'energy efficient' design approach. Although, various works have concentrated on environmental concerns and the need of greening the building industry, nevertheless, few works have focused on retail properties such as shopping centres. Meanwhile, the multifaceted environmental impact of this building type in the built environment is undoubtedly demanding attention. This paper investigated green attitudes towards the integration of eco-design features in existing shopping complexes in Minna metropolis. The aim is to promote eco-friendlier shopping centres that maximize energy resources and minimise the current environmental burden emanating from the commercial buildings in the retail sector. Shopping complexes in Minna were purposively selected based on zoning and their commercial activities. Initial findings show that the majority of the shopping centres do not undertake green initiatives. This is perceived to be as a result of the owners' interest. Results from the findings indicated that environmental sustainability of these buildings depends on adequate knowledge of energy efficiency needs and other factors such as the resource capacity and available capital perceived to influence environmental sustainability initiatives of the project. It concludes the need for these issues to be addressed in order to realize a greener retail industry where "green" initiatives are embraced and implemented more extensively.

**Keywords:** built environment, eco-design, energy efficiency, shopping complex, sustainability

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# KEY ELEMENTS FOR SUSTAINABLE INFRASTRUCTURE DESIGN IN DEVELOPING COUNTRIES

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Infrastructure makes available the physical structures needed to provide the commodities and services essential to enable, sustain and enhance societal living. Investment in infrastructure in developing countries is essential for poverty reduction and it positively and significantly correlates with economic growth. Infrastructure provision has considerable impacts on resource utilization, quality of the environment and overall quality of life. This research recognizes the fact that infrastructure provision process should meet performance requirements in terms of economic, ecological and social aspects and that the design approach has to be in a way to harness technologies and meet human needs by working with nature, instead of solving problems at nature's expense. The objective of this study was to identify key design elements for sustainable infrastructure design in developing countries. Systematic literature review was employed to identify the key elements. The key elements were further refined by Delphi research technique that involved internationally recognized experts in the areas of sustainable infrastructure provision. The refined key elements are outlined under eight categories namely material selection, economic considerations, social considerations, environmental considerations, technical considerations, policy and regulations, design and project management and design professionals and the design process. The results of the study would help primarily design professionals in developing countries in designing sustainable infrastructure.

**Keywords:** design, developing countries, key elements, sustainable infrastructure

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# LESSONS LEARNT FROM THE 2012 FLOOD DISASTER: IMPLICATIONS FOR BUILDING DESIGN AND CONSTRUCTION IN HIGH-RISK FLOOD PRONE AREAS OF BAYELSA STATE, NIGERIA

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Studies have shown that most parts of Yenagoa, the Bayelsa State capital fall within the high-risk flood zone of Nigeria and are susceptible to annual flooding. However, the 2012 flood was unusual in magnitude and led to the inundation of entire communities, the destruction of lives and property especially buildings and infrastructure. Over three years have elapsed since the floods and new construction projects have resumed in some of the hardest hit areas of Yenagoa. This paper draws on data from a survey of 400 new residential dwellings around areas hardest hit by the flood in Yenagoa. The survey involved interviews with home owners, private developers and architects in the area, to investigate possible lessons learnt in design, material use and construction to enhance resilience against future extreme floods in the region. The results of the survey show the percentage of developers who took precautionary measures in increasing flood resilience and those who did not; the role of the architects in developing flood resilient buildings; and the factors that have influenced these decisions and level of professional involvement.

Keywords: adaptability, architectural design, building construction, flooding, lessons learnt, resilience

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# MARKET FIRES AND RISK ACCUMULATION IN GHANA'S BUILT ENVIRONMENT

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In the last two decades, traditional open-air markets which serve as centres for livelihood activities in Ghana have also become the ill-fated amphitheatre of incessant fire disasters. The disasters are often blamed on unseen risk accumulation processes. This study examines the risk accumulation processes responsible for the unending fire disasters in the Kumasi Central Market regarded as the largest open-air-market in Ghana. By engaging with some fire (non) victims in the Central Market, through a multi-directional methodological approach, traders' limited understanding of the risk accumulation arising out of their (in) actions is revealed. It is shaped by complex socioeconomic factors, unsustainable planning and development practices and poor management framework, all of which have worked together to add to the risk in the market. Till date, these factors have been poorly understood and documented and therefore traders are reluctant to adopt mitigating measures required to reduce such fire disasters. The study concludes by suggesting a continuous debate on building a resilient market place where all key stakeholders are involved rather than government investment in infrastructure enrichment of this busy public gathering place.

**Keywords:** central market, disaster, Kumasi, risk accumulation, urbanization

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Owusu-Sekyere, E., Attakora-Amaniampong, E. and Yakubu, R. A. (2017) Market fires and risk accumulation in Ghana's built environment *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 1027-1047.*

# MATERIAL WASTE CAUSES AND THEIR IMPLICATIONS ON COST OVERRUNS IN ABUJA, NIGERIA: A MATERIALS-PROCUREMENT STAGE PERSPECTIVE

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Material wastage and cost overruns are global problems affecting construction projects. These problems occur at different stages of a project, from planning, design, estimating, materials procurement and construction stage of a project. The purpose of this paper is to examine the material waste causes and control measures that have effects on project-cost overruns at the materials procurement stage of a project. The study covers building-construction professionals in Abuja, Nigeria, from which a purposive sample of 30 professionals was drawn. Interviews were conducted with the sampled professionals; and in the process, quantitative data were generated by using a tick-box questionnaire. The tick-box questionnaire contained literature based information, which was personally perused by the researcher – when the respondents mentioned any of the issues contained in the tick-box. The results from the tick-box were the only data utilised in this research. The data were analysed by using the descriptive and inferential methods. The research found that the material waste causes that have ‘very high effects’ on cost overruns with respect to materials procurement stage are: procuring items not in compliance with specification, inexperienced personnel in estimation and procurement, mistakes in quantity surveys (poor estimate for procurement), and damage of materials during transportation. Conversely, difficulties of vehicles in accessing site and errors in shipping among others were identified to have ‘very little effects’ on cost overruns. Analysis of variance revealed a none significant difference in the views of the professionals on these issues. The study concludes that effective management of the identified material waste causes would translate into reduction in the amount of cost overruns with respect to procurement stage of a building project.

**Keywords:** control measures, cost overruns, material waste, procurement stage

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# METHODS OF DURATION ESTIMATION AT THE RURAL ROAD AGENCY IN GHANA

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The methods used in fixing contract duration is essential to both clients and contractors. The purpose of this paper is to determine the current practices or methods employed by the Department of Feeder Roads in estimating the duration of road and bridge construction projects. A questionnaire survey was administered to 66 professionals at the agency to indicate the techniques employed in estimating the duration of road and bridge construction projects. The results showed that 13.6% of the professionals arbitrarily fix contract durations with 68.2% indicating that they used similar experience on previous projects to fix duration. The results further showed that the duration fixed by construction professionals at the agency were different from that used by the contractors in executing contracts. It is recommended that the rural road agency adopts a scientific approach in the estimation of duration of their projects to prevent time overruns of future projects.

Keywords: bridges, contract duration, duration methods, rural roads, Ghana.

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Mensah, I., Adjei-Kumi, T. and Nani, G. (2017) Methods of duration estimation at the rural road agency in Ghana *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 1063-1078.*

# NATURE AND FEATURES OF TENDERS PROCESSED BY A UK CONTRACTOR IN 2010

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Construction contractors are constantly tendering for work. One reason is because of the widespread use of competitive tendering by clients as a strategy for awarding construction and engineering projects. Tenders submitted by contractors are often influenced by a range of factors which include cost of resources, profit, risk, market conditions and the firm's particular circumstances. Major contractors process several tenders annually in order to respond to client invitations, win work and sustain their business. However, little empirical research is often reported on the nature of tenders processed by contractors. Several studies acknowledge difficulty in accessing such data. Here, however, the authors were able to negotiate access into the database of a major UK contractor for documentary analysis of tenders processed in 2010. The purpose was to examine the nature of tenders processed and its essential features. 35 out of 57 tenders processed in one year were analysed to develop an empirical understanding of variables such as the value of projects and their tender period, costs of tendering, and extent to which subcontractors respond to tender invitations. No significant relationship was found between project value and the amount of time allowed for tendering. Tendering costs for the 35 projects analysed represented 1.76% of the company's annual turnover of £150m. This estimate excludes tendering costs for 22 other projects which could increase annual tendering costs of the firm to 3% of turnover. 72 enquiries to subcontractors received quotations from 50% of them. This demonstrates waste; one area contractors should address to reduce tendering costs. The value of this paper lies in reporting empirical findings on contractor tendering from an organisational perspective.

**Keywords:** relationship between project value and tender period, subcontractors' response to tender invitations, tendering, tendering costs

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# PERCEPTIONS OF CONSTRUCTION MANAGEMENT STUDENTS ABOUT THEIR CAREER PATHS TO BECOME CONSTRUCTION SUPERINTENDENTS

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A construction superintendent plays an important role in any construction project. The construction superintendent works closely with a construction project manager to make sure that the project stays on time and on budget. Superintendents in many ways function as bosses for building sites. It is their responsibility to make sure that projects are completed on schedule, within budget, and in a way, that is safe and follow local building codes and by-laws. Growth in the number of students becoming construction superintendents may become an emergent problem in the US construction industry soon. As it is known, companies have begun to heavily recruit project managers and superintendents out of school due to the improved technology used in the industry. However, few students are embarking on the route to become a superintendent upon graduating. This research study explores the market forces driving the need for superintendents and the potential shortages anticipated which are already being felt. It reveals the career track the current generation of construction management students are pursuing and the reasons for such choices; and it identifies different avenues the industry and CM programs can take to improve the issue. The major data for this research was collected via literature review and questionnaire surveys. Based on the analysis of these data, conclusive evidence concerning the current generation of construction student's preference in career path and the role the construction program plays were realized. The number of students going toward a superintendent career path tend to go up throughout the curriculum depending on formal construction experience. There were no freshman respondents to quantify, however from the academic status of sophomore up to the senior level tend to choose field positions after having worked in the field for a certain amount of time. Although there were more students wanting to become project managers due to personal preference, it can be said that acquiring construction experience while in school heavily sways a student's decision. Most students have a general understanding of the differences between a PM and Superintendent.

**Keywords:** careers in construction, construction education, construction superintendent, labor force

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Robinson, D., Azhar, S. and Nadeem, A. (2017) Perceptions of construction management students about their career paths to become construction superintendents *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 1097-1111.*

# POWER SECTOR DEVELOPMENT REFORMS IN NIGERIA: THE ROOTS TO THE CHALLENGES

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Nigerian socioeconomic development has been threatening persistently with severe power shortage and they are currently experiencing growth in demand for electricity. Various factors are responsible for the challenging situations such as oil pipeline vandalizations, stealing of high-tension cables and economic sabotage. Although several reforms, policies and regulations have been applied to address the insufficient electricity supply for over 120 years in Nigeria, yet the problem of inadequate electricity supply is even getting worst. The complexity of possible inference of the data for the inadequate electricity supply is not well understood. The research examined the various electricity reforms, policies and regulations adopted since 1896 till date to determine the status of the power supply and demand, and the key factors responsible for it. The research adopted a literature-based from peer review methodology to analyse electricity reforms adopted. The result from the peer review indicated that Poor maintenance culture, corruptions, inadequate funding, insecurity and lack of turnaround in energy mix are the key challenges facing the power industry, making it incapable to generate, transmit and distribute adequate and efficient electric power in the country. The finding also showed that Government lack understanding of the economic benefits of the power sector, thus leading to lack of comprehensive review of their reforms and policies. The paper also suggested that tapping from other sources of energy such as renewable energy, i.e. solar with sound policies and best practices is essential to supplement the existing source of energy while improving other key challenges identified.

**Keywords:** Nigerian electricity, power sector reform, electricity supply, privatisation

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Abdullahi, D., Suresh, S., Renukappa, S. and Oloke, D. (2017) Power sector development reforms in Nigeria: the roots to the challenges *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 1112-1122.*

# PREDICTING THE VOLUME OF MATERIAL WASTE: A CASE OF ONGOING BUILDING PROJECTS IN ABUJA, NIGERIA

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While quantification of material waste is crucial for construction waste management, accurate estimation can be accomplished by developing waste quantification model that is applicable for national or regional construction waste generation. This is important for building professionals to properly plan and control their disposal thereof. The purpose of this study was to develop mathematical models for quantifying the volume of building-material waste in Abuja, Nigeria. The methodological approach adopted is the quantitative technique that is rooted in the positivist research paradigm. 31 ongoing building construction projects were investigated, which includes public and private projects using purposive sampling technique (projects to the value of 1.6 billion Naira/8 million USD and above). The data for this research were sourced from the field investigation (measurement of the volume of material waste) and data from the archival records (drawings, project-progress reports, and specifications) on building materials and volume of material waste. Linear-regression analytical tool was used for the analyses. The study revealed a statistically significant relationship between the variables analysed models for predicting the volume of building-material waste in a project were developed from the linear-regression analyses. These models are presented and discussed in this paper. The study recommends the use of this model by construction professionals of the Nigerian construction industry in quantifying volume of waste at an early stage in the life of a project. This in turn, would minimise waste generation, which is in line with the prime objective of waste-management for a building project.

Keywords: building size, building materials volume, material waste, models , waste volume

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Saidu, I, and Shakantu, W. M. W. (2017) Predicting the volume of material waste: a case of ongoing building projects in Abuja, Nigeria *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 1123-1143.*

# QUALITY CULTURE ORIENTATION OF CONSTRUCTION FIRMS AS DRIVER OF PROJECT PERFORMANCE IN NIGERIA

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Construction is known to play significant role in driving economic growth by providing the needed infrastructure. This role is however hampered by poor quality standards which are manifested in high value of rework and incessant building collapse. Studies have identified culture in various forms as a moderator of performance and quality culture is considered as a useful tool for quality improvement. However, studies on the interrelationship between quality culture and performance are generally scarce. This study therefore investigates the orientations of the Quality Culture (QC) of construction firms in Nigeria and its contribution to project performance. The objectives are to determine the orientation of the quality culture of construction firms and its relationship with project outcome. To achieve these objectives, a survey of 86 firms drawn from the population of construction firms in Nigeria was conducted. 43 QC components were identified and categorised into seven QC orientations namely: management commitment, management support, technical staff, labour, system, process and values. The adoption of QC component was measured on a 5-point Likert scale namely: nil, low, moderate, high and very high which were scored 1, 2, 3, 4 and 5 respectively. Data were collected on contractors' staff perception of the adoption of QC components, initial and actual contract periods and sums and values of variation and rework of projects executed by construction firms sampled using structured questionnaires. Data collected were analysed to derive the levels of adoption of QC components groups or orientations, cost and time overruns and costs of variation and rework of projects using mean score. The relationship between QC orientations and project outcome was analysed using Pearson correlation test. The results show that management commitment and support, labour and process QC orientations have higher level of adoption than technical staff, system and value orientations. It is further discovered that only management commitment and support orientations have significant relationship with rework. It is concluded that the QC of construction firms is more oriented toward management commitment and support, labour and process QC components but only management commitment and support contribute to quality standards. It is recommended that construction firms should strive to improve their level of adoption of QC components in order to improve the performance especially the quality standards of projects executed.

Keywords: construction firms, Nigeria, project performance, quality culture, quality culture orientation

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# READINESS OF NIGERIAN CONSTRUCTION FIRMS TO ADOPT LEAN CONSTRUCTION PRINCIPLES

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Lean construction principles are one of such innovative processes that bring about the much needed continuous improvement and desired change in the construction industry. Research have shown that construction projects are susceptible to problems such as low productivity, poor safety, inferior working conditions, insufficient quality, lack of timely communication and coordination amongst project stakeholders, and rising litigation. The adoption of lean construction (LC) Principles within the manufacturing and other industries had led to notable improvement and resulted in improved time-to-market, reduced production cost, improved quality of the product and active customer involvement. The study appraised the readiness assessment of Nigerian construction firms to adopt LC principles. The method of study involved a critical exposition of related literature, and VERDICT readiness assessment model. A structured questionnaire was issued to a sample size comprising 72 firms drawn from a finite population of 199 Nigerian construction firms operating in Abuja, Nigeria. The result of the study revealed that Nigeria construction firms have management readiness to adopt LC principles, but do not have process/project, people and technology readiness to adopt LC principles. The study concludes that Nigeria construction firms are not yet ready to adopt LC Principles. The study recommends developing a framework for LC principles adoption, continuous awareness campaign of LC principles and its potential benefits via education and training to professional bodies, tertiary institutions offering building construction related programmes and stakeholders in the construction industry in order to build well equipped industry to operate in line with global best practices, deliver projects successfully and more efficiently to satisfy clients' needs.

**Keywords:** adoption, construction firms, construction industry, lean construction, Nigeria, readiness

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# READINESS OF NIGERIAN CONTRACTORS TO ADOPT BUILDING INFORMATION MODELING (BIM) TECHNOLOGIES

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One of the major challenges facing the construction industry is the issue of fragmentation as well as numerous stages related to a construction process. Building Information Modeling (BIM) has become the new international benchmark for efficiency in design, construction and maintenance of buildings and also serves as a platform that brings about new channel of communication between project stakeholders and improvement of project outcomes. However, miniature impact of BIM technologies has been felt in the Nigerian construction industry. The aim of this study is to assess the readiness of contractors to adopt BIM technologies in Nigerian construction industry. A quantitative approach was adopted for the research. A well-structured Questionnaire was self-administered to a sample of contracting firms within FCT Abuja, Kaduna and Kano. The questionnaire sought the perception of the respondents on the factors affecting BIM adoption, and their level of readiness to adopt BIM technologies in their practices based on the four categories of readiness (management, people, process and technology). 53.4% response rate was achieved and used for analysis. Descriptive Statistics and Percentage distribution was used to establish the rate of responses for the background information of the respondents while Means and Standard deviations were used to establish the significant of the factors affecting BIM adoption in Nigeria. The readiness assessments result shows that contractors' have management, technology fully and process partially readiness to adopt BIM, but more attention needs to be given to people so as to achieve readiness to adopt BIM. It was realized that most people in the organizations have adopted a wait-and-see attitude, reflecting the industry's reluctance to change existing practices and hesitation to learn new concepts and technologies. In addition, closed organization cultures, high switching costs, and limited training and technology support contributed to the unreadiness to adopt BIM. More time and incentives are required to facilitate BIM adoption in Nigeria.

Keywords: adoption, Building Information Modeling, contractor, challenges, readiness,

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# RETHINKING DESIGN SOLUTIONS TO HOMELESSNESS: A REVIEW OF PLANNING SPACE STANDARDS

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A review of national space standards in Ghana, Kenya, Nigeria, and South Africa was conducted in response to the challenge of urban homelessness and the lack of affordable housing. Whilst innovative efforts in relation to the (re)use of building materials, construction costs, construction finance and governmental policies all have an impact on the production of affordable housing units, the reality is that the informal sector is a major provider of housing for people on low or intermittent income, yet is rarely viewed as a source of valuable information, nor as part of the strategy for increasing the production of affordable housing. Space standards for residential buildings from the national building codes and one informal settlement in each of the four case study countries were analysed. A small sample of twenty residential floor plans from the Nigerian and Kenyan informal settlements was also analysed. The results from the analyses suggest that modifications to space standards can help increase the production of affordable housing units. The paper proposes a flexible space planning approach within the building codes which would allow for consultations with target populations, rather than a rigid application of the space standards which can result in accommodation that is not affordable for the people it is meant to house.

Keywords: affordable homes, homelessness, shelter, space standards

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Adeokun, C. O. and Opoko, A. P. (2017) Rethinking design solutions to homelessness: a review of planning space standards *In: Laryea, S. and Ibem, E. (Eds) Procs 7th West Africa Built Environment Research (WABER) Conference, 16-18 August 2017, Accra, Ghana, 1189-1209.*

# REVIEW OF CRITICAL SUCCESS FACTORS FOR THE IMPLEMENTATION OF TOTAL QUALITY MANAGEMENT IN THE CONSTRUCTION INDUSTRY

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Total Quality Management (TQM) is a philosophy that involves every organization in the industry in the effort to improve performance. The concept is an integrative management principle for continuously improving the quality of products and processes to achieve customer satisfaction. To achieve this concept required a clear establishment of Critical Success Factors (CSFs). However, lack of clear establishment of CSFs for the implementation of TQM in the construction industry has led to failure of the system. In the pursuit of performance excellence in the construction industry and with an increasing awareness of construction quality, construction firms have no option than to implement TQM with clear CSFs. This paper therefore identifies and establishes the critical success factors for the implementation of Total Quality Management in the construction industry. Desk study and Delphi survey approach was adopted for this study. Based on the examination of existing literature and comprehensive analysis of the Delphi survey, the paper proposes eight (8) critical success factors of TQM for the construction industry. These include Leadership and Top Management, Supplier Quality Management, Quality System Evaluation, Client Focus and Involvement, Company Vision and Plan Statement, Product Selection and Design Management, Construction Process Management and Improvement, Construction Employees Involvement and Motivation. Hence to ensure successful implementation of total quality management in the construction industry, attention therefore should be given to the identified critical success factors in this study.

**Keywords:** total quality management, critical success factors, construction industry

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# REVIEW OF THEORIES; METHODOLOGIES AND ANALYTICAL TOOLS APPLIED IN SUSTAINABLE CONSTRUCTION RESEARCH

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The need to adopt sustainable practices at the organisation level in the construction industry continues to be a growing debate among researchers in terms of the theories, methodologies and approaches. Hence, the aim of the paper is to review theories, methodologies and analytical approaches applied in context of sustainability research. Through a thorough literature review, the findings point out to the fact that, there is limited use of grounded theories which underpin organization adoption of sustainable practices and most studies adopt standalone theoretical basis instead of more integrated theories in sustainability research. In addition, it was revealed that there is dominant use of empirical methods especially survey and semi-structured interview. The study contributes to the philosophical development of sustainable procurement practices. This will be useful to researchers in construction management knowledge. Future research opportunities were identified such as the development of a model that builds on multiple organizational theories for the adoption of sustainability, and application of Least Square-Structural Equation Modelling in sustainable construction research.

**Keywords:** adoption, analytical tools, methodologies, organisational theories, sustainability practices

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# RISK MANAGEMENT FRAMEWORK FOR BUILD OPERATE AND TRANSFER (BOT) INFRASTRUCTURE PROJECTS IN NIGERIA

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The use of concession agreement such as the Build-Operate-Transfer (BOT) for infrastructure development is becoming considerably popular in both developed and developing countries. However, the successful implementation of BOT depends largely on understanding the contexts and types of risks associated with these types of agreements. This study presents a robust evaluation framework for assessing critical risks of BOT projects in Nigeria. Risk factors were identified and investigated through literature survey and subjected to experts' scrutiny for modification and adoption. Ten (10) experts, two (2) each from the offices of developers, lenders, contractors, government and academics were consulted for review and modification of the identified risk factors. 120 structured questionnaires were randomly administered to professionals in the offices of government agencies, developers, lenders and contractors for rating the criticality and impact of the adopted risk factors based on a 5- point likert scale. Descriptive statistics (Criticality Index) was employed to evaluate the impact of the risk factors. The results revealed that risk factors with the highest (CI) that require utmost attention are change in government policies (4.3593), unfavourable business environment (4.2093), project company default (4.2093), time performance risk (4.1239), cost performance risk (4.0814), excessive development cost (4.0581), instability in government (4.0116) and insufficient funds to finance projects (4.0116). A project risk framework was developed by classifying the risk factors into political, procurement, financial and revenue, legal, development, construction and operating risks. The framework provides stakeholders with the understanding of key risk factors for effective implementation of BOT projects in Nigeria.

**Keywords:** risk management, build operate and transfer, infrastructure, framework, Nigeria.

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# SOCIO-ECONOMIC DETERMINANTS OF HOUSING SATISFACTION AMONG MIDDLE-INCOME HOUSEHOLDS IN OWERRI, NIGERIA

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Housing provision in Nigeria has not only been plagued by insufficiency in numbers, but also by inadequacies in quality. Housing quality is a predictor of housing adequacy. Adequate housing is housing that is in congruence with a family's needs and social status. Achieving this balance creates the possibility of residents experiencing satisfaction with their housing. Housing satisfaction must therefore be viewed as a critical element in housing provision, as it can substantially impact on the overall well-being of housing residents. This study addresses housing satisfaction among the middle-income in Nigeria, and the roles if any, socio-economic factors play in housing satisfaction among this income group. A total of 344 middle income households drawn from multi-stage sampling, were studied. Data collection was through administration of a structured questionnaire, and physical appraisal of housing formation in the study area. The socio-economic variables tested in the study are Income, Family size, Family structure, Level of education, Nature of employment, and Socialisation habits. Logistic regression test, with the logit dichotomous model was used for the analysis. The results of the study show that the socio-economic characteristics which significantly affect housing satisfaction among the middle-income group in Nigeria are Income, Nature of employment, and Socialisation habits. The other socio-economic variables could be accommodated by residents in their housing, if these three were adequately considered from inception. It is the conclusion of this study that housing design for this income group must place emphasis on affordable, cost-effective, and space-efficient housing, which will truly reflect good quality environments, and increase residents' satisfaction with their housing.

**Keywords:** housing satisfaction, mass housing, middle-income, Nigeria, socio-economic

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# STUDY OF WOOD AS A SUSTAINABLE MATERIAL FOR CLIMATE CHANGE MITIGATION USING ATHENA ECOCALCULATOR AND SYSTEM DYNAMIC MODEL

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In this study, the environmental effects of wood, steel and concrete as sustainable building materials were investigated quantitatively using Athena EcoCalculator model for Commercial and Residential Assemblies. A desk study methodology was adopted while a second model, System Dynamic Model (SDM) was used to further model the dynamics of the impact categories of wood, steel and concrete for a 60 m<sup>2</sup> two-bedroom residential building for 60 years life of the building. The results showed that wood materials require much lower process energy and result in lower (35% and 38%) carbon emissions than concrete and steel. The SDM also showed that wood has lower environmental impact of a building when compared to concrete and steel. The behaviour of each material indicated varied trend of increasing behaviour over the 60-year period.

**Keywords:** climate change, life cycle assessment, sustainable material, system dynamic model, wood

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# SUCCESSION PLANNING AND CONTINUITY OF FAMILY-OWNED BUSINESS: “PERCEPTION OF OWNERS IN THE WA MUNICIPALITY, GHANA

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The focus of this paper was to determine the perceptions of succession planning by owners/founders of family businesses and its importance in ensuring the continuity and prosperity of businesses in the Wa Municipality, Ghana. The literature generally indicates that succession in family businesses takes the form of transfer from one generation to another but succession planning appears to be left to chance by many firms. This neglect of succession planning and the emotions generated by the process makes owners ill-prepared for succession. The main question explored in the current study was: To what extent do Owners/Managers of family-owned businesses (FOBs) perceive succession planning as an important aspect of business continuity? A sample of 205 small firms was drawn randomly from a population of 440 family businesses in the Wa Municipality in Ghana. A structured questionnaire schedule was used to collect data which was analysed using descriptive and inferential statistics. The findings indicate that majority (94.1%) of FOBs perceive business planning as an important skill for owners or founder while the ability to develop a business strategy has a positive impact on succession and leads to continuity of FOB. People with high level of formal education tend to have positive perception on the importance of succession planning and business continuity as compared with those with lower levels of formal education. Majority of FOB owners or founders perceive that business continuity benefits the founder, the successor, the family and other stakeholders. It is therefore recommended that founders or owners of FOBs should make provision for the education and training of potential successors to facilitate succession for continuity.

**Keywords:** continuity, family-owned business, perception, planning and succession.

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# THE IMPACT OF THE VAN STADENS WIND FARM ON THE SURROUNDING COMMUNITY – A CASE STUDY

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In March 2013, an urgent application was brought forward by residents of Blue Horizon Bay, South Africa, in which they were seeking an interdict to restrain the continued construction of a Wind Farm granted special consent by the Nelson Mandela Bay Municipality. Residents had objected to the process followed when approving the development of this major new project and how the existing legislation was applied. The aim was thus to determine the nature of the impact the Metro Wind Van Stadens wind farm had on the surrounding environment including the health and wellbeing of residents as well as on the value of properties, thereby better informing future wind farm / project public participation processes. A quantitative research method has been employed, using a Stratified sampling technique, to collect data from thirty-five permanent residents in Blue Horizon Bay residing within a two-kilometre radius of the wind turbines as well as from a random selection of seven property experts operating in Nelson Mandela Bay was also collected. The results of the study show that residents have opposing perceptions towards the wind farm with visual pollution on the horizon in the nature conservancy negatively impacting the majority of residents, whilst a minority of residents have reported adverse health effects linked to infrasound. The property experts had similar perceptions although they did agree that wind turbines can cause the value of residential properties to drop when placed within a certain proximity to residential dwellings, with the distance and the topography having an impact thereon. The results of the study provide insight into the importance of an open and transparent public participation process that effectively addresses the impact wind turbines can have on people and the environment as well as the implications for property prices, as this process generated the most concern. In addition, the findings have relevance to the engagement processes of government entities with communities on projects of any scale particularly the communications process employed.

Keywords: Blue Horizon Bay, health, Van Stadens wind farm, wind turbine

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# THE PREVALENCE OF LEADERSHIP OVER MANAGEMENT FEATURES AMONGST CONSTRUCTION PROJECT MANAGERS IN THE UAE

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Leaders and managers are different; and their traits are also different. Construction project managers (CPMs) often provide vision and direction on how their projects should be executed, which is leadership. CPMs also plan and deliver projects, as 'Managers'. Thus, CPMs have both leadership and management abilities. A research investigated if the leadership traits of CPMs outweigh their managerial features, or vice-versa. The research was carried out in the United Arab Emirates (UAE) where 145 CPMs were asked to describe themselves in terms of 13 comparative 'leadership versus management' features. Ninety (62%) of the people approached responded. Analysis of the data collected, by means of descriptive and inferential statistics, showed that 11 (85%) of the 13 leadership traits scored higher than their management counterparts; and 9 (69%) of these higher scores were statistically significant. This suggests that more of the CPMs which were surveyed have prevalent leadership traits. In this regard, the respondents felt that they were e.g. creative, inspiring, trusting and passionate; which are all qualities of leadership. The survey has identified current CPMs who are potential leaders; and contractors and indeed other organisations can adopt our analysis for identifying their future leaders.

**Keywords:** leadership, management, project management, self-evaluation, skills, traits

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# THE RELATIONSHIP BETWEEN CONSTRUCTION SECTOR AND ECONOMIC GROWTH IN NIGERIA: 1981-2013

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Construction has been acknowledged to be a major driver of economic growth in most countries of the world, especially, the developing ones. Given its labour-intensive nature, the construction sector influenced other sectors of the economy through direct and indirect employment. Since the early 1970s, several studies have attempted to examine the relationship between the construction output and economic growth. The results from these studies have been mixed. While some observed a uni-directional relationship running between the construction output and economic growth in either direction, others have suggested that the relationship between the two variables is bi-directional. However, most of these studies have focused on developed economies with only a few addressing the relationship between construction output and economic growth in developing countries. This paper investigated the relationship between construction output and economic growth in Nigeria. The dataset employed in the study consists of quarterly data on construction output and GDP from 1981 to 2013. Data on construction output and GDP were obtained from the Central Bank of Nigeria Statistical Bulletin for 2015. The two variables were expressed in natural logarithms, thus allowing the estimated coefficients to be considered as the elasticity of the relevant variables. The co-integration analysis of the data for the study indicated that a long run relationship exists between the construction output and economic growth in Nigeria. To actually determine the direction of causality, the Granger Causality test was conducted on the data. The results showed that a uni-directional causality exists between the construction output and economic growth in Nigeria with the causality running from the latter to the former. To improve the performance of the construction sector and enhance its relevance in the growth process, few policy recommendations were offered.

Keywords: causality, construction sector, GDP, Nigeria

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# THE SHARED OWNERSHIP TENURE AND ITS APPLICABILITY TO THE AFRICAN AFFORDABLE HOUSING MARKET

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A housing scheme aimed at workers employed in key sectors such as the police force, education, and healthcare, which enables affordable home-ownership in stages- Shared-Ownership- has proved to be a viable option in countries such as the United Kingdom, and its suitability for the African market is explored in this paper, in response to housing shortages on the continent. A two-stage questionnaire was administered to a small focus panel of 5 professionals drawn from the construction industry in Ghana, Nigeria, and South Africa, to assess key features, benefits and shortcomings of the shared-ownership scheme in relation to the African housing market. The results revealed a clear need for format-modification in the African context yet highlights that some benefits of the product can assist (African) key workers to own their home during their prime working life. The authors concluded that the scheme offers benefits for the African affordable housing market by allowing immediate occupation of the property and payment in stages. However, any adaptation of the scheme must be compatible with the role of small scale property developers, include maintenance programmes, and have clear and comprehensive legal documentation.

Keywords: affordable homes, housing, key workers, shared ownership

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# THE SIGNIFICANCE OF HEALTH AND SAFETY OF CONSTRUCTION INDUSTRY PERSONNEL IN LAGOS STATE: CCECC CASE STUDY

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Assurance of health and safety of personnel in construction industries is a product of planning, co-ordination and commitment by the employers and the employee. The aim of this study is to access the significance of health and safety of construction industry personnel in Lagos State. It is of high importance to assess the factors that could facilitate health and safety hazards on construction site and the factors that could ameliorate the hazards on construction site. An exploratory survey was used in generating data within the Chinese civil engineering construction company(CCECC) Lagos. The population of the study consists of 75 workers of three categories vis a-vis supervisors, the foremen and the Artisans. The questionnaire was designed to obtain a fair representation of the three categories. Mean average statistics revealed that, site congestion, negligence, inadequate communication, and lack of safety equipment are highest factors that could facilitate health and safety hazards. While provision of site emergency facilities, site canteen, staff training and incentives could go a long way in ameliorating hazards. The study therefore recommended a cordial and passionate relationship between the employer and the employee by holistically providing site emergency facilities, safety equipment, staff training amongst other factors to give the workers a sense of belonging to the organization.

Keywords: construction industry, health and safety, hazard, Lagos, survey

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# THERMAL CLIMATE AND RESIDENTS' PERCEPTIONS OF SULTRY CONDITIONS IN RURAL AND SEMI-URBAN SETTLEMENTS IN SOUTHWESTERN NIGERIA

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Thermal climate, the atmospheric conditions of an area based on temperature differences and changes, involves delimitations of regions into thermal zones to enhance policies on dividing an area into temperature zones. This study examined the variations in the thermal climate of the urbanized southwestern Nigeria using selected traditional indices. It also investigated the coping strategies of residents in selected settlements to extreme thermal conditions. Air temperature, dewpoint temperature (an index of absolute humidity) and selected indices; Effective Temperature (ETI) and Relative Strain indices (RSI) were evaluated for 1961 – 2013 at ten meteorological stations in the regions. Results showed that the study area is characterized by 21.1 - 22.9 °C, 30.9 - 32.2 °C and 26.2 - 28.1 °C minimum, maximum and mean temperature variables, respectively within the study period. Dewpoint temperature, RSI and ETI were 21.3 - 24.4 °C, 0.09 - 0.15 (no unit), and 24.6 - 26.7 °C, respectively. Variations in the average values of selected variables between 1960 – 1990 and 1991 – 2013 were not significant ( $p > 0.05$ ) but spatial variations occurred from one location to the other; there is also a tendency for increase in the values of the thermal climate variables. The study also showed that dominant coping strategies were changing cloth/wears, opening windows for cross ventilation and installing fan at homes or offices in the urban settlements. The study concluded that response to potentially increasing thermal stress (sultry) in the region is rudimentary, and recommends awareness of vulnerability to extreme thermal conditions in the region.

**Keywords:** regional climate, sultry, temperature change, thermal climate

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# UNETHICAL PROFESSIONAL PRACTICES IN TENDERING OF PUBLIC BUILDING PROCUREMENT IN BAUCHI METROPOLIS, NIGERIA

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Globally, Public construction procurement is acknowledged as instrument for promoting economic, social and environmental wellbeing of a nation, and as a strategic means for curtailing unethical practices in the use of public funds. Nonetheless, abuse of tendering procedure in public building procurement are evident in Nigeria. Hence, this study investigated unethical professional practices in tendering of public building procurement in Bauchi metropolis, Nigeria, with a view to improving on professional ethics that will ensure value for money (VfM) procurement. Stratified random sampling technique was used to administer 122 questionnaires to construction professionals in Bauchi metropolis, and records 85.73% (105) valid response rate. Data were analysed using descriptive and inferential statistics. Results show no statistical difference in respondents mean scores on what constitute, influences perpetuation and measures for curbing unethical professional practices respectively. Connivance, deceitful advertisement, deliberate disparity of documents to tenderers, divulging confidential tender information, favouritism, and non-adherence to prequalification criteria were ranked as severe causes of unethical professional practices. Discontinuity in government projects, glorifying corrupt leaders, greed, immorality in society, poor understanding of ethical standards, poor workers remuneration, job insecurity, and weak judicial systems were ranked severe factors that influences perpetuation of unethical professional practices. While credible leadership, enforcement of strict punitive measures by professional bodies, ensuring parity in tendering, introducing ethics as a course in academic institutions, organizing seminars on ethics, strict adherence to professional ethics and procurement requirements, sufficient time for preparation of tenders, and understanding ethical and professional values among professionals were ranked effective and highly effective measures for curbing unethical professional practices. The implication is that contractors, consultants, and clients are all culprit in exhibiting unethical professional practices, and this need to be addressed collectively. This study recommends: stakeholders in tendering adhere to ethical requirements, public procurement Act be reviewed, improvement on public workers remuneration, appointment of credible leaders in public procurement agencies, and synergy between key public construction stakeholders for effective implementation of measures for curbing unethical professional practices.

**Keywords:** Nigeria, professionals, public building procurement, tendering, unethical practices

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# USING ANALYTIC HIERARCHY PROCESS (AHP) TO ASSESS EFFECTIVENESS OF COMPETITIVE TENDERING PROCESS

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Despite reforms of public works procurement undertaken in Chad from 2000s, Competitive Tendering does not fully benefit developing countries as expected due to the ineffectiveness of the process. To improve the performance, one of appropriate ways is the assessment of the overall effectiveness. So, the paper aims at applying Analytic Hierarchy Process (AHP) in assessing the overall effectiveness of Competitive Tendering Process for works procurement at pre-contract stage. The effectiveness assessment uses seven criteria and thirteen related quantifiable indicators along five phases of the process. Based on these variables, two combined AHP hierarchies were constructed and used for data collection via a questionnaire from a sample of 60 procurement entities in Chad. 38 valid completed questionnaires were returned representing 63.32%. The main finding is an AHP adapted methodology involving nine steps which were fully described in the paper. Data were analyzed following this adapted methodology. A practical example is provided for illustration in appendix 2. The study concludes that AHP is an emerging and suitable method to evaluate performance of tendering process in works procurement with many other advantages.

Key words: AHP, overall effectiveness assessment, competitive tendering, developing countries

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# VALUATIONS FOR COMPENSATION PURPOSE: THE NEED FOR GLOBAL UNIFORMITY

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Compulsory land purchase is a tool for the control of land uses as well as land acquisition for developmental projects by the public authorities, deriving such power in the relevant laws of different countries which usually provide for monetary compensation to the land/property owners whose land were confiscated. This study examined the compensation process of some countries across the continents in a search for a global standard for uniformity. The research adopted a content analysis of the provisions of compulsory land purchase laws of selected countries and literature review of some papers on compensation for compulsory land acquisition from different countries. There is no definition of 'adequate compensation' in the public land acquisition law of any of the countries under focus. The study found a provision for compensation in the various public land acquisition laws examined, with use of different nomenclature (Just, Fair, Equity, Equivalent) to qualify the compensation value. There is also no uniformity on the basis of valuations for compensation purpose across countries. In the spirit of globalisation and the various international standard being established like the financial reporting (IFRS) and valuation practise (IVSC-RICS Red Book), it will be germane to have a global standard for compensation to be adopted and incorporated in the various laws on compulsory land purchase and compensation. The study concludes that there is a need for global uniformity in valuation basis and methodology for global standard that should be adopted in compulsory land acquisition laws and implementation.

Keywords: compensation, compulsory acquisition, global, uniformity, valuation

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