



WEST AFRICA BUILT ENVIRONMENT RESEARCH (WABER) CONFERENCE

12-14 August 2013

British Council, Accra, Ghana

BOOK OF ABSTRACTS

Editors

A/Prof Samuel Laryea

Dr Sena Afi Agyepong



Book of abstracts of the West Africa Built Environment Research (WABER) Conference
2013
Accra, Ghana, 12-14 August 2013

Editors

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First published 2013

ISBN 978-0-9566060-7-5

Published by
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Please visit www.waberconference.com for more information

Declaration

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

FOREWORD

A very warm welcome to everyone attending this WABER 2013 Conference. This year's conference is special for a number of reasons. First, it is our fifth anniversary conference. Time flies! Second, we have keynote speakers from very distinguished backgrounds. Third, we have a WABER Committee providing the academic leadership for development of the Conference. Fourth, we have participants coming from 12 different countries. Fifth, we are back in Ghana after our successful WABER 2012 conference in Abuja, Nigeria. Sixth, the person who has written the paper adjudged to be the best is winning a prize worth about £3000 (Pounds) plus an opportunity to disseminate their work and network with international researchers. This is the first time of instituting the WABER-ARCOM best paper prize and the winner will be travelling to the UK to participate in the ARCOM 2013 Conference on 2-4 September – all expenses are paid for by the Association of Researchers in Construction Management (ARCOM). These are exciting developments and I want to thank you for contributing to our success.

I thank everyone here for coming particularly those of you who keep coming from year to year since 2009. Thanks also to all authors who have successfully gone through the peer review process and had their papers accepted and published in this proceedings. The peer review process for this conference has become increasingly rigorous so please accept our congratulations if you have your paper published in this proceedings. We received a total of 232 abstracts, 172 full papers, and eventually accepted 102 papers for publication in this proceedings which represents approximately 60% of full papers submitted. This statistic provides an indication of significant participation in the WABER conference and underscores the need to congratulate successful authors. The paper publishing process would not have been possible without the usual support of our 45 scientific committee members, 12 theme leaders and 58 reviewers from various parts of the world. Thank you for supporting us. We will be building on the successes of the past 5 years to develop our African Journal for Built Environment Research and expand the WABER website to provide a range of resources and services to support your research development.

We owe a huge debt of gratitude to Doagonal Projects Africa (DPA) Pty Ltd for serving as a major sponsor for the WABER 2013 conference. The Managing Director, Mr Moses Honu, has been very instrumental in making the collaboration between WABER and DPA possible so I wish to thank him for his passion about research and the development of the built environment field in Africa. We are also developing partnerships with RICS and John Rixs Construction Engineers & Contractors whose logos are featured on the front cover of this publication.

This year we have outstanding keynote speakers in the persons of Prof Chimay Anumba, Dr Ron Watermeyer and Dr Roine Leiringer. I would like to thank them for accepting our invitation to come and interact with the delegates at this conference. I cannot close without expressing gratitude to Dr Sena Agyepong – our Regional Organising Director. Her dedication and strong commitment is what sustains us from year to year. Dr Emmanuel Essah has been instrumental in helping to organize the conference logistics and financial issues.

My final and special thanks is reserved for our delegates who attend the conference. I know the difficult conditions under which many of our colleagues operate. Many of you have travelled great distances to come here. A number of you have covered your expenses from your own pockets. I want to recognize your commitment towards research development and the sacrifices you have made in order to be here. Thank you for coming and I pray you benefit greatly from the conference and go on to experience significant career progression in the coming years.

Take every chance to interact and enjoy the conference and have a safe journey back home.

A/Prof Samuel Laryea
School of Construction Economics and Management
University of the Witwatersrand, Johannesburg, South Africa
August 2013

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Prof Kabir Bala, Ahmadu Bello University, Nigeria
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We are grateful to the following academics for leading the refereeing process for papers relating to their research areas:

Dr Emmanuel A. Essah, University of Reading, UK – Building services, solar energy technologies, renewable energy, building physics, sustainable technologies

Dr Haruna Moda Musa, Manchester Metropolitan University – Sustainability in the built environment and construction materials

Dr Noah K. Karley, Heriot-Watt University, UK – Real Estate Development

Dr Roine Leiringer, University of Hong Kong, Hong Kong – Construction procurement, and organisational strategy and development

Dr Scott Fernie, Loughborough University, UK – Construction procurement, supply chain management, partnering and relationship management

Dr Tyler James Frazier, Technische Universität München, Germany – Building services, transportation and infrastructure development services

Dr. Jian Zuo, University of South Australia, Australia – Project management and project organisation

Dr Yingbin Feng, University of Western Sydney, Australia – Occupational Health and Safety, Human resources

Stephen Ajadi, Contemporary Initiative for Research in Design (CIRD), Nigeria – Architecture and planning

Dr Nii Ankrah, University of Wolverhampton, UK – HR, Culture and project organization

Dr Aaron Anvuur, Loughborough University, UK – Procurement and Supply Chains or Project Organisation and Management

Dr Martin Morgan Tuuli, Loughborough University, UK – Quantity surveying, financial management and construction economics

REVIEW PANEL

The peer review process for an international conference of this nature requires the expertise and voluntary contribution of a number of academics from various countries. We are grateful to the following people who assisted by carrying out the review of abstracts and papers for the WABER 2013 conference in addition to the members of our Scientific Committee.

Dr. Folake Isaacs-Sodeye, University College London, United Kingdom

Dr Bekithemba Mpofu, The College of Estate Management, UK

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Prof George Ofori, National University of Singapore, Singapore

THANK YOU FOR YOUR CONTRIBUTION

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The West Africa Built Environment Research (WABER) Committee for 2012-14 comprises of the following persons:

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Dr Emmanuel Essah, University of Reading, UK

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Dr Martin Tuuli, Loughborough University, UK
Prof Stella Zubairu, Federal University of Technology, Minna, Nigeria

The main responsibility of the WABER Committee is to provide the infrastructure and academic leadership for developing the WABER conference.

Our sincere thanks to the following persons who provided the infrastructure and academic leadership for developing WABER over the past four years: Dr Sena Agyepong, Mr Samuel Asare-Konadu, Dr Emmanuel Essah, Dr Chris Harty, Professor Will Hughes, Dr Samuel Laryea, Dr Roine Leiringer and Professor George Ofori.

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We wish to express our profound gratitude to the following sponsors and partners of the WABER Conference.

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“Our firm is about delivery. It’s about the quality of work we do and the services we provide to satisfy our clients”

Mr Samuel Asare-Konadu, Founder and Managing Director, A-Kon Consults Ltd



Humble Beginnings

A-Kon Consults Ltd opened its doors for business on 21st October, 2002. After starting the company from his dining table, Samuel Asare-Konadu used all the capital he had to pay for the rent of a small 20 m² office space for \$2,200. The first five years was a slow but steady walk to building a brand presence and reputation in the industry. The company often took on unpaid jobs by small contractors until the first big contract for a residential apartments’ project in an exclusive suburb of Accra. Since then, we have experienced rapid, profitable growth and expansion in projects and services.

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Our portfolio of completed projects include the Accra Sports Stadium, Cargill cocoa processing factory, office buildings for Maersk Line, Ericsson, and several residential real estate projects. Currently, A-Kon Consults Ltd is partnering with Davis Langdon, the world’s leading quantity surveyors on the first green building in Ghana, the One Airport Square project, valued at \$45 million. This affirms our reputation as one the leading firms in Ghana with the capacity to deliver on innovative and environmentally sustainable designs for the built environment.

Our team has diverse skills and experience in design and project management, commercial property development, and engineering, in addition to our core competence

in quantity surveying to deliver on projects and our range of services offered. This expertise is reflected in the firm's technical excellence and dedicated pursuit of exceptional value to clients.

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Infrastructure is essential to a developing economy which in turn is based on the development of knowledge and skills in construction and engineering. A-Kon Consult thus focuses on education as its vehicle of social impact. The company supports programmes that seek to advance the training and continuous professional development of students, quantity surveyors and other stakeholders in the construction industry.

Our Future

A-Kon Consults Ltd is proud to be celebrating 10 years and rises to the challenge of shaping a sustainable future due to technological changes and evolution of the industry, by innovating and executing on improved solutions for its clients.

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A warm welcome awaits you if you would like to contact us through any of the following coordinates:

Location: No. 4, Saflo Link Abelenkpe, Accra

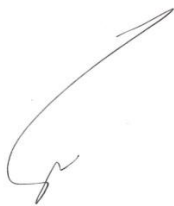
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We are delighted to be part of the 5th WABER Conference taking place in Accra, Ghana on 12-14 August 2013. As a firm we always strive to drive high standards, professionalism and development of the construction industry. A vibrant and well organised construction industry can create growth and opportunity for our people. A lot of those participating in this year's WABER Conference are future leaders of the construction industry either as academics, researchers or practitioners. You have ideas. We need your ideas and innovations to develop the industry and regional economy and take it forward to the next level. That is why we are happy to be part of this conference.



Samuel Asare-Konadu

Managing Director

B.Sc. (Hons), MRICS, MCIQB, MGhIS

Email: sak@a-konconsults.com

PROGRAMME

MONDAY 12TH AUGUST 2013

07:30-09:00 REGISTRATION

09:00-09:45 OPENING SESSION (AUDITORIUM)

09:00-09:10 Welcome address

09:10-09:20 Remarks by Managing Director of Diagonal Projects Africa (DPA) – Moses Honu

09:20-09:40 Address by Guest of Honour – Samia Yaba Nkrumah

09:40-09:45 WABER 2013 Group Photograph

09:45-10:00 BREAK

10:00-10:40 KEYNOTE ADDRESS by PROFESSOR CHIMAY J. ANUMBA

FREng, PhD, DSc, Dr.h.c., CEng, FICE, FIPStructE, FASCE, FCIQB

Department Head and Professor of Architectural Engineering, The Pennsylvania State University, USA

Title: Emerging trends in Building Information Modelling: Implications for projects in developing economies

11:00-13:00 PARALLEL SESSION (STREAM 1 - AUDITORIUM)

Chairperson: Dr Martin Tuuli, Loughborough University, UK

11:00-11:10 A case for deepened construction supply chain management in South African state-owned enterprises - FA Emuze, V Klaas and J Smallwood

11:10-11:20 Sustainable supply chain management in construction firms - Elizabeth Ojo, Charles Mbohwa and Esther T.Akinlabi

11:20-11:30 Discussion

11:30-11:40 A preliminary inquiry into the applicability of client-contractor partnering in the Ghanaian construction industry - Frederick Ababio Nuamah, Patrick Manu, and Emmanuel Manu

11:40-11:50 Contractor-subcontractor working relationships: a review of transaction cost economics and resource-based theory - Augustine Blay-Armah, Andy Ross and Raymond Abdulai

11:50-12:00 Discussion

12:00-12:10	A framework for assessing the effectiveness of competitive tendering process in public works procurement at pre-contract stage in Chad: a research proposal - Sazoulang Douh
12:10-12:20	Contextualising the methodology for developing a collaborative working framework for improving construction design service delivery in Ghana – N. K. Orgen, D.K. Ahadzie, J. Ayarkwa and E Badu
12:20-12:30	Discussion
12:30-12:40	Expert system and econometric entropy-based model for residential building project cost adjudication - Lekan M.AMUSAN; AYO K.Charles and Timothy O.Mosaku
12:40-12:50	Awareness of artificial intelligence (AI) methods for cost estimating in the Nigerian construction INDUSTRY - Baba Shehu Waziri
12:50-13:00	Discussion

13:00-14:15 LUNCH AND NETWORKING BREAK

15:00-17:30 PARALLEL SESSION (STREAM 1 - AUDITORIUM)

Chairperson: Dr Aaron M. Anvuur, Loughborough University, UK

15:00-15:10	Governing construction project procurement to mitigate contractor's opportunism: A conceptual framework. - Olusola Ogunsina,Deji Rufus Ogunsemi,Oluseyi Awodele
15:10-15:20	An appraisal of challenges facing competitive tendering implementation in public works procurement in chad republic - Sazoulang Douh, E. Badu, T. Adjei-Kumi, E. Adaniyira
15:20-15:30	Discussion
15:30-15:40	Housing procurement in informal settlements: a case study of Ayobo, Lagos, Nigeria – Opoko Akunnaya Pearl and Ibem Eziyi Offia
15:50-16:00	Procurement for national transformation: adopting modern technology methods the alternative for adequate housing delivery in Nigeria - Zaki Yakubu M, Abdullahi Suraj, Musa-Haddary and Yakubu Gimson
16:00-16:10	Discussion
16:10-16:20	An evaluation of public private partnership (PPP) for housing delivery in Lagos state, Nigeria - Aiyetan, Ayodeji Olatunji and Abiola-Falemu, J. Ojo
16:20-16:30	A critical review of public private partnership practice in Nigeria - Afeez Olalekan Sanni,a and Maizon Hashim
16:30-16:40	Discussion
16:40-16:50	Whole life costing practice in procurement of public buildings in Nigeria: myth or reality? - Fatima M Bello, Ahmed Doko Ibrahim and Baba Adama Kolo
16:50-17:00	Bridging the finance gap in infrastructure procurement through build-operate-transfer (BOT) mechanism in Nigerian tertiary institutions - Gbadegesin, Job Taiwo and Oyewole.Mathew.O
17:00-17:10	Discussion

17:10 CLOSE AND REFRESHMENTS

MONDAY 12TH AUGUST 2013

07:30-09:00 REGISTRATION

09:00-09:45 OPENING SESSION (AUDITORIUM)

09:45-10:00 BREAK

10:00-10:40 KEYNOTE ADDRESS by PROFESSOR CHIMAY J. ANUMBA

FREng, PhD, DSc, Dr.h.c., CEng, FICE, FStructE, FASCE, FCI OB

Department Head and Professor of Architectural Engineering, The Pennsylvania State University, USA

Title: Emerging trends in Building Information Modelling: Implications for projects in developing economies

11:00-13:00 PARALLEL SESSION (STREAM 2 - SEMINAR ROOM)

Chairperson: Dr Roine Leiringer, University of Hong Kong, Hong Kong

11:00-11:10 Investigation into the costs of preliminaries and relationship between these costs and total cost of building projects - Inyang-Udoh, U. I.

11:10-11:20 Assessment of the pricing of preliminaries items in the bill of quantities - Wasiu Adeniran Bello and Afeez Adetayo

11:20-11:30 Discussion

11:30-11:40 The 10% standard or lump sum - a statistical analysis of estimating construction contingency accuracy - Omoleye B.Ojuri

11:40-11:50 Project cost risk and uncertainties: towards a conceptual cost contingency estimation model - Joseph Ignatius Teye Buertey, Emmanuel Abeere-Inga, Theophilus Adjei Kumi

11:50-12:00 Discussion

12:00-12:10 Challenges facing district assemblies' "in-house" administered construction contracts – Sarfo Mensah and Collins Ameyaw

12:10-12:20 Reducing variability in concrete activity labour productivity to improve labour performance - John Ebhohimen Idiake, Bala Kabir and Shehu Ahmadu Bustani

12:20-12:30 Discussion

12:30-12:40 An assessment of contractor's risks exposure within some standard forms of building contract in Nigeria - Biodun Nathaniel Obaju, Yakubu Gimson Musa-Haddary and Baba Adama Kolo

12:40-12:50 Post-contract construction disputes in the Ghana health sector: causes and effects - Sarfo Mensah and Collins Ameyaw

12:50-13:00 Discussion

13:00-14:15 LUNCH AND NETWORKING BREAK

14:15-14:55 KEYNOTE ADDRESS by Dr RON WATERMEYER

DEng, CEng, PrEng, PrCM, PrCPM, FSAICE, FIStructE, FICE

Convenor of the International Standardisation Organisation's (ISO) Technical Committee TC 59 (Building and Construction) Working Group 2 for Construction Procurement (ISO 10845)

Title: Value for money in the delivery of public infrastructure

15:00-17:30 PARALLEL SESSION (STREAM 2 - SEMINAR ROOM)

Chairperson: Professor Wellington D. Thwala, University of Johannesburg, South Africa

15:00-15:10 Identification of Construction Delay Factors: Perception of Multinational and Indigenous Construction Firms in Nigeria - Abisuga Abiodun Olatunji and Salisu Harfiz Adewale

15:10-15:20 Delays to large construction projects in Ghana: a risk overview - Joseph Ignatius Teye Buerthey, Miezah, Augustine Kaku, THEOPHILUS Adjei Kumi

15:20-15:30 Discussion

15:30-15:40 Effects of management practices on the completion time of building projects in Ghana - Anita Asamoah-Duodu, Kwame Danso and Collins Ameyaw

15:50-16:00 Effect of bid bond on construction project performance in Nigeria - Oke, A.E., Ogunsemi, D. R., Aje I.O. and Ogundimu, A.F.

16:00-16:10 Discussion

16:10-16:20 The problems and prospects of the Tagwai dam, Minna, Niger State, Nigeria - Musa Dalil

16:20-16:30 Managing end-users' satisfaction during capital developments by adopting value engineering as project management tool - Ogbeifun, E, Pretorius, J.H. and Mbohwa, C.

16:30-16:40 Discussion

16:40-16:50 Exploring the benefits of e-tendering for infrastructure project procurement in Nigeria - Alhassan Dahiru, Sani Usman Kunya and Ahmed Isah Gumel

16:50-17:00 Cost of tendering in Ghana- client's perspective - Collins Ameyaw, SARFO Mensah and Johmark Asubonteng

17:00-17:10 Discussion

17:10 CLOSE AND REFRESHMENTS

TUESDAY

13TH AUGUST 2013

PARALLEL SESSION (STREAM 1 – AUDITORIUM)

Chairperson: Dr Cynthia Adeokun, Covenant University, Nigeria

09:00-09:10	A paradigm shift in urban economic theories: the re-examination of land and housing values determinants - Ilechukwu, V.U
09:10-09:20	Improving land governance in Nigeria: the case of compulsory acquisition and compensation practice - Odebode, Adedayo Ayodeji, Olaleye, Abel and Oladokun, Timothy Tunde
09:20-09:30	Discussion
09:30-09:40	Reconciling the provisions of the land use act and the Kwara State land charge law - Atilola Moses Idowu
09:40-09:50	Factors affecting the implementation of building regulations (L.I.1630) in GHANA - Simon Ofori Ametepey and Samuel Kwame Ansah
09:50-10:00	Discussion
10:10-10:20	Appraisal of the development control activities of Oriade local government planning authority, Osun State, Nigeria - Ogundahunsi, D. S.
10:20-10:30	Implication of housing development on wetland loss in Eti Osa local government area of Lagos State, Nigeria – Muraina Alimi Musibau and Iyanda Oladimeji
10:30-10:40	Discussion

10:40-11:00

REFRESHMENTS AND NETWORKING BREAK

Chairperson: Dr Gabriel Nani, KNUST, Kumasi, Ghana

11:00-11:10	Amoebic urbanization: the Lagos-Ota nexus - Taofiki SALAU, Taibat LAWANSON AND Omoayena Yadau
11:10-11:20	Go-ahead element of domestic architecture: socio-economic and cultural characteristics of the residents in Benin - Ekhaese Eghosa Noel
11:20-11:30	Discussion
11:30-11:40	Determining the unique features of mass housing projects (MHPs) - E. Adinyira, D. Ahadzie, T. E. Kwofie
11:40-11:50	Towards efficient provision of physical infrastructure in residential areas of Makurdi, Nigeria - Patience Adzande
11:50-12:00	Discussion
12:00-12:10	Poverty and socio-economic adaptation strategies in Lagos metropolis, Nigeria - Taibat Lawanson and Leke Oduwaye
12:10-12:20	Sharing, cooperation and conflicts: Multihabitation as an urban low income housing strategy in Accra - Irene Appeaning Addo
12:20-12:30	Discussion
12:30-12:40	Impact of road transportation on regional development of Igbomina Region Of Osun State, Nigeria – Adedotun S.B.
12:40-12:50	Post occupancy evaluation of public secondary schools facilities - Abisuga Abiodun Olatunji
12:50-13:00	Discussion

13:00-14:15 LUNCH AND NETWORKING BREAK

14:20-14:55 KEYNOTE ADDRESS by DR ROINE LEIRINGER (AUDITORIUM)

Co-editor of Construction Management and Economics journal & Associate Professor in the Department of Real Estate and Construction at The University of Hong Kong

Title: Research development

15:00-17:30 PARALLEL SESSION (STREAM 1 - AUDITORIUM)

Chairperson: Professor G.W.K. Intsiful, KNUST, Kumasi, Ghana

15:00-15:10	Perception of the financial sector towards real estate investment in Sub Saharan Africa: a case study Ghana - Enyonam Offeibea Megbenu, Frederick Ababio Nuamah and Michael Mwinseoro Muomaalah
15:10-15:20	A study of liquidity in residential property sales transaction in Lagos state Nigeria - Odebode Adedayo Ayodeji
15:20-15:30	Discussion
15:30-15:40	Effects of trends in annual rents on occupancy ratio in multi-storey commercial properties in Kaduna metropolis, Nigeria - A.A Yakub, S Balarabe, A.O Salawu, S D Gimba
15:50-16:00	Effective sites and services scheme as a means of solving low-income housing need in Nigerian cities - Bello Nurudeen Akinsola, Oladokun Timothy Tunde and Adegunle Tomisi Olusegun
16:00-16:10	Discussion
16:10-16:20	Correlates between construction company size and corporate performance: an exploratory study - George Cyril Tucker, ABIMBOLA O Windapo, Keith S Cattell
16:20-16:30	Reversing the business failure rate among small and medium size construction firms in South Africa: a progressive study - L Wentzel, F A Emuze and J J Smallwood
16:30-16:40	Discussion
16:40-16:50	The missing links between construction sector and development in Nigeria: a polycentric planning perspective - Samson Akinola, Moses Ogunbiyi, Adesokan Adeleye and Ayodeji Ajayi
16:50-17:00	The inflation hedging potential of commercial property investments in Ibadan, Nigeria - Ogunba Olusegun Adebayo, Obiyomi Olawale Oluwatosin and Dugeri Terzungwe
17:00-17:10	Inflationary trends and the prices of some selected construction plants – D.O. Mac-Barango
17:10-17:20	Development of a design-related computer-based model for estimating building material quantities - Blondel Abaitey, John Dadzie and Godfred Fobiri
17:20-17:30	Discussion

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CLOSE AND REFRESHMENTS

TUESDAY

13TH AUGUST 2013

PARALLEL SESSION (STREAM 2 – SEMINAR ROOM)

Chairperson: Dr Emmanuel Essah, University of Reading, UK

09:00-09:10	Building design practice and household energy use in urban centres in Nigeria; a case study of Bauchi town - Ibrahim Udale Hussaini
09:10-09:20	Redesigning buildings for efficient utilization of solar energy source in Kaura Namoda, Nigeria - Nghai Ezekiel Suleman and Edwin Albert Umoh
09:20-09:30	Discussion
09:30-09:40	A case for improved indoor environmental quality (IEQ) in multi-use buildings - FA Emuze, H Matshili and B Botha
09:40-09:50	Operation green Lagos programme and its implication for sustainable development - Isidore C. Ezema
09:50-10:00	Discussion
10:10-10:20	Spatial analysis of fire disaster and emergency service location in Jos metropolis - Ozigis S. M, Gajere E. N, Emmanuel E. A and Hyelpambuwa Y
10:20-10:30	Geospatial analysis of pre and post 2012 flood disaster in Lokoja and environs, Nigeria – Achema E. Emmaneul, Ojigi M.Lazarus and Adeleke A.Jude
10:30-10:40	Discussion

10:40-11:00

REFRESHMENTS AND NETWORKING BREAK

Chairperson: Dr Kulomri Adogbo, Ahmadu Bello University, Nigeria

11:00-11:10	Barriers to sustainable construction in the Ghanaian construction industry: consultants perspectives - Susan D. Djokoto and John Dadzie
11:10-11:20	Sustainability and the built environment: a case study of the Hausa migrant settlement, Sabo, in Ile-Ife, Nigeria - Adisa Buki
11:20-11:30	Discussion
11:30-11:40	Identification and Characterisation of Wetlands for Sustainable Development in Ede Region, Southwestern Nigeria. - Gasu, M. B.
11:40-11:50	Sick buildings syndrome, health issues and life expectancy of residents in Nigerian cities - Ekhaese Eghosa Noel and Omohinmin Asotie Conrad
11:50-12:00	Discussion
12:00-12:10	Environmental justice, planning and oil and gas pipelines in the Niger Delta region of Nigeria – Friday A.Ogwu and Abdulrahman A.Sahabo
12:10-12:20	Urban degreening, erosional impact and housing quality in Osun State, Nigeria: mitigating flooding through polycentric environmental planning - Samson Akinola, Samuel Adedotun, Dele Ogundahunsi and Deborah Yakubu

12:20-12:30	Discussion
12:30-12:40	Geospatial techniques in risk mapping of oil pipelines in Obio/Akpor areas of Rivers State, Nigeria - Onyechefuna Hilda U., Aderoju Olaide M., Emmanuel E.Achema
12:40-12:50	Application of Semi-Quantitative Risk Based Inspection Technique in Prioritizing Defects Severity of a Residential Building Systems - Dabo B. Hammad and Ali Garba Rishi
12:50-13:00	Discussion

13:00-14:15 LUNCH AND NETWORKING BREAK

14:20-14:55 KEYNOTE ADDRESS by DR ROINE LEIRINGER (AUDITORIUM)

Co-editor of Construction Management and Economics journal & Associate Professor in the Department of Real Estate and Construction at The University of Hong Kong

Title: Research development

15:00-17:30 PARALLEL SESSION (STREAM 1 - AUDITORIUM)

Chairperson: Dr Fidelis Emuze, Central University of Technology, Free State, South Africa

15:00-15:10	Factors militating against private practice by graduates of architecture in the North-West geo-political zone of Nigeria – Musa Nuhu Madawaki
15:10-15:20	Perceptions of final-year female undergraduates on their propensity to participate in construction practice - Kulomri Jipato Adogbo, Ahmed Doko Ibrahim and Yahaya Makarfi Ibrahim
15:20-15:30	Discussion
15:30-15:40	Key competencies of value managers in Lagos State, Nigeria - Ayodeji Emmanuel Oke and Deji Rufus Ogunsemi
15:50-16:00	Knowledge management perceptions: the case of construction professionals in Nigeria - T.Zuofa and E.G.Ochieng
16:00-16:10	Discussion
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16:20-16:30	Codes of practice: prerequisite for quality structural design and management of buildings in Nigeria - OLANITORI L.M.
16:30-16:40	Discussion
16:40-16:50	Health and Safety Performance in the Uganda Construction Industry - Moses Okwel, Henry M. Alinaitwe and Denis Kalumba
16:50-17:00	Conceptual model for integrating health and safety into construction procurement in Ghana – Moses Honu, S. Laryea, John Smallwood
17:00-17:10	The study of organisational quality policy practices of Nigerian building design firms in relation to number of employees - D. Kado and M. Abubakar
17:10-17:20	An assessment of the key determinants of Building Science students' satisfaction when undertaking group work: a case study of the University of Johannesburg, South Africa - Clinton Aigbavboa and Wellington Thwala
17:20-17:30	Discussion

17:30 **CLOSE AND REFRESHMENTS**

WEDNESDAY **14TH AUGUST 2013**

09:00-11:00 **WORKSHOP ON RESEARCH GRANT PROPOSAL WRITING**

Facilitator: Professor Chimay J. Anumba

11:00-11:30 **REFRESHMENTS AND NETWORKING BREAK**

11:30-13:00 **PARALLEL SESSION (STREAM 1 – AUDITORIUM)**

Chairman: Dr Taibat Lawanson, University of Lagos, Nigeria

11:30-11:40	Cultural expression and sustainable design of resorts in Nigeria - Stephen Nwabunwanne Oluigbo
11:40-11:50	Analyses of the costs and benefits of sustainable tourism development –evidence from the leading tourism countries and cities of the world - Abdulrahaman A. Sahabo and Friday A. Ogwu
11:50-12:00	Discussion
12:00-12:10	How domestic space embodies status: a comparative study of kitchens and culinary practice in Ile-Ife, Nigeria - Folake Ekundayo Isaacs-Sodeye
12:10-12:20	The Orowa house: a typology of traditional Yoruba architecture in Ile-Ife, Nigeria - Cynthia O.Adeokun
12:20-12:30	Discussion
12:30-12:40	Metamorphing barriers: bowlderizing the Nigerian wall - Stephen Ajadi
12:40-12:50	Causes of materials waste on construction sites in Ghana - E Ofori-Yeboah
12:50-13:00	Discussion

13:00-14:30 LUNCH AND NETWORKING BREAK

14:30-17:00 RESEARCH SKILLS WORKSHOP ON QUALITATIVE AND QUANTITATIVE DATA ANALYSIS TECHNIQUES (AUDITORIUM AND SEMINAR ROOM)

Facilitators: Dr Martin Tuuli & Dr Aaron M. Anvuur

17:00-17:15 Conference Summary - Dr Roine Leiringer (AUDITORIUM)

17:15-17:45 Presentation of certificates and prizes – Samuel Laryea and Sena Agyepong (AUDITORIUM)

17:45 CLOSE AND REFRESHMENTS

WEDNESDAY 14TH AUGUST 2013

09:00-11:00 WORKSHOP ON RESEARCH GRANT PROPOSAL WRITING

Facilitator: Professor Chimay J. Anumba

11:00-11:30 REFRESHMENTS AND NETWORKING BREAK

11:30-13:00 PARALLEL SESSION (STREAM 2 – SEMINAR ROOM)

Chairperson: Dr Sena Agyepong, Ashesi University College, Ghana

11:30-11:40 Is the quality of cement a contributing factor for building collapse in Ghana? - Humphrey Danso and Isaac Boateng

11:40-11:50 Suitability of bagasse ash as a filler material in hot mix asphalt (HMA) concrete - Abdulfatai Adinoyi Murana, Aminat Abubakar Ahmed and Faith Toyin Jegede

11:50-12:00 Discussion

12:00-12:10 AN evaluation of the properties of binary concrete containing metakaolin - Okoli O.G, GETSO A.I and Dahiru D

12:10-12:20 Strength evaluation of low density polyethylene as an admixture in hot mix asphalt concrete - Abdulfatai Adinoyi Murana, Abdulhameed Talle Rabiou and Umar Usman Umar

12:20-12:30 Discussion

12:30-12:40 Evaluation of the performance of broken waste tiles as aggregate in lightweight concrete - Otuoze, H.S., Ahmed, H.A., Alhassan A., Aliyu, N.S., Suleiman, M.A. and Yabefa, A.J.

12:40-12:50 Effects of Nigerian metakaolin (MK) on cement mortar and compressive strength of concrete - Abalaka, A.E., Mohammed I. and

12:50-13:00	Mohammed, B.M. Discussion
13:00-14:30	LUNCH AND NETWORKING BREAK
14:30-17:00	RESEARCH SKILLS WORKSHOP ON QUALITATIVE AND QUANTITATIVE DATA ANALYSIS TECHNIQUES (AUDITORIUM AND SEMINAR ROOM) Facilitators: DR MARTIN TUULI & DR AARON M. ANVUUR
17:00-17:15	Conference Summary - Dr Roine Leiringer (AUDITORIUM)
17:15-17:45	Presentation of certificates and prizes – Samuel Laryea and Sena Agyepong (AUDITORIUM)
17:45	CLOSE AND REFRESHMENTS

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SECTION 1: KEYNOTES

EMERGING TRENDS IN BUILDING INFORMATION MODELLING – IMPLICATIONS FOR PROJECTS IN DEVELOPING ECONOMIES

Professor Chimay J. Anumba¹

Department Head and Professor of Architectural Engineering, The Pennsylvania State University, USA

The Developments in Building Information Modelling (BIM) have resulted in significant industry interest and uptake. Many new building projects are increasingly dependent on BIM for resolving coordination, schedule, integration, estimating and other functions. Advances in information and communications technologies (ICT) are continuing to open up new opportunities and applications. As such, more needs to be done to fully exploit the potential of these technologies and to meet the requirements of increasingly complex projects. This Keynote Lecture will provide a historical perspective on BIM, discuss some current developments, and explore potential future directions for BIM. The role of integrated project delivery and other collaborative systems will be highlighted. An insight into potential future developments and applications (for example, in healthcare facilities) will also be provided. The implications of these developments for projects in developing economies will be discussed in the concluding part of the lecture.

Keywords: Building information modelling, developing economies.

Professor Chimay J. Anumba – Bio-Sketch

Professor Chimay Anumba is a Fellow of the Royal Academy of Engineering. He holds a Ph.D. in Civil Engineering from the University of Leeds, UK; a higher doctorate – D.Sc. (Doctor of Science) - from Loughborough University, UK; and an Honorary Doctorate (Dr.h.c.) from Delft University of Technology in The Netherlands for outstanding scientific contributions to Building and Construction Engineering. His research interests are in the fields of advanced engineering informatics, concurrent engineering, knowledge management, distributed collaboration systems, and intelligent systems. He has over 450 scientific publications in these fields and his work has received support worth over £100m from a variety of sources. He has also supervised more than 40 doctoral graduates and mentored over 20 postdoctoral scholars. He is a Chartered Engineer and Fellow of the ICE, IStructE, ASCE and CIOB.

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VALUE FOR MONEY IN THE DELIVERY OF PUBLIC INFRASTRUCTURE

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Public infrastructure, which is central to the economy of a country, has little inherent value, but creates value through the economic and social activities it supports. The economic downturn has put the spotlight on the value for money proposition that planned and delivered public infrastructure provide. A number of different organisations have over the last few years began to put in place processes and procedures to deliver value for money. Others have identified the drivers of value for money. Approaches to monitoring and assessing value for money have also been recently documented. It is important to not only have a clear understanding of what is meant by value for money but also how value for money can be demonstrated or confirmed in the context of infrastructure delivery. Such an understanding enables a strategic approach to be taken in the design and implementation of a procurement and delivery management system for infrastructure. This paper outlines current thinking around what constitutes value for money and how it is assessed. It also indicates how procurement and delivery management systems need to be designed and implemented to support of this imperative.

Keywords: value for money, procurement, delivery management, infrastructure.

INTRODUCTION

People are surrounded by economic infrastructure (fixed capital investment including construction works) which are foundational to a better life for all. Investment in economic infrastructure occurs in expectation of demand or in reaction to demand for capacity. When it happens, it has the following three impacts (Watermeyer, 2011a):

- 1) an initial growth in demand for people, equipment and materials on the project, which lasts as long as it takes to create the asset;
- 2) a demand on resources over the lifespan of the project to maintain the asset; and
- 3) a productivity impact in the overall economy, either producing more or producing it better due to more efficient infrastructure (or simply the availability of capacity like harbour capacity and electricity).

Expenditure on economic infrastructure will not necessarily lead to economic growth. Infrastructure which provides improvements or efficiencies in services, production or export capabilities and which is delivered and maintained in a manner which minimizes waste of materials, time, and effort in order to generate the maximum possible amount of value, is most likely to contribute to economic growth.

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The failure of or the lack of sufficient infrastructure puts the spotlight on government whose goal is to deliver a better life for all. The tackling of poverty and underdevelopment in Africa is being hampered by shortcomings in the delivery and maintenance of infrastructure as evidenced in a recent World Bank report (Foster, 2008)) which examined infrastructure in 24 countries that together account for 85 % of GDP, population and infrastructure aid flows of Sub-Saharan Africa. This report found that:

- in some countries infrastructure provision is not focussed where it is most needed;
- countries typically only manage to spend about two thirds of the budget allocated to investment in infrastructure; and
- about 30% of infrastructure assets are in need of rehabilitation.

The global financial crisis has caused governments to rethink the management of their procurement and delivery management systems in the wake of massive fiscal stimulus packages. Governments need to manage these expenditures wisely in order to obtain value for money, sustain public and private confidence that public funds are being well spent and demonstrate financial stewardship and lasting benefits (Schooner and Yukins, 2011).

The key question that is currently being asked whenever new public infrastructure is contemplated or delivered is “does the investment represent value for money?”

THE VALUE FOR MONEY CONCEPT

Principles

The Office of the Auditor-General of New Zealand (2008) defined value for money in a procurement context as “*using resources effectively, economically, and without waste, with due regard for the total costs and benefits of an arrangement, and its contribution to the outcomes the entity is trying to achieve.*” This office stressed that value for money in a procurement context does not necessarily mean selecting the lowest price but rather the best possible outcome for the total cost of ownership (or whole-of-life cost).

Barnett *et al* (2010) consider value for money to be a term generally used to describe an explicit commitment to ensuring that the best results possible are obtained from the money spent. They furthermore point out that such a term reflects a concern for more transparency and accountability in spending public funds, and for obtaining the maximum benefit from the resources available. The UK National Audit Office (2010) defines “*good value for money*” as the “*optimal use of resources to achieve the intended outcomes.*” The Department for International Development (DFID) (2011) views value for money as a means for developing a better understanding (and better articulation) of costs and results so that more informed, evidence-based choices can be made.

Table 1: Interpreting the 4 E's associated with value for money

Dimension of value for money	Interpretation	Underlying key questions
Economy	Economy focuses on the reduction of the cost of resources used for an activity with a regard for maintaining quality. It relates to how cost-effectively financial, human or material resources are acquired and used. It speaks to acquiring inputs of the right quality at the right price.	Can the same or equivalent inputs be obtained for less money? Would using less expensive different / alternative inputs risk effectiveness, including sustainability? Would using less expensive inputs risk greater maintenance costs over the life of the project? What are the cost inputs and the whole life costs?
Efficiency	Efficiency focuses on the increasing of an output for a given input, or minimising input for a given output, with a regard for maintaining quality. It is a measure of productivity as it relates to how resourcefully inputs are converted into outputs and subsequent outcomes. It speaks to how well inputs are converted to outputs.	Can the same results be achieved while saving on how the activities are managed? Would making savings on how the project is managed risk a reduction in effectiveness or incur other costs? Would different pathways in delivery achieve different outcomes? How much is got out in relation to what is put in?
Effectiveness	Effectiveness focuses on the successful achievement of the intended outcomes from an activity. It relates to how successfully an intervention achieves its intended outcomes and subsequent impacts are realised. It speaks to how well outputs achieve desired outcomes.	What outcomes have been achieved? What is the gap between what has been achieved and what was intended? Is the performance acceptable? What are the qualitative and quantitative measures of increase or decrease in outcomes that demonstrate that a project is effective in delivering its intended objectives?
Equity	Equity focuses on the selection of resources and targeting strategies to promote secondary objectives. It relates to the potential to generate business and employment opportunities for targeted groups. It speaks to what equity can be leveraged through a project.	Who benefits from the business and employment opportunities generated by economic activity? What targeting strategies are applied to promote secondary objectives? How is health and safety performance improved?

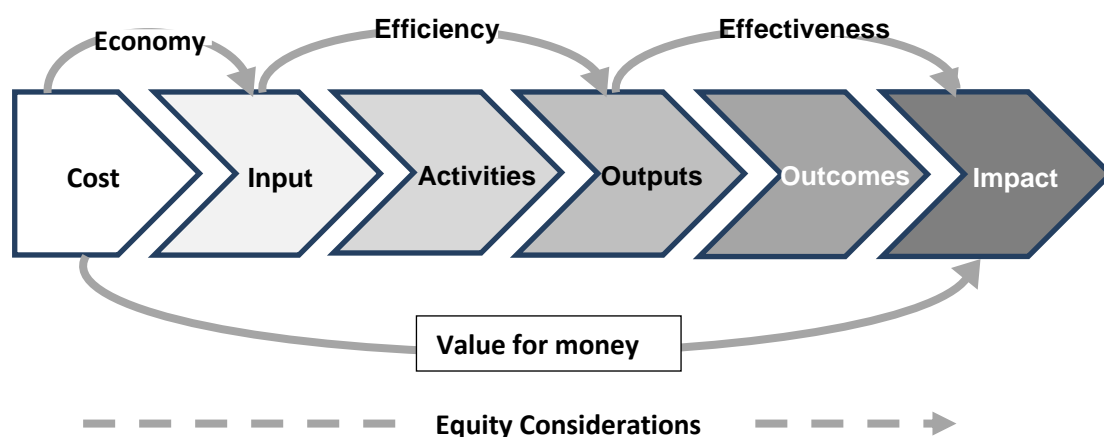
Jackson (2012) argues that value for money is about “*striking the best balance between the “three E’s” – economy, efficiency and effectiveness*” and is “*not a tool or a method, but a way of thinking about using resources well.*” Jackson also points out that a “*fourth “E” – equity – is now also sometimes used to ensure that value-for-money analysis accounts for the importance of reaching different groups.*” DFID (2011) views “equity” in the context of value for money as “*making sure our development results are targeted at the poorest and include sufficient targeting of women and girls.*” Equity, from a developing country perspective can also relate to the establishment and strengthening of indigenous building materials and methods and the

promotion of construction technologies that increase employment; all of which ensure local participation in projects. Accordingly economy, efficiency and effectiveness relate to the primary objectives of a project whereas equity relates to the secondary objectives of the project i.e. what can be promoted through the delivery of the product e.g. the alleviation and reduction of poverty, job creation or the promotion of health and safety performance beyond statutory requirements (Watermeyer, 2012a and b).

Table 1 interprets the 4“Es” associated with value for money based on Adam Smith International (2012), Department of International Development (2011), Jackson (2012), National Audit Office (2010) and Watermeyer and Pham (2011).

Monitoring and evaluating value for money

Adam Smith International (2011) point out that donors including the Department for International Development (DFID) generally use a “results-based management” approach to monitor and evaluate the performance of their activities and to focus on whether or not their support creates positive, lasting changes (see Figure 1). The funding and deliverables of the activities are in terms of this approach are a means to an end.



Cost	Sum of money required to fund the intervention
Input	Inputs cover all the materially significant financial, human and material resources used for a development intervention
Activities	Activities are used to deliver outputs
Outputs	Outputs relate to products, capital assets and services which result from a development intervention. Outputs are limited to the specific, direct deliverable of the intervention.
Outcomes	Outcomes are the likely or realised short-term/medium-term effects of the outputs of any intervention. Outcomes are used to identify (a) what will change, (b) who will benefit and (c) how it will contribute to poverty reduction and/or the Millennium Development Goals
Impact	Longer-term effects are produced, directly or indirectly, by a development intervention. Impact refers to higher level identified achievements that the intervention will contribute towards

Figure 1: Results chain framework (after DFID, 2011)

An alternative way of looking at Figure 1 is to consider it as a quality management system. ISO 9000 (2005) in this regard defines quality as the “*degree to which a set of inherent characteristics fulfils requirements*” and a quality management system as a “*management system to direct and control an organisation with regard to quality*.” It also defines efficiency as the “*relationship between the result achieved and the resources used*” and effectiveness as the “*extent to which planned activities are realised and planned results achieved*.”

The UK National Audit Office (2010) offers a practical analytical framework within which judgements regarding good value for money can be made in a consistent manner i.e. whether or not optimal use of resources was made to achieve the intended outcomes, using the following six steps and the process outlined in Figure 2:

- 1) Establish what is optimal (i.e. “*the most desirable possible given expressed or implied restrictions or constraints*”) by considering what reasonable constraints need to be taken into account in respect of planning (what is wanted), implementation (delivering or procuring well) and monitoring (being able to assess performance).
- 2) Capture the scale of resources initially in the plans and later, as outturn.
- 3) Identify expected and actual outcomes by considering the planned achievements and later actual achievements.
- 4) Establish the consequences for value for money by comparing expected and achieved outcomes or what could have been achieved.
- 5) Draw an overall conclusion on the value for money achieved with these resources (external comparison) by comparing performance with appropriate external benchmarks such as alternative actions, accepted good practice or internal/external industry benchmarks, past performance and shareholder expectations.
- 6) Make recommendations to secure improved outcomes.

Delivering value for money through projects

The management approach to delivering value for money over the life of a project is summarised in Figure 2. The critical starting point is to clearly define objectives and expected outcomes as well as parameters such as the time lines, cost and levels of uncertainty. This frames the value for money proposition that needs to be implemented at the point in time that a decision is taken to proceed with a project i.e. it establishes “economy” and identifies “equity”. The end point is to compare the projected outcomes against the actual outcomes i.e. to confirm the “effectiveness” of the project in delivering value for money.

The implementation of infrastructure projects needs to be responsive to the project objectives, deliver the expected outcomes and remain as far as possible within the confines of the parameters upon which the decision to proceed with the project were

based. Cost overruns and lower-than-predicted income streams frequently place project viability at risk and turn projects that were initially perceived to be vehicles to economic growth into obstacles to such growth (Allport, 2011). Accordingly, implementation which sits between “economy” and “effectiveness” in the results chain framework needs to be executed “efficiently” so that time delays, scope creep and unproductive costs and the effects of uncertainty on objectives (risks) are minimised in order to maintain the value for money proposition formulated at the outset of the project. This necessitates that the implementer of the project exercise due care and reasonableness during implementation. Failure to do so may result in substandard or unacceptable performance which results in a gap between intended and achieved outcomes. This puts value for money for a project at risk.

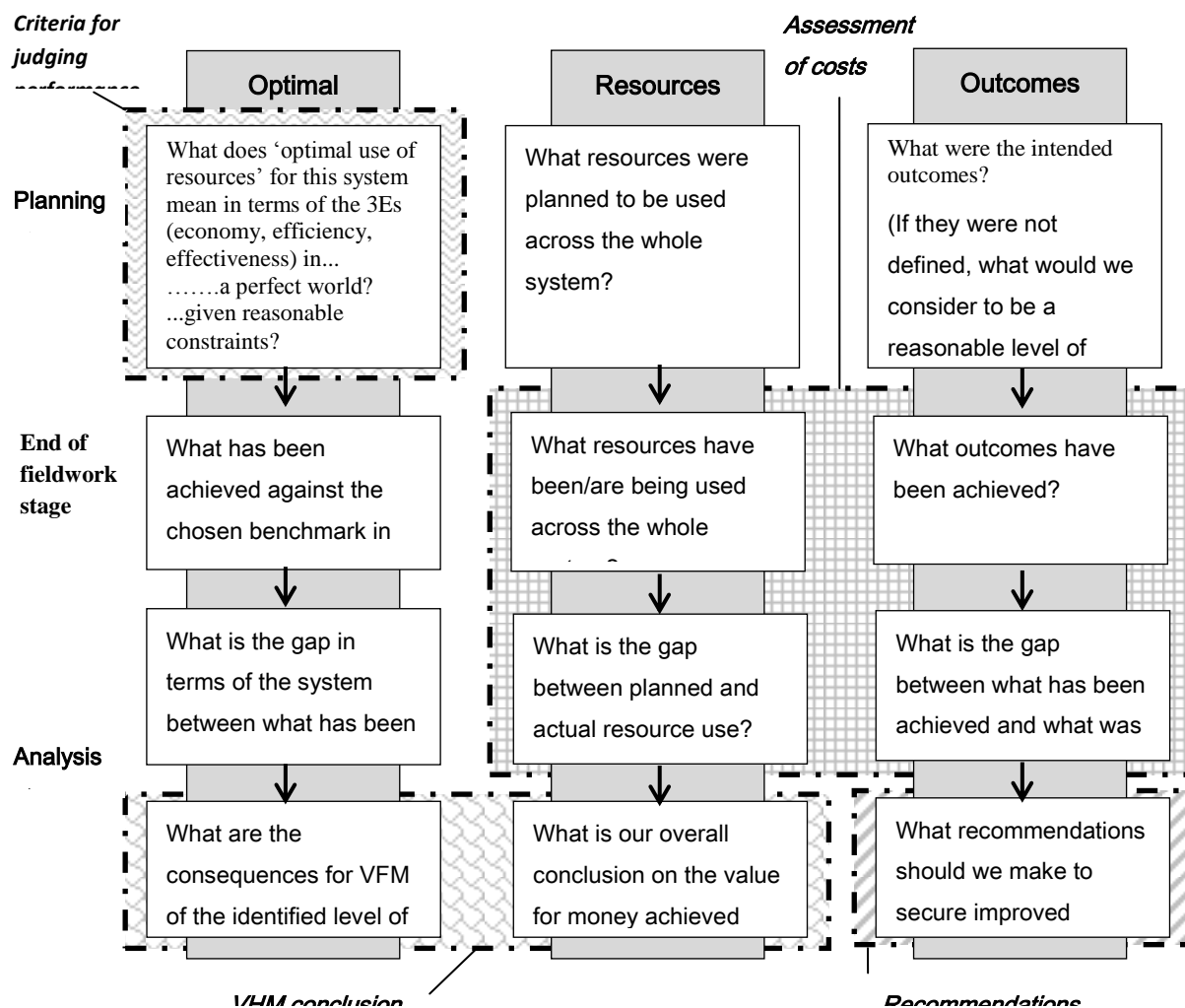


Figure 2: Framework of questions for assessing value for money (National Audit Office, 2010)

Due care speaks to the care that an ordinary and reasonable person would normally exercise under circumstances such as those under consideration. The concept of due care is used as a test of liability for negligence i.e. a breach of duty of care which results in loss to the person or entity the duty is owed. Negligence usually includes doing something that an ordinary, reasonable and prudent person would not do, or not doing something such a person would do considering the circumstances and situation. Reasonableness on the other hand applies to that which is appropriate for a particular situation, circumstance or context and the way a rational person would have acted.

Accordingly, an implementer that implements projects with due care needs to:

- put in place a suitable and appropriate procurement and delivery management system,
- allocate tasks and responsibilities and provide the necessary financial and human resources to enable the system to be effectively implemented;
- have in place delivery policies; and
- take corrective action to meet objectives when it became clear that some of the objective might not be met.

INHIBITERS OF VALUE FOR MONEY

Flyvbjerg *et al* (2003) have identified two root causes for lack of success, namely:

- optimism bias - the human mind's cognitive bias in presenting the future in a positive light; and
- strategic misrepresentation – behaviour that deliberately underestimates costs and overestimates benefits for strategic advantage usually in response to incentives during the budget process.

HM Treasury (2011) has cited the two main causes of optimism bias in estimates of capital costs as:

- *poor definition of the scope and objectives of projects in the business case, due to poor identification of stakeholder requirements, resulting in the omission of costs during project costing; and*
- *poor management of projects during implementation, so that schedules are not adhered to and risks are not mitigated.*

Hawkins and McKittrick (2012) in their report on the pilot countries in Construction Sector Transparency Initiative (CoST) programme found that in the 145 projects sampled in eight countries, 31% exhibited poor management of time and cost with at least 55% being over budget and 8% being more than 100% over budget. They observed that, apart from pilot study countries being greatly challenged to disclose the 31 items of information required in terms of the CoST programme, procuring entities rarely met even their legal requirements for disclosure (See Figure 3). In most of the countries assurance team had to assume responsibility for the collection and collation

of the information for disclosure. It is therefore not surprising that Jackson (2012) cites the lack of data upon which to base decisions as a key challenge in delivering value for money.

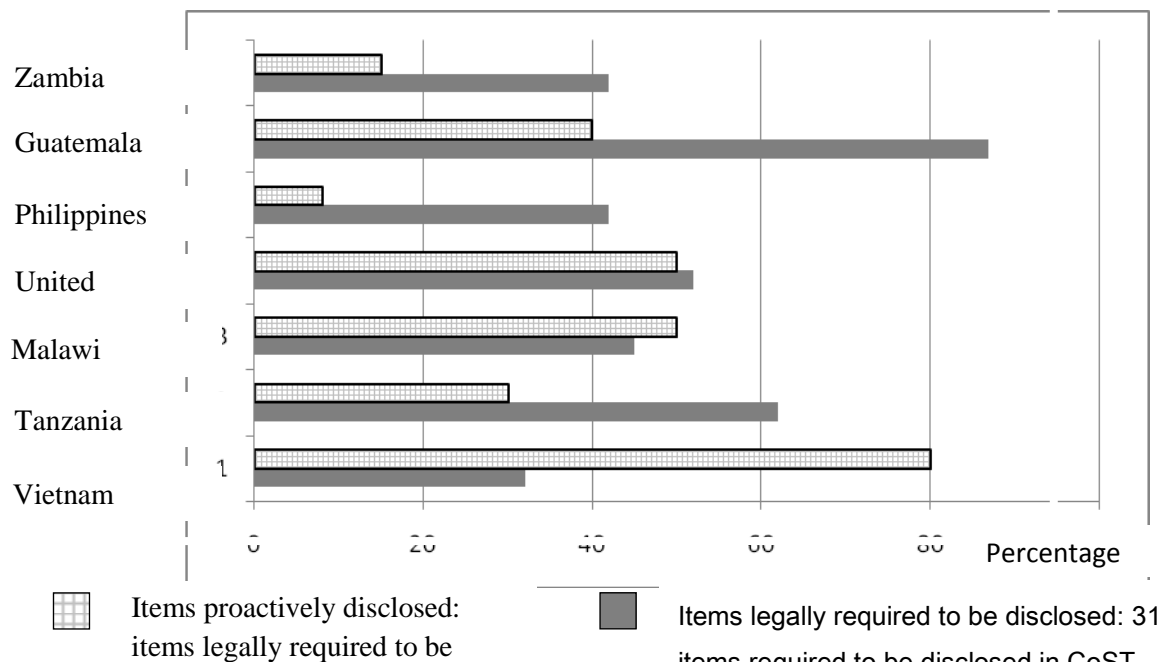


Figure 4: Information disclosure in the CoST pilot countries (after Hawkins and McKittrick (2012) and CoST (2011))

DRIVERS OF VALUE FOR MONEY

A scan of recent publications suggests project outcomes can be improved in a number of ways. DFID (2011) have identified skills and behaviours, transparency, internal scrutiny, external scrutiny, results and value for money tools, systems development and influencing partners as being drivers of value for money. Dobbset *al* (2103), suggest that boosting infrastructure productivity could save \$1 trillion dollars a year and cites the following main levers to delivery potential savings, namely:

- improve project selection and optimise infrastructure portfolios;
- streamline delivery;
- make the most of existing infrastructure assets; and
- upgrade infrastructure governance systems to ensure close co-ordination between different infrastructure authorities, clear separation of political and technical responsibilities, broad public-private sector co-operation, trust-based engagement of stakeholders throughout the process to avoid suboptimal solutions and unnecessary delays, the availability of reliable data on which to base day-to-day oversight and long term planning and strong public-sector capabilities across the value chain of planning, delivery and operations.

The South African Planning Commission's *National Development Plan 2030: Our future – make it work* proposes that the following five areas be focused on in designing a procurement system that is better able to deliver value for money, while minimising the scope for corruption (Watermeyer *et al*, 2013):

- 1) differentiate between the different types of procurement which pose different challenges and require different skills sets;
- 2) adopt a strategic approach to procurement above the project level to balance competing objectives and priorities rather than viewing each project in isolation;
- 3) build relationships of trust and understanding with the private sector;
- 4) develop professional supply chain management capacity through training and accreditation; and
- 5) incorporate oversight functions to assess value for money.

The George Washington University Law School (Schooner and Yukins, 2012) have expressed the view that proper management of government procurement systems is critical if massive fiscal stimulus packages in the wake of the global crisis are to deliver value for money. They stress that leaders, in order to fulfil their fiduciary responsibilities, need to maximise competition among the global economy's most qualified firms, strive to purge corruption from procurement, and build (or restore) capacity in their public procurement systems. They point out that the current economic downturn present governments with a unique opportunity to invest in rebuilding their professional acquisition workforces by aggressively recruiting the best talent, bolstering skills-based training, improving retention and incentives, and identifying best practices for efficient procurement.

The Construction Sector Transparency Initiative (CoST) is a country-centred initiative which seeks to improve value for money on projects. It does this by increasing transparency in the delivery of construction projects by ensuring that basic information associated with projects is disclosed to the public at key points throughout the project cycle. CoST compliments rather than replaces a country's supervision, audit, regulatory, investigative, and judicial functions by putting in place a multi-stakeholder group to verify and interpret disclosed information along the full value chain on large projects. Stakeholders can then use this knowledge as a basis for holding the responsible parties accountable. This results in improved performance which in the long term is expected to improve value for money from investments in infrastructure as indicated in Figure 3. CoST in essence brings key stakeholder groups together on neutral ground and assists them to form and pursue shared objectives in improving value for money in construction projects and in improving efficiency and effectiveness.

Watermeyer (2011) points out that a procurement system is always designed around a set of system objectives. These typically relate to good governance (primary objectives) and, particularly in developing countries, to the use of procurement to promote social and national agendas (secondary or non-commercial objectives). Procurement systems such as those which are based on the following system objective

provide a platform to achieve fair competition, reduce the possibilities for abuse and improve predictability in procurement outcomes are therefore most likely to realise value for money:

- primary objectives: the procurement system shall be fair, equitable, transparent, competitive and cost-effective.
- secondary objectives: the procurement system may, subject to applicable legislation, promote objectives additional to those associated with the immediate objective of the procurement itself.

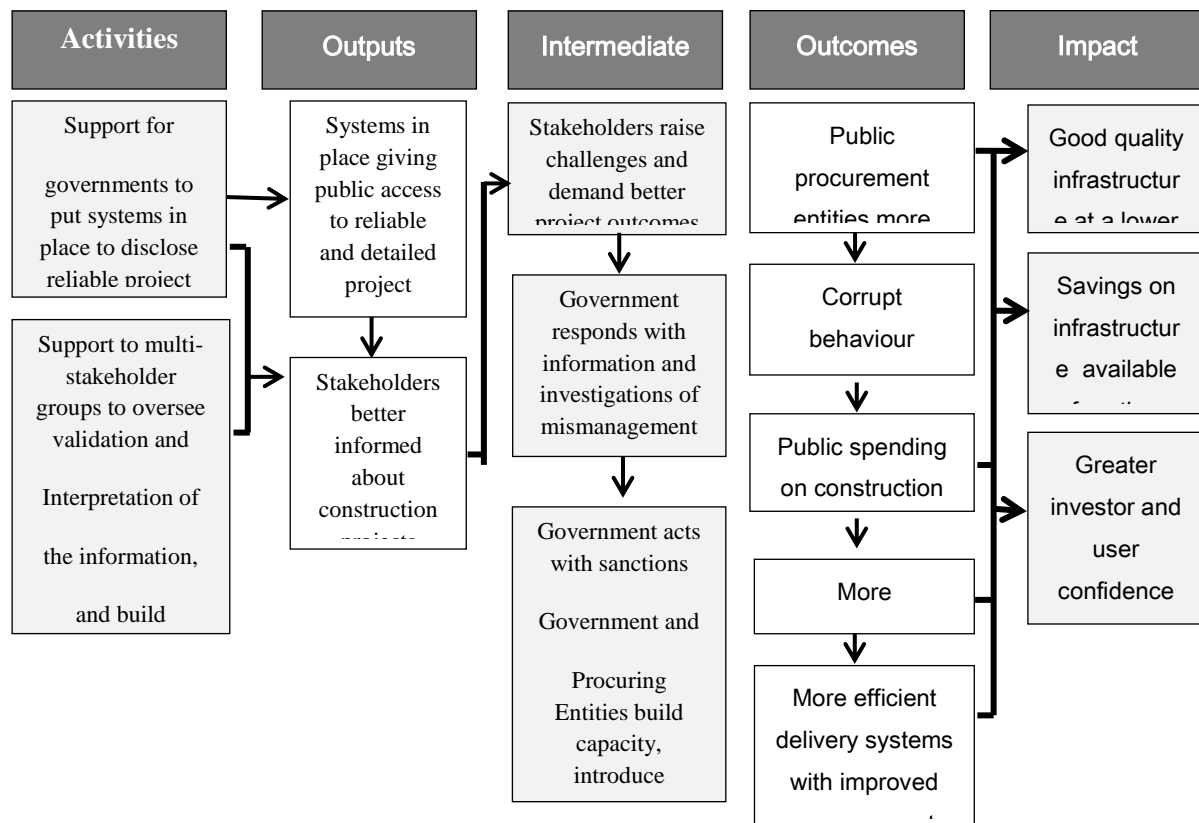


Figure 3: Results chain for the CoST Programme (Construction Sector Transparency Initiative, 2013)

Watermeyer (2011b) points out that there are a number of different approaches to procuring goods, services and works, each of which can result in different outcomes. Procurement strategy is all about the choices made in determining what is to be delivered through a particular contract, the procurement and contracting arrangements and how secondary procurement objectives are to be promoted. Resources and objectives need to be matched to the choices made regarding the manner in which needs are to be met in order to achieve optimal outcomes.

DFID (2013) has recently issued a statement which sets out how their suppliers are expected to demonstrate delivery on value for money. Forms of contract which provide open book approaches to the costing of changes due to the occurrence of risk

events, are drafted on a relational contracting basis, based on the belief that collaboration and teamwork across the whole supply chain optimises the likely project outcomes, provide pricing arrangements that align payments to results and reflect a more balanced sharing of performance risk are most likely to enable suppliers to deliver on DFID's expectations.

The Society of Construction and Law (2002) has published a protocol for determining extensions of time and compensation for delay and disruption. It exists to provide guidance in the form of 21 core principles to all parties to the construction process when dealing with time or delay matters. It recognises that transparency of information and methodology is central to both dispute prevention and dispute resolution. Forms of contract which contain provisions dealing with unforeseen events that can give rise to an extension of time or compensation for the additional time spent and the resources employed in a manner which is consistent with this protocol are most likely to deliver value for money.

Lichtig (2006) has indicated that in order to provide higher value and less waste the fragmentation in design needs to be addressed, preferably before 25% of the design is complete. Target cost contracts can be used to facilitate early contractor involvement in terms of the design by employer, develop and construct and design and construct contracting strategies. Accordingly forms of contract which make provision for cost based pricing strategies can be effectively used to deliver value for money (Watermeyer, 2012b).

A MODEL FOR THE DELIVERY OF INFRASTRUCTURE

The critical starting point in delivering value for money through infrastructure projects is to clearly define objectives and expected outcomes as well as parameters such as the time lines, cost and levels of uncertainty. This frames the value for money proposition that needs to be implemented at the point in time that a decision is taken to proceed with a project i.e. it establishes "economy" and identifies "equity". The end point is to compare the projected outcomes against the actual outcomes i.e. to confirm the "effectiveness" of the project in delivering value for money.

The implementation of infrastructure projects needs to be responsive to the project objectives, deliver the expected outcomes and remain as far as possible within the confines of the parameters upon which the decision to proceed with the project was based. Implementation sits between "economy" and "effectiveness" in the results chain framework. It needs to be executed "efficiently" in order to minimise time delays, scope creep and unproductive costs and to mitigate the effects of uncertainty on objectives (risks) so as to maintain the value for money proposition formulated at the outset of the project. This necessitates that the implementer of the project exercise due care and reasonableness during implementation. Failure to do so may result in substandard or unacceptable performance which results in a gap between intended and achieved outcomes. This gap puts value for money for a project at risk.

Due care speaks to the care that an ordinary and reasonable person would normally exercise under circumstances such as those under consideration. The concept of due care is used as a test of liability for negligence i.e. a breach of duty of care which results in loss to the person or entity the duty is owed. Negligence usually includes doing something that an ordinary, reasonable and prudent person would not do, or not doing something such a person would do considering the circumstances and situation. Reasonableness on the other hand applies to that which is appropriate for a particular situation, circumstance or context and the way a rational person would have acted.

Accordingly, an implementer that implements projects with due care needs to:

- document and put in place a suitable and appropriate procurement and delivery management system;
- allocate tasks and responsibilities and provide the necessary financial and human resources to enable the system to be effectively implemented; and
- take corrective action to meet objectives when it becomes clear that some of the objective might not be met.

DESIGNING A PROCUREMENT AND DELIVERY MANAGEMENT SYSTEM TO DELIVER VALUE FOR MONEY

The review of the literature in this paper suggests that project outcomes can be improved by embracing the following in the design of an infrastructure delivery management system:

- adopt a strategic approach to procurement and delivery management above the project level;
- establish trust-based engagement of stakeholders throughout the process to avoid suboptimal solutions and unnecessary delays;
- put in place governance systems which incorporate oversight functions to assess aspects of value for money throughout the project cycle in a systematic manner;
- put in place rigorous project selection processes;
- differentiate between the different types of procurement which pose different challenges and require different skills sets (see Figure 4);
- standardise delivery in a manner which enables risks to be proactively managed and responsibilities to be clearly established;
- build relationships of trust and understanding with the private sector;
- put in place reliable data gathering systems on which to base day-to-day oversight and long term planning;
- develop strong public-sector capabilities across the value chain of planning, delivery and operations; and
- increase transparency through the disclosure of information which is subjected to internal and external scrutiny.

Procurement system needs to be designed around objectives which speak to “economy”, “efficiency” and “equity” and contain a wide range of procurement

procedures which enable best value for money in a number of different circumstances. Forms of contract, which form an integral part of any procurement system, need to support open book approaches to the costing of changes due to the occurrence of risk events, foster collaborative working relationships, provide pricing structures that align payments to results and reflect a balanced sharing of performance risk and deal with delays and disruptions efficiently and effectively. Furthermore they should be sufficiently flexible to accommodate both price-based and cost-based pricing strategies with any level of design responsibility.

The delivery of construction works needs to be managed and controlled in a logical, methodical and auditable manner. The starting point in the development of any delivery management system is to identify the information which needs to be developed and accepted by the client at a particular point in the delivery process to enable a project to be advanced i.e. at a control point (or gate). The stages in the delivery of construction works can then be defined as the activities that need to take place between such points. These stages enable the work flow (sequence of connected activities) toward the attainment of an end of stage deliverable to be developed and culminate in gates (control points) which can be used to provide assurance that the proposed works (Watermeyer, 2012a):

- remains within agreed mandates;
- aligns with the purpose for which it was conceived, and
- can progress successfully from one stage to the next.

Table 2 illustrates the stages on a project involving the delivery of infrastructure or scheduled maintenance and how they relate to the dimensions relating to value for money and the sequence of activities. Control points (gates) can be located within or at the end of the processes shown in Figure 4. This creates a control framework which ensures that positive control is exercised over processes. It also ensures that supporting information is gathered systematically (Watermeyer *et al*, 2012).

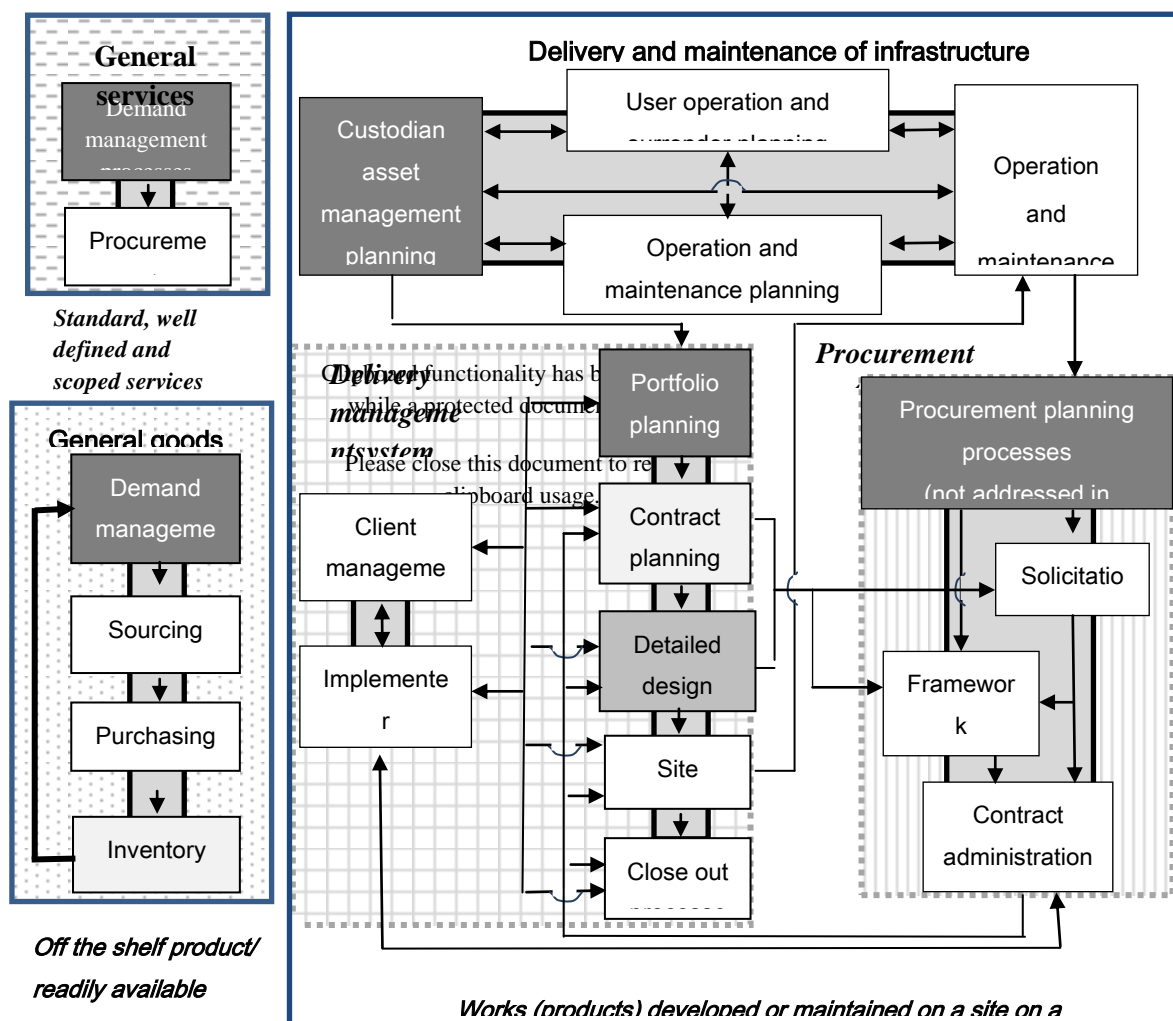
Poor decisions or analysis during the portfolio planning stage can have significant cost ramifications downstream. Accordingly, a project and economic appraisal needs to be undertaken during the portfolio planning phases to establish the “economy” and “equity” dimension in the value for money proposition which projects have to offer. Thereafter proposed projects need to be prioritised so that only those that are most likely to satisfy stated objectives and yield value for money are delivered.

It is important to continue with planning processes at a project or contract level before authorizing implementation. This allows:

- sufficient design concepts or solutions to be developed to establish the feasibility of the works or to select a particular conceptual approach to pursue;
- the design or solution at the end the planning stage to be “frozen” ahead of implementation;

- residual risks to be identified and their potential impact on project outcomes to be understood;
- the time, cost and scope of the project to be confirmed and adjusted to remain within the desired value for money parameter upon which the initial decision making was based; and
- informed decisions regarding implementation to be made.

Thereafter the delivery of construction works needs to be managed and controlled in a logical, methodical and auditable manner to ensure “efficiency” and “effectiveness” in implementation.



NOTE

Client = organization responsible for initiating, financing and commissions works to be constructed, refurbished, rehabilitated or maintained and pays for it

Implementer = organisation which acts as the agent of the client during implementation

Figure 4: Commonly encountered public sector supply chains (after Watermeyer et al, 2012)

Table 2: Stages in the delivery of new infrastructure (After Watermeyer et al, 2012)

Dimension of value for money	Processes	Gate	Stage description	Deliverable
Economy	Planning at a portfolio level	G1	Infrastructure planning	Client approved infrastructure plan which identifies needs and links prioritised needs to a forecasted budget
		G2	Procurement planning	Client accepted construction procurement strategy for implementing the infrastructure plan in the medium term
	Planning at a package level	G3	Package preparation	Client accepted strategic brief for the works
		G4	Package definition	Client accepted concept report setting out the Integrated concept for the works
Efficiency	Detailed design	G5	Design development	Client accepted design development report setting out the integrated developed design for the works
		G6A	Design documentation (Production information)	Completed and client accepted production information for the works
		G6B	Design documentation (Manufacture, fabrication and construction information)	Client accepted manufacture, fabrication and construction information for the works
	Site	G7	Works	Completed works which are capable of being occupied or used and accepted by the client.
		G8	Hand over	Works which have been taken over by the user complete with record information
Effectiveness	Close out	G9A	Asset data	Archived record information and updated asset register
		G9B	Package completion	Completed contract or package order complete with closeout information

CONCLUSIONS

Value for money may be regarded as the optimal use of resources to achieve the intended outcomes. Underlying value for money is an explicit commitment to ensuring that the best results possible are obtained from the money spent or maximum benefit is derived from the resources available. It is a means for developing a better understanding (and better articulation) of costs and results so that more informed, evidence-based choices can be made. Value for money is about striking the balance between three “E’s” – economy, efficiency and effectiveness” whilst being mindful of a fourth “E” – equity.

Current procurement and delivery management systems needs to be reviewed and possibly redesigned to ensure that they deliver on the three “Es” and promote aspects of the fourth “E”. This may require a culture and mind set change to embrace new and emerging procurement and delivery management practices which are designed to support value for money outcomes.

Evidence based research is required to enable informed and effective decision to be made in order to deliver value for money on the basis of solid evidence, proof of effectiveness and the integration of experience and judgement. Such research is required not only to guide and shape value for money practices but also to transfer knowledge into practice.

Training and education is also required to support those engaged in the infrastructure supply chain to understand the value for money concept and their role in supporting this imperative.

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SECTION 2: CONFERENCE PAPERS

A CASE FOR DEEPENED CONSTRUCTION SUPPLY CHAIN MANAGEMENT IN SOUTH AFRICAN STATE-OWNED ENTERPRISES

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The purpose of this paper is to present the preliminary literature findings of a research project. The main project is set out to identify, analyse and report on performance requirements, mechanisms and actions required to address the performance of construction related small and medium size enterprises (SMEs) that are providing services for state owned enterprises (SOEs) in South Africa. The need for the project arose from the view that the absence of performance evaluation mechanism leads to the poor management of the performance of organisations involved in most SOE supply chain. This inevitably lead to none creation of expected value in the system. Through a related literature study, the findings that have emerged so far suggest that it is notable that the SMEs related programmes in SOEs have not address performance and relationship management within their supply chain strategy in explicit terms as there is less or no means to record, measure and enhance SME contributions. These SMEs also recognise the fact that when their performances are poor and / or good, there is no difference and / or feedback mechanism to record it.

Keywords: construction , supply chain management, South Africa

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A CASE FOR IMPROVED INDOOR ENVIRONMENTAL QUALITY (IEQ) IN MULTI USE BUILDINGS

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The purpose of this paper is to present the findings of a research project aimed at determining the level of satisfaction of building occupants' in terms of Indoor Environmental Quality (IEQ). The findings were derived from the views of the occupants residing in a Country Club Estate in Johannesburg, South Africa. The questions addressed how poor air quality, lack of access to daylight, unpleasant acoustic conditions, and control over lighting and thermal comfort leads to dissatisfaction with the IEQ of buildings. The data were collected during August and September 2012. Questionnaires were sent to ten office blocks within Country Club Estate complex in Johannesburg, South Africa. A total of 126 questionnaires were sent out and 102 replies were received. Observations from the data led to the view that the satisfactory level of IEQ awareness is low among the occupants. Organisational structure needs to be formed that will enlighten occupants about factors that contribute to poor indoor air quality (IAQ). Organisational procedures also point to the fact that the level of IEQ is low. The inconsistent ratings that were recorded suggest that there appears to be a major scope for addressing post occupancy evaluated (POE) related matters in the complex.

Keywords: buildings, indoor environmental quality, post occupancy evaluation.

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A CRITICAL REVIEW OF PUBLIC PRIVATE PARTNERSHIP PRACTICE IN NIGERIA

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The use of Public Private Partnerships (PPP) in Nigeria as a procurement method for the public projects came with great expectation that the critical social and economic infrastructures would be addressed soon. But after a decade, there is still no appreciable progress in exploring the PPP method to develop the critical public infrastructure. This paper critically reviewed the implementation of PPP in Nigeria so that the system could be improved to meet the acceptable best practice. The study revealed that delays in negotiation, high participation costs, attitude of public officers, poor performance of PPP projects, low level of technology, social-cultural issues and macro-economic environment are the critical challenges that are affecting the smooth management of the PPP projects in Nigeria. Therefore, it is recommended that the government should create opportunities for training and re-training of the participants in the implementation of PPP projects. The interest of the residents should be a priority before and during the implementation of PPP projects in their domain.

Keywords: PPP, project performance, participation costs, infrastructure.

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A FRAMEWORK FOR ASSESSING THE EFFECTIVENESS OF COMPETITIVE TENDERING PROCESS IN PUBLIC WORKS PROCUREMENT AT PRE-CONTRACT STAGE IN CHAD: A RESEARCH PROPOSAL

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Effective implementation of competitive tendering has the potential for assuring transparency, accountability, fairness, justice and ethical standards in public works procurement. It promotes sound contract practices and growth of indigenous technology by providing a reliable environment for all industry operators. Furthermore, it can reduce time and cost, promote competition, hamper corruption, and strengthen the public service system. Although, competitive tendering appears to be the most acceptable method of selecting contractors everywhere, its implementation in Chad is facing many challenges despite the reforms put in place in 2003 resulting in a very poor performance of government procurement. Field survey reveals that lack of effectiveness assessment of the tendering processes at pre-contract stage is one of the main causes. Therefore, this research project aims at developing a Framework for Assessing the Effectiveness Assessment of Competitive Tendering Process with following specific objectives: (1) To identify the Major Challenges facing the implementation of Competitive Tendering Method in Chad; (2) To determine relevant Factors Underpinning the Effectiveness of Competitive Tendering Method in Chad; (3) To establish key Indicators for the determination of the Effectiveness of Competitive Tendering Process in Chad; (4) To develop a Framework for Assessing the Effectiveness of Competitive Tendering Process in Chad; (5) To Validate the developed Framework by a focus group workshop. The study uses mixed (quantitative and qualitative) approach with interview and questionnaire as main instruments for data collection. The targeted population comprises 56 institutions deeply involved in public procurement in Chad.

Key words: Framework, Effectiveness assessment, Public Procurement, Competitive Tendering, Chad

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Sazoulang Douh (2013) A framework for assessing the effectiveness of competitive tendering process in public works procurement at pre-contract stage in Chad: a research proposal *In: Laryea, S. and Agyepong, S. (Eds) Procs 5th West Africa Built Environment Research (WABER) Conference, 12-14 August 2013, Accra, Ghana, 49-57.*

A PARADIGM SHIFT IN URBAN ECONOMIC THEORIES: THE RE-EXAMINATION OF LAND AND HOUSING VALUES DETERMINANTS

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The past urban economic studies have shown that land and housing values are largely determined by location factors such as distance from Central Business District (CBD), ignoring the non-location factors like time of land purchase, zoning policy, housing quality and neighbourhood infrastructures. Therefore, this paper examined the relative importance of location and non-location factors in the determination of land and housing values, by posting Onitsha city as a case study. Eight hundred and fifty residential housing units were selected and questionnaire administered to the landlords through multi-stage sampling technique. The regression analysis results showed that non-location factors, especially, time of land purchase ($R^2 = 0.478$, $p < 0.05$) and number of rooms ($R^2 = 0.325$, $p < 0.05$) were more important determinants of land and housing values than the location factors. Also, Land and housing values increased with distance from the CBD because of the effects of non-location factors. Therefore, the paper suggested the need to include non location factors in the revision of the urban economic theories for better understanding of the determinants of land and housing values, especially in Onitsha.

Key words: Urban land value, housing value, location factors, non location factors, Onitsha

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A PRELIMINARY INQUIRY INTO THE APPLICABILITY OF CLIENT-CONTRACTOR PARTNERING IN THE GHANAIAN CONSTRUCTION INDUSTRY

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Construction projects in Ghana are predominantly procured through the traditional route which has been reported to be characterised by adversarial client-contractor relationships. In an effort to engender more collaboration in client-contractor relationships, studies have often advocated for projects to be procured through partnering arrangements. Clearly, central to the use of client-contractor partnering in a context such as Ghanaian construction industry where there is no report of client-contractor partnering is its perceived applicability. A pilot questionnaire survey of clients and contractors and subsequent analyses rather suggest that client-contractor relationships are not just adversarial but are even more paternalistic in nature. The analyses further suggest that partnering is applicable in the Ghanaian construction industry despite the predominant adversarial and paternalistic client-contractor relationships. Although these findings are not conclusive given the limited scope of the survey, they provide a preliminary positive indication of the use of partnering in Ghana.

Keywords: Ghana, partnering, procurement.

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A STUDY OF LIQUIDITY IN RESIDENTIAL PROPERTY SALES TRANSACTION IN LAGOS STATE NIGERIA

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The research aims at reducing the sales transaction time with a view to enhancing the liquidity of residential properties. The researcher adopted a five (5) stages transaction process adapted from McNamara (1998) and Crosby and McAllister, (2005) three (3) and six (6) stages of property transaction processes. With a target on the Nigerian property market, this paper examined the average transaction time on each stage in the sales transaction process to know the liquidity in residential properties sales transaction. The researcher used self administered questionnaire to elicit information on the average transaction time on each stage in the process and frequency of sales on different property types from; 40% of the registered estate surveyors and valuers in the 2009 NIESV Directory and vendors. Out of the sample frame of 270 registered estate surveying and valuation firms, 108 sample size of estate firms, representing 40 per cent of firms in the study area was selected randomly. A total of 432 questionnaires were administered on the two categories of stakeholders in the Nigerian real estate markets. The sample was selected randomly from the respective sample frame of the stakeholders i.e. estate firms and vendors. Two hundred and sixteen (216) each were administered on estate surveying firms and vendors. Data were analyzed with the use of frequency distribution, and mean. The result showed that, marketing period is the most significant stage of residential property transaction with an average transaction time of 72.14 days hence, the major determinant of transaction time, followed by exchange to completion, and pre-marketing period each with an average transaction time of 43.42 days and 31.07 days respectively. The other two processes, due diligence and decision to sell with average transaction of 24 days and 23.72 days which is less than a month are not significant. The supply of fund is averagely accessible and the marketing strategies used did not maximize the marketing opportunities in information technology which could have assisted in having shorter transaction time. Also, the market liquidity for block of flats is 47 days, detached house 85 days, duplex 104 days and bungalow 228 days. The study concluded that marketing period contributed more to the transaction delay, while exchange to completion and pre-marketing stages in property sales transaction process also had negative impact on the residential property sales transaction.

Keywords: Liquidity, Residential Property, and Sales Transaction.

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AMOEBIC URBANIZATION: THE LAGOS-OTA NEXUS

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This paper investigates the relationship between the Lagos Megacity and Ota Township, a small township on its periphery. The study examines linkages between and Lagos in terms of growth, urban development as well as mobility. 553 questionnaires were administered to household heads across the 12 residential districts of Ota Township. Survey was carried out by systematic random sampling. Classified traffic counts were also taken at strategic locations along the four main axial roads in Ota. The data collected were analysed with descriptive and inferential statistical methods including cross-tabulation and correlation analysis. Findings of the research have shown that the proportion of inter-city traffic from Ota directed towards Lagos is about 48% of total inter-city traffic generated. More than 40% of Ota residents migrated from Lagos and still commute daily to the megacity. The paper concludes by recommending strategies for better synergies between Ota Township and the Lagos megacity. These include the implementation of integrated master planning, effective environmental management and traffic policies for the township as well

Keywords: Peri-urban, settlements; linkages; Lagos Megacity; Ota Township.

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AN APPRAISAL OF BUILDABILITY PRACTICE IN THE NIGERIAN CONSTRUCTION INDUSTRY

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The traditional contract procurement system has long been the most widely accepted and used system in Nigeria; this separates the design phase from the construction phase of a project, thus leading to buildability problems and high rate of building defect because of lack of constructors' input in design development. This is a study on the problems of buildability practice in Nigerian construction industry. A total of 40 structured questionnaires were administered to relevant professionals within the construction industry out of which 30 were received and analyzed. A structured oral interview was also undertaken. Results revealed that, a section of professionals especially designers do not have clear understanding of the philosophy behind buildability, 75% of designers do not understand the reason and relevance of constructors' input in design development. It was concluded that one of the major problems that affect buildability practice in Nigeria is the issue of effective communication and relationship between professionals, which is discouraged by the nature of contract procurement system. Some of the suggestions made are: the inclusion of buildability as part of curriculum in every institution for both designers and constructors and also to include buildability programme in the national building code (NBC) 2006 which will encourage the creation of an enabling environment for the practice.

Keywords: buildability, design analysis, traditional contract procurement, experience, maintainability

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AN APPRAISAL OF CHALLENGES FACING COMPETITIVE TENDERING IMPLEMENTATION IN PUBLIC WORKS PROCUREMENT IN CHAD REPUBLIC

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Competitive Tendering is widely recognized as an attractive procurement mechanism and is commonly advocated by international organizations due to its widespread benefits. In Chad, despite the reforms undertaken since 2003, the implementation of Competitive Tendering is still characterized by low rate (25%) of projects execution due to excessive delays in the treatment of projects, abusive use of derogations (60%) in the award of contracts, concentration of many contracts (28%) into the hands of few contractors, and projects' overprices reaching 40%. As result, the performance of the works procurement process is very poor. The objective of the study is to appraise the challenges facing the implementation of competitive tendering in works procurement. A series of structured exploratory interviews were held with policy and decision makers among senior public officers to complement and/or corroborate initial observations and findings from literature review. Besides, a questionnaire using a 5-points Likert scale is employed to rank the 15 potential challenges and related issues identified. The study reveals the following major challenges: delay, ignorance and complexity of procedures, rigidity and incompleteness of regulations, lack of qualified personnel, lack of adequate equipment, poor funding of activities and entities, institutional weaknesses, corruption, political interferences. The study recommends that these challenges must be addressed through development of well-articulated long-term strategies among which a thorough review of the processes and procedures to mitigate delays and corruption.

Key words: Competitive Tendering, Challenges, Works Procurement, Delay, Chad

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AN ASSESSMENT OF CONTRACTOR'S RISKS EXPOSURE WITHIN SOME STANDARD FORMS OF BUILDING CONTRACT IN NIGERIA

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Construction projects are subjected to several risks due to different activities involved. The activities are performed by several parties under different circumstances. Among the various stakeholders the Contractor has been identified as the party that carries the highest number of risks. Contractors are always exposed to contractual risks which occur as a function of contract provisions and clauses. This research work identified and assessed the risks which Contractors are exposed to within some Standard Forms of Contract in Nigeria. It went further to determine the likelihood of occurrence of the identified risks as well as the impact of these risks on Contractors. Data were collected through questionnaires distributed to selected Contractors around Abuja and analysed using qualitative risk analysis technique. The research identified 35 potential risk factors with 54% of the risks emanating from the Clients, 31% from the Architect, 6% from the Quantity Surveyor, 6% from the Project Managers and 3% from the government agents. The study revealed that failures to write instructions regarding variations and documents which are not issued on time are the major potential risk factors with high likelihood of occurrence while the other risk factors have moderate likelihood of occurrence. Thirteen (13) potential risk factors were identified to have high impact on Contractors project delivery. Fifteen (15) risk factors represent high degree of risk. The study concluded that Contractors must understand the nature of risks, their source and the extent of exposure so as to pay attention to dealing with them appropriately. The study therefore recommended that Contractors should minimize the adverse consequence of these risks and maximize the opportunities that comes with it using appropriate risk management tools.

Keywords: contractual risk, standard forms of building contracts, contractors.

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AN ASSESSMENT OF THE KEY DETERMINANTS OF BUILDING SCIENCE STUDENTS' SATISFACTION WHEN UNDERTAKING GROUP WORK: A CASE STUDY OF THE UNIVERSITY OF JOHANNESBURG, SOUTH AFRICA

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This study assesses university's students' views on team work. The specific research aim is to investigate the factors that affect students' satisfaction when undertaking group work. The data used in this paper were derived from both primary and secondary sources. The secondary data was collected via a detailed review of related literature. The primary data was collected through a structured questionnaire aimed at 55 BTech (undergraduate final year) students. Data received from the questionnaires was analysed using descriptive statistics procedures. Findings from the study revealed that the most important factors which affect students' satisfaction when undertaking group works are: students having the same attitude towards work; ground rules for the operation of the group; some students do not come to group meetings and not all students contribute to the group assignments. This study reveals the key determinants of students' satisfaction when undertaking group work, hence preparing the students to be team players before they enter the world of work.

Keywords: team work, group work, University of Johannesburg, student

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ASSESSMENT OF THE PRICING OF PRELIMINARIES ITEMS IN THE BILL OF QUANTITIES

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The preliminaries section of a bill of quantities fulfils a number of functions consisting of information of project, describing requirements related to project, services and facilities that need to be provided prior to commencement of work on site. The preliminary items are usually priced but it is unusual to find more than a handful of items priced. The factors influencing the pricing of preliminaries items and the significance of these items in the bill of quantities based on the opinion of practitioners in the industry were assessed. A total of 80 questionnaires were distributed through purposive sampling to contractors and consultants. Forty two representing 53% response rates were used for the analyses. Data were analysed using frequency, mean and relative importance index. Complexity and size of project has the highest relative index (0.90) being very highly important factor followed by method of construction and site condition; site location and, plant and equipment required. In assessing the significance of preliminaries items scaffolding was considered very highly in pricing closely followed by temporary hoarding, water and site administration. Lighting and power, setting out, safety, health and welfare were also closely rated. The research reveals that all preliminary items were within the significant range in their mean and professionals would most likely price these items except the following six items; Small Plant and Tools, Temporary Telephone, Overtime, Cleaning, Drying the Works and Defects after Completion that were ranked low yet important

Keywords: consultants, contractors, preliminaries , pricing

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AN EVALUATION OF PUBLIC PRIVATE PARTNERSHIP (PPP) FOR HOUSING DELIVERY IN LAGOS STATE, NIGERIA

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Housing is second to food in man hierarchy of needs and it is a fundamental need for every human being irrespective of their level of income or financial status. Basic as this need is, it (housing) and its associated facilities such as water, electricity, waste disposal and so on, are grossly inadequate and government alone cannot muster sufficient resources to meet with the demand. PPP provides an alternative avenue for funding major public sector capital projects. This study aims at evaluating public private partnership for housing delivery in Lagos State, Nigeria. A total of two hundred and twenty-eight (228) questionnaires were received and analysed for this study. The following professionals constitute the sample surveyed, architects, builders, estate surveyors and valuers, structural engineers, town planners and quantity surveyors. The simple random sampling technique was employed in the selection of respondents. Data collected were analyze using mean item score (MIS). The result obtained from the analysis of data indicates that BOT is the most familiar and most used of the PPP options. Unstable political situation/instability of government, lack of or poor legal/regulatory framework, corruption of public officials, lack of transparency in contract awards, lack of government commitment and support, inappropriate risk sharing and inability of the private partner to identify and manage risks are the greatest challenges to PPP projects, and usage of the mode for housing delivery. Recommendations were made based on the result of data analysed, that Government should encourage the use of PPP for housing provision in Nigeria, create an enabling and secure investment environment for both local and foreign investors, show adequate commitment and support throughout the partnership period; and establish a financial structure that can provide adequate security for lenders.

Keyword: housing, public private partnership, construction, professionals

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AN EVALUATION OF THE PROPERTIES OF BINARY CONCRETE CONTAINING METAKAOLIN

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The advantages of using binary blends of concretes are mostly in terms of improving concrete properties, economy and sustainability with less environmental impact. This research evaluated the properties of binary concrete containing metakaolin as partial replacement of an Ordinary Portland Cement exposed to aggressive environment. Grade 40 cement concrete (conventional concrete) was designed using the Building Research Establishment method. An optimal percentage replacement of cement with metakaolin was also used to produce binary concrete. The samples were cured in water and three aggressive media (3.5% NaCl, 1% MgSO₄ and 2% MgSO₄) for 7, 14, 28 and 90 days. At the end of each curing period, the concrete samples were tested for compressive strength, tensile strength and abrasion resistance. The research revealed that binary concrete has higher (improved) compressive strength by about 10.8% and 11.9%, higher tensile strength by about 21.6% and 34.5% at 28 and 90 days respectively. Also, the binary has higher abrasion resistance than the conventional concrete by about 66.7% at 14 days and 33.3% at 28 days, while the two concrete samples have roughly the same resistance at 90 days. It was concluded that the binary concrete is more durable than conventional concrete in the three aggressive media. It was recommended that more research be carried out with the aim of commercial production of binary concrete of metakaolin and other pozzolanas.

Keywords: metakaolin, pozzolana, binary blends

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ANALYSES OF THE COSTS AND BENEFITS OF SUSTAINABLE TOURISM DEVELOPMENT – EVIDENCE FROM THE LEADING TOURISM COUNTRIES AND CITIES OF THE WORLD

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Relying largely on documentation analysis, this paper explores the costs and benefits of sustainable of tourism development using global evidence. The paper argues that the rapid development of global tourism industry in recent years has led to a significant employment creation with some associated negative consequences. With a bulk of evidence from the developed countries, the paper presents a longitudinal evidence of world tourism earnings, expenditure and attraction among the top 10 countries and top 21 cities most visited across the globe. It demonstrates how global tourism development can induce the governments at all levels to hugely invest in infrastructure development. It concludes that the money spent on tourism is directly or indirectly returned to the local economy; this the paper sees as a positive impact of tourism. Institutionalizing tourism development in government policy and improving the capacity to implement it are recommended to improve current trends.

Keywords: costs and benefits analyses; sustainable tourism development; evidence; global industry

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Abdulrahaman A. Sahabo and Friday A. Ogwu (2013) Analyses of the costs and benefits of sustainable tourism development –evidence from the leading tourism countries and cities of the world *In: Laryea, S. and Agyepong, S. (Eds) Procs 5th West Africa Built Environment Research (WABER) Conference, 12-14 August 2013, Accra, Ghana, 193-201.*

APPRAISAL OF THE DEVELOPMENT CONTROL ACTIVITIES OF ORIADE LOCAL GOVERNMENT PLANNING AUTHORITY, OSUN STATE, NIGERIA

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This study assesses the development control activities of Oriade Local Government Council, Osun State, Nigeria. The objectives are to examine the functions and operational procedure of the Authority, examine the plan approval process, assess the adherence to the building codes, examine the constraints to the effective functioning and suggest possible solutions to the identified constraints. Six hundred and one households were selected from six randomly selected towns out of forty in the Council. Primary data for the study were obtained through structured questionnaire. Information obtained include age, type and use of building, building plan approval process, adherence to building codes, post approval activities of the Planning Officials and general functions of planning authority. Findings reveal that 53.2% of the sampled buildings were for residential use, 47.4% did not fulfill the road setback requirement and 70% did not have adequate airspace while 8.3% did not have building permit. Appraisal of the plan approval process reveals that 49.9% of the sample processed their building permits through a third party, 30% had their plan approved in two weeks and 82% in a month. 54.2% of the sampled altered the structure and design of their development during construction without necessary permit while 33.3% reported that Town Planning Officials did not monitor their development during construction. It was concluded that the Local Planning Authority did not perform its functions adequately and recommended that adequate provision should be made for effective performance of site inspectors; qualified and adequate personnel should be employed and house numbering be done for effective administration.

Keywords: physical planning, development control, local planning authority, building permit

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AWARENESS OF ARTIFICIAL INTELLIGENCE (AI) METHODS FOR COST ESTIMATING IN THE NIGERIAN CONSTRUCTION INDUSTRY

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Accurate estimate is desired by both clients and contractors at the early project stage for determining a realistic price for incorporation into the bid package. Alternative methods of cost estimating are therefore important in the early planning or conceptual design phases of projects before detailed information is available to allow for quantity takeoff estimate to be performed. The study investigates the extent of awareness of the use of Artificial Neural Network (ANN) and Fuzzy logic (FL) techniques by professionals in the estimation of construction cost in the Nigerian Construction Industry. Questionnaire survey (with a response rate of 64%) was used to obtain information from professionals for analysis. The results of descriptive statistic revealed that professionals in the industry do not use any of the AI methods for cost estimation due to the lack of knowledge of their concepts. The study further revealed that the traditional methods are still the most widely used methods for cost estimation. From the study, the continued use of the traditional methods of cost estimation is undermining the call for paradigm change.

Keywords: artificial intelligence, cost estimation, neural network, fuzzy logic, Nigeria.

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BARRIERS TO SUSTAINABLE CONSTRUCTION IN THE GHANAIAN CONSTRUCTION INDUSTRY: CONSULTANTS PERSPECTIVES

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The construction industry in Ghana is considered the second largest sector contributing to the Gross Development Product (GDP) of the economy. The concept of sustainability which means meeting the needs of the present without compromising on that of future generations has emerged as a possible remedy to using resources prudently with immense benefit. However its application in the Ghanaian construction industry is yet to be fully explored due to perceived barriers. This research paper aims to examine the concept of sustainability in the Ghanaian construction industry with the main objective of identifying the barriers affecting sustainable construction in the Ghanaian construction industry. In this research, data were collected through a questionnaire survey by respondents randomly selected from the construction professionals in Ghana. Data collected were mainly analyzed using relative importance index to rank barriers identified during extensive literature review. The results show that key barriers to sustainable construction are lack of demand for sustainable buildings, lack of strategy to promote sustainable construction, initial higher cost, lack of public awareness and lack of Government support.

Keywords: sustainability, sustainable construction, barriers, construction industry

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BRIDGING THE FINANCE GAP IN INFRASTRUCTURE PROCUREMENT THROUGH BUILD-OPERATE-TRANSFER (BOT) MECHANISM IN NIGERIAN TERTIARY INSTITUTIONS

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Recent surveys suggest that the usual delays experienced in the procurement of infrastructure and abandonment cases which arise as a result of insufficient fund necessitate the need for the adoption of BOT towards financing housing infrastructure in Nigerian tertiary institutions of learning. Yet, the adoption of the initiative is argued to be influenced by a variant of factors which introduced elements of doubt on its relative effectiveness compared with traditional procurement method (TPM). Hence, this study therefore examines the stakeholders' perception on the level of effectiveness of BOT as a private finance initiative, compared with TPM. It also determines the influence of respondents' years of experience in PPP/BOT procurement and the outcome of assessment based on the identified factor frameworks. It further compares the respondents' assessment status of BOT and TPM system in housing infrastructure. To achieve the objectives, questionnaires were administered on a purposive sample of the core professionals who are staff in Physical Planning and Development Units (PPDU), Housing unit, works and Maintenance sections of the selected tertiary institutions in South-western Nigeria. Using descriptive statistics, Chi-square and t-test analysis, the result indicates higher level of effectiveness in favour of BOT than TPM. It also found that, except for cost/funding, there is a significant relationship between the respondents' years of experience and duration of the project, nature of the project, accountability/due process, economic/environmental compliance, client satisfaction/risk distribution and political influence. It also found that there is significant difference in the respondents' assessment of BOT and TPM systems based on all the factor frameworks.

Keywords: BOT , finance, infrastructure, tertiary institution

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BUILDING DESIGN PRACTICE AND HOUSEHOLD ENERGY USE IN URBAN CENTRES IN NIGERIA: A CASE STUDY OF BAUCHI TOWN

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Architecture and the general art/science of building design play a significant role in household energy use. This is because the efficiency of the inherent energy in use is dependent to some extent on the pattern of the building design, the nature and/or the technology of the appliances in use, and the occupant behaviour. This paper attempts to present the role of design practice in attaining household energy efficiency through a qualitative study approach of case study (inventory) of selected households; and interview of housing design stakeholders in Bauchi town. The objective is to determine the level of energy efficiency consideration in housing design practice by the housing stakeholders in Bauchi, Nigeria. The result reveals a low level of energy efficiency consideration in design practice; requiring a strategic programme to boost energy efficiency practice of the nation in a bid to meeting the global quest for energy efficiency; and subsequently sustainable energy development.

Keywords: building design practice, energy efficiency, households, energy use, appliances technology, Bauchi- Nigeria.

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CAUSES OF MATERIALS WASTE ON CONSTRUCTION SITES IN GHANA

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Construction site waste management has become an important issue in the construction industry given the need for sustainability in construction. Despite its importance, in the Ghanaian construction industry, contractors do not give much attention to managing site waste. This research investigates the causes of material wastage on construction sites in Ghana by the use of a questionnaire survey involving contractors. The findings reveal that the wrong dimensions, wrong orders, multiple handling, and inaccurate cutting are the most significant causes of material waste arising from design, material procurement, material handling, and operational activities respectively. These findings should help provide some stimuli for contractors in Ghana to devise robust measures to reduce materials waste on site. Designers also ought to be mindful of the dimensions they provide in drawings and specifications.

Keywords: construction waste, Ghana.

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CHALLENGES FACING DISTRICT ASSEMBLIES' "IN-HOUSE" ADMINISTERED CONSTRUCTION CONTRACTS

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The District Assemblies of local Authorities in Ghana are mandated to exercise considerable responsibility towards providing the needed infrastructure in their area of jurisdiction. In the exercise of this mandate the District Assemblies engage in construction contract administration using "in-house" personnel as against employing external contract administration firms. Such contracts administered could face challenges. The aim of this paper is to carry out detailed examination of the contract administration procedures of some of the District Assemblies in Ghana to find out the challenges faced by the in-house personnel that administer such contracts. In addition to desk based and exploratory study to find out and examine the nature of contract administration at the District Assemblies level, structured questionnaires and face to-face interviews were used to carry out a case study of three District Assemblies in the Ashanti Region in order to identify challenges faced in the contract administration process. It was discovered from the survey that pertinent challenges militate against effective contract administration at the district level by the "in-house" actors. Inadequate contract monitoring logistics was determined as the major challenge facing the district assemblies' in-house actors in the administration of contracts.

Keywords: challenges, contract administration, district assemblies, Ghana, in-house personnel

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CODES OF PRACTICE: PREREQUISITE FOR QUALITY STRUCTURAL DESIGN AND MANAGEMENT OF BUILDINGS IN NIGERIA

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The high incidence of collapse of buildings in Lagos state in particular, and the country, Nigeria in general, calls for the assessment of the whole construction industry and the codes of practice and standards being used in the country. The goal of the research work is to determine the influence of the usage of British Standards and Codes on the Nigerian construction industry generally and specifically on the strength of concrete. One partially collapsed building was studied. Cored cylindrical samples were taken from parts of the buildings that were yet to collapse and subjected to compressive strength tests. Also, five samples of sand were sourced from borrowed pits in Akure metropolis. From each sand sample, 10 cubes of concrete using mix ratio 1:2:4 by weight were casted and subjected to compressive strength tests. The results of the compressive strength test of the cylindrical specimens taken from parts of the building that were yet to collapse, showed that the characteristic strength of concrete used for the building is 8.2N/mm^2 as against the 20N/mm^2 recommended by the consultant structural engineer, in charge of the building. Furthermore, the results of cube tests conducted showed that the characteristic strengths of concrete cubes produced from the five samples of sand are between 11.23N/mm^2 and 18.54N/mm^2 . Since the actual characteristic strengths from both the cylindrical tests and cube tests is less than the expected characteristic strength of 20N/mm^2 for concrete of mix ratio 1:2:4 based on CP114 (1957), which had long been superseded newer versions, the structural integrity of structure built from such concrete would have been compromised, and liable to collapse. Research work should be focused on concrete mix design methods using locally available aggregates.

Keywords: collapse, building, codes of practice, standards, concrete

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CONCEPTUAL MODEL FOR INTEGRATING HEALTH AND SAFETY INTO CONSTRUCTION PROCUREMENT IN GHANA

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The purpose of this work is to develop a framework for integrating health and safety (H&S) into the procurement process of construction projects in Ghana at multiple levels. Procurement is the process through which the contracts for construction work are created, managed and fulfilled. The procurement process in construction comprises of specification, selection and award of a contract. The stage at which procurement occurs suggests that procurement can be used as a tool for incentivising H&S in construction contracts. Invariably the success of construction contracts is judged on the basis of cost, quality, and time performance. However, the overriding importance of human life and health suggests that any project which is completed in accordance to its cost, quality, and time objectives, but fails to fully ensure the health and safety of the people associated with it, should probably be regarded as a failure. Clearly, the health and safety of people working on construction sites should be of value and this should be fully embedded at multiple levels. Appropriate legislation, professional institutions, trade associations, procurement approaches need to be mobilised to minimise accidents on construction sites. However, this is not always the case in most parts of Africa where legislation and the institutional framework of the construction industry does not seem to uphold health and safety of workers as a paramount importance in construction projects and contracts. This research focuses on Ghana. The purpose of this work is to develop a framework for integrating health and safety into the procurement process of construction projects in Ghana at multiple levels. The research will provide a basis for improving the culture of health and safety on construction contracts in Ghana.

Keywords: Ghana, health and safety, procurement.

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CONTEXTUALISING THE METHODOLOGY FOR DEVELOPING A COLLABORATIVE WORKING FRAMEWORK FOR IMPROVING CONSTRUCTION DESIGN SERVICE DELIVERY IN GHANA

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Evidence exists in developing economies that there are construction supply chain problems and business relationship gaps. The business relationship gaps encourage discords, disputes and conflicts (DDC) and prevent exchange of information for effective and efficient supply chain of information flow (SCIF). These problems together impede the improvement of Design Service Delivery (DSD) activities. There is a quest for robust and reliable methodologies for this kind of built environment (BE) on-going research. This is to increase standard and acceptability of non-collaborative adversarial business relationship assessment results. The purpose of the paper is to justify the methodological issues and their appropriateness in dealing with the research aim, questions and objectives. These methodologies will also provide a valid and credible basis for the research path. Findings from the selected case study of business relationship maturity levels of individual construction firms or respondents can be categorised using the illustrative/indicative improvement assessment conceptual model. The categorization of the business relationship maturity levels will assist in effecting specific improvement in DSD activities

Key words: business relationship, construction supply chain management, design service delivery, research methodology

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CONTRACTOR-SUBCONTRACTOR WORKING RELATIONSHIPS: A REVIEW OF TRANSACTION COST ECONOMICS AND RESOURCE-BASED THEORY

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One prominent characteristic of the construction industry is the increased dependence on subcontracting in projects delivery. Different reasons have been assigned to this dramatic rise and the decisions to subcontract. However, current theories offer at least two main explanations for subcontracting; the transaction cost economics and the resource-based view of the firm. Whilst there has been increased utilisation of transaction cost economics in construction literature, little or no use has been made with resource-based theory regarding decisions to subcontract. Through comprehensive review of current literature, this paper identifies key variables of the two theories affecting subcontracting decisions and combines them to propose an integrated conceptual framework to enhance our understanding of subcontracting decisions. It also serves as the basis for empirical study to be carried out.

Keywords: resource-based theory, subcontracting decision, transaction cost economics.

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CORRELATES BETWEEN CONSTRUCTION COMPANY SIZE AND CORPORATE PERFORMANCE: AN EXPLORATORY STUDY

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This paper investigates the correlates between Construction Company's size in terms of net asset, technical and management skills, human resource, finance, innovation and experience and their corporate performance. The main objective of this paper is to establish among the variables the most significant factors that have greater impact on the corporate performance of firms. The rationale for the study is based on the fact that the size of construction companies that enhances their corporate performance is unknown. A descriptive survey method was used with quantitative data gathering using structured questionnaires. A combination of convenience and snowball sampling techniques was used in identifying 35 building and civil engineering construction companies based in three provinces of South Africa and registered in grades 2-6 of the Construction Industry Development Board (cidb) contractor grading register. Multi-attribute methods and rank correlation tests were used in the data analyses. The findings of this exploratory study indicate that there is a negative significant relationship between staff size a key indicator of company size and corporate performance (Return on Total Assets- ROTA) and a positive significant relationship between technical and management skills and corporate performance turnover. Based on these significant findings, it can be concluded that it is not the size of staff that determines the corporate performance but their productivity. Effective and efficient staff as well as good technical management skills of the company will make the construction company more competitive and influence its corporate performance. The findings of this research however will inform construction companies of the requisite construction company size that enhances their competitiveness in the market place which in turns impacts on their corporate performance.

Keywords: capacity, company size, competitiveness, construction company, corporate performance.

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COST OF TENDERING IN GHANA- CLIENT'S PERSPECTIVE

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Tendering can be described as a process by which a contractor is selected in an objective and transparent manner leading to the award of contract. This process comes with a lot of cost to the tenderers and the client. The purpose of this study was to assess the cost of tendering in Ghana focusing on the cost incurred by the clients. A case study approach was adopted in investigating the cost of tender for three entities. Historical records of awarded contracts in three public institutions (tertiary education, local government and tertiary health institutions) were collected in terms of cost of advertisement, tender opening, tender evaluation and approval from relevant tender review boards. The study established that, the clients in these three institutions from 2009 to 2012 spent an average of Three Thousand, Six Hundred and Forty-Seven Ghana cedis, One Pesewa (GH¢ 3,647.01) equivalent to \$1,879.90 per project which is averagely 0.70% of contract sum.

Keywords: tendering cost, public institutions, tendering stages, Ghana, clients

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CULTURAL EXPRESSION AND SUSTAINABLE DESIGN OF RESORTS IN NIGERIA

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Culture is one of the pillars of sustainable design and plays a major role in resort design at many locations. It stands as an interface between the tourists who are its consumers, and the locals, to whom it is a way of life. Many resort designers in Nigeria have at the least attempted to interpret and reflect local culture in a symbolic manner. It is in this light that this paper examines various attempts at reflecting local culture in resort design in Nigeria. This was based on purposive and illustrative selection of cases, visual surveys/ descriptive analysis and interviews. The result shows the existence of some common features in attempts at expressing culture. These include; cylindrical buildings with conical roofs, use or representation of local materials, and the use of art and crafts, ornaments and decorations. In most cases however, these were sparingly applied and limited to a number of buildings within the resort. One of the key limitations raised by respondents was that local building traditions could not offer tourists the required level of comfort. This calls for more research, innovation and creativity in harnessing rich local cultural heritage of host communities in order to offer tourists richer experience in resorts.

Keywords: culture, expression, identity, resorts, sustainable design, tourism.

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DELAYS TO LARGE CONSTRUCTION PROJECTS IN GHANA: A RISK OVERVIEW

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Delay to large scale projects, which is as a result of actions or inactions of some project stakeholders, is becoming a global phenomena and Ghana is no exception. The objective of the research is to identify, rate and rank the most significant risk factors that causes delay on projects and examine the social impact of these delays to recommend modalities to help mitigate these risk factors. The study adopted quantitative methods with the distribution of 144 questionnaires to built environment professionals receiving a response rate of 75.7%. The instrument listed 58 common factors under 8 category that contribute to the causes of delay for respondents to rate. Analysis of data non-parametric test revealed that client, contractor, material and finance category factors significantly resulted in the schedule delay of large infrastructural projects. The survey analysis revealed that micro-factors that result in delays to large construction projects are time constraint, cost overrun, payment problems, dispute and litigation. The research recommended the following modalities to minimize such delays: availability of resources, improved communication and coordination, proper scope definition and feasibilities, utilization of modern technology, appropriate application of technologically based systems and competent project management's structures.

Key words: cost overruns, delayed payment, disputes, risk and social impact.

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DETERMINING THE UNIQUE FEATURES OF MASS HOUSING PROJECTS (MHPS)

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It is argued that, in order to successfully manage and deliver large complex projects, one has to gain a precise understanding of the characteristics and particularities of that project. Mass Housing Projects (MHPs) differ significantly from the 'one-off' traditional projects often encountered in the construction industry and thus require unique management skills and approach in its implementation. MHPs are characterised by managerial and communication ineffectiveness inherent from their nature, features and particularities. Understanding the unique characteristics of MHPs are aimed at improving its organisation, planning, communication and managerial effectiveness to improve delivery. Through comparing 'one-off' traditional projects and Mass Housing projects from literature, focus group discussion and questionnaire survey, 10- unique features of Mass Housing Projects were established from management perspective. Mean scores and Kruskal-Wallis were used to test the level of agreements to the variable by the respondents. Also through Kruskal-Wallis test, 9- unique features had p-values greater than 0.05 ($p > 0.05$) showing that there were no significant variations in the means and respondents gave consistent responses, interpretations and low variability to the variables. The study is a preliminary stage of exploring the unique features of MHPs and its impact on communication performance among the project team.

Keywords: mass housing projects, project feature, project management

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DEVELOPMENT OF A DESIGN-RELATED COMPUTER-BASED MODEL FOR ESTIMATING BUILDING MATERIAL QUANTITIES

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Construction estimating involves the estimating of materials, labour, equipment, overheads and contingencies. Building developers have over the years asked for material estimates with reference to the specific design of their buildings after the designs have been completed. To date, there is no computer based model that takes into account the design of the structure/building with reference to the estimate being prepared. The traditional quantity take-off has to be completed before the materials can be extracted. Many find difficulties with estimating programs which exist today because they are complicated. This research sought to develop a design-related computer based model, for building material estimation where the user could input design data in the interface and generate the requisite quantities of materials required for the building by the click of a button. The design-based material extraction model was validated and evaluated by professionals in the Building Construction Industry in Ghana. In order to test the model, the model estimation process was run for six (6) different projects, three (3) each for residential and educational buildings. Projects that were used for the testing of the model were different from those used in formulating the model. In the testing process, a manual material extraction process was used for the calculating the material quantities of Cost Significant Items (CSI) of the project. The model was then used to estimate the material quantities and the results were compared with the manual approach. The average variances between the model generated and the traditional method of material estimation for the educational and residential buildings together, are -11.24% and +30.02%.

Keywords: cost significant items, model, estimation, take-off, variance.

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EFFECT OF BID BOND ON CONSTRUCTION PROJECT PERFORMANCE IN NIGERIA

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Bid bond is a type of construction bond that keep frivolous bidder out of the bidding process by ensuring that successful bidder will enter into the contract and provide the required performance and payment bonds. The aim of this research is to assess performance of bid bond in Nigerian construction industry and its effect on project time and cost. Data for the study were collected using well structured questionnaire administered on professionals in the construction industry as well as cost data of completed building projects. The data was analyzed using mean score, mean group difference, percentage, Spearman's rank correlation coefficient (Rs) and linear regression analysis. The study revealed the purposes and benefits of bid bond as well as risk associated with construction projects with and without bid bond. It was observed that there is significant relationship between cost of bond and initial cost; final cost; cost overrun; number of days to secure bond; initial time, final time and time overrun. Finally, the study recommended that bid bond should be properly used in construction industry by consulting appropriate professionals at the tendering stage of the project so as to reduce abandonment of the project, incompetent contractors, risk that can arise during the construction, quality failure, poor performance as well as cost and time overrun.

Keywords: bid; bid bond; construction bond; construction project performance; Nigeria.

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EFFECTS OF NIGERIAN METAKAOLIN (MK) ON CEMENT MORTAR AND COMPRESSIVE STRENGTH OF CONCRETE

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The effects of MK produced by calcining raw kaolin at 700°C using materials passing 75µm sieve on physical properties of cement mortar at standard consistence were determined in the laboratory. The MK was also used as partial ordinary Portland cement (OPC) replacement in concrete at water/cement (w/c) ratio of 0.30 and 0.40. In cement mortar, standard consistence water content change as a result of MK addition was marginal; the initial setting times reduced with increase in MK content, but no unsoundness was recorded. The results of compressive strength tests on cube specimens show that at 28 and 90 days, the specimens containing 15% MK recorded the maximum strength increase at a w/c ratio of 0.40.

Keywords: metakaolin, compressive strength, concrete.

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EFFECTIVE SITES AND SERVICES SCHEME AS A MEANS OF SOLVING LOW-INCOME HOUSING NEED IN NIGERIAN CITIES

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The importance of infrastructure and services in achieving efficient and effective functioning of cities and towns as well as promote national economic development have been well emphasized by the political declaration issued at the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg, South Africa. It has also been ascertained by empirical studies that the basis for sustainable urban development is the existence of functional and efficient sites with infrastructure and services. This work therefore examines the effectiveness of sites and services schemes in Nigerian situation and compares it with what obtained in the other selected countries of the world. This is with the aim of deriving lessons that will be of great benefit to Nigeria most especially to solve the housing need problem of poor majority of Nigerians living in Nigerian cities.

Keywords: sites and services, Nigerian cities, sustainable development, low-income housing.

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EFFECTS OF CURING CONDITIONS ON COMPRESSIVE STRENGTH DEVELOPMENT OF CONCRETE CONTAINING OPTIMUM RICE HUSK ASH REPLACEMENT

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Concrete cube specimens containing optimum cement replacement with low specific surface rice husk ash (RHA) were cured in water and ambient air (uncured). The results of compressive strength tests at 28 days show that uncured cube specimens containing optimum RHA replacement had higher compressive strength compared to specimens without RHA at water/binder (w/b) ratio of 0.35, 0.40, 0.45, 0.50 and 0.55. However, the water cured cubes containing optimum RHA replacement recorded higher compressive strength above control at 28 days at w/b ratio of 0.35, 0.45, 0.50, and 0.55.

Keywords: compressive strength, curing, RHA, incinerator

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EFFECTS OF MANAGEMENT PRACTICES ON THE COMPLETION TIME OF BUILDING PROJECTS IN GHANA

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Time is an important factor in the life of any project, more especially in construction industry. It is therefore paramount that all efforts are channelled towards identifying factors that have the potential to derail project schedule. The aim of the study was therefore to assess the effect of some management practices on the completion time of building projects in Ghana. The study adopted survey research design; relative importance index and binary logistic regression statistical approach in the identification of the management practices that have significant impact on construction project time in Ghana. The study identified; poor site management, poor supervision, poor planning, low capacity of contractors, long waiting time for approval of drawings by client, delay in design information and discrepancies in design as the most significant factors that influence project duration in Ghana.

Keywords: time, management practices, project time and project

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EFFECTS OF TRENDS IN ANNUAL RENTS ON OCCUPANCY RATIO IN MULTI-STOREY COMMERCIAL PROPERTIES IN KADUNA METROPOLIS, NIGERIA

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The research investigates the effect of the variance in Rents paid on Occupancy Ratio of multi-storey commercial properties within a period of seven years (2006-2012) using the commercial city of Kaduna in Nigeria as the case study. The study was carried out using a semi-structured questionnaire along with personal interview administered on tenants and managing agents of 3 selected multi-storey buildings. Using Correlation and Time-series analysis, it was discovered that the incessant increase in rent on the properties over the years has impacted on the occupational ratio of these buildings as there is an inverse relationship between the occupancy-status and rents-paid in the buildings, thus, as the occupancy ratio in the buildings continue to decline, the rental value continued to increase. Among the recommendation was that Landlords should not be too ambitious as to continuously increase the rents charged, even as against the recommendations of their professional managing agents, to curtail the incessant decrease in occupancy ratio.

Keywords: rent; multi-storey buildings; occupancy ratio; Kaduna

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ENVIRONMENTAL JUSTICE, PLANNING AND OIL AND GAS PIPELINES IN THE NIGER DELTA REGION OF NIGERIA

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This paper analyses the impact of oil and gas pipelines on the environment and settlements from the perspective of environmental justice, using a case study of the oil-producing communities in the Niger Delta region of Nigeria. The paper mobilises theories of environmental justice to support an in-depth empirical analysis of the development and management of oil and gas pipelines in the region. The empirical evidence equally suggests that the lack of community involvement and appropriate recognition of some groups of stakeholders in the management of the oil and gas pipeline project is strongly related to the incidence of pipeline impacts on the communities. The paper advocates a new approach, based on the core principles of environmental justice that promotes inclusion of the necessary stakeholders, including the physical planners, and would incorporate local knowledge and experience into the environmental management of the region in a way to protect the environment and people from the impacts of the pipeline.

Keywords: environmental justice, planning, oil and gas pipelines, Niger Delta, Nigeria

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EVALUATION OF THE PERFORMANCE OF BROKEN WASTE TILES AS AGGREGATE IN LIGHTWEIGHT CONCRETE

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The possibility of using broken waste tiles as Lightweight Concrete (LWC) aggregate material was investigated. Mix ratio of 1:2:4 were adopted and varying water to cement (w/c) ratio of 0.5 to 0.7 were selected depending on workability demands. A total of 198 cubes were cast, 18 cubes for each of 0 (control), 20, 30, 40, 50, 60, 70, 80, 90 and 100% waste ceramic tiles partially replacing coarse aggregates and three cube for each of 1, 3, 7, 14, 21 and 28 curing days periods. The results showed that 50% broken tiles partially replacing coarse aggregate gave the most adequate results and is generally optimal and satisfactory for compressive strength, density and water absorption of LWC.

Keywords: broken tiles, aggregates, lightweight concrete, compressive strength, density, water absorption.

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EXPERT SYSTEM AND ECONOMETRIC ENTROPY-BASED MODEL FOR RESIDENTIAL BUILDING PROJECT COST ADJUDICATION

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The main aim of the study is develop an expert system and econometric entropy-based model for residential building project for cost judgment and decisions in residential building project. The study used random sampling technique to select projects completed between 2009 and 2011, the project were examined for their cost centres. As-built cost of four hundred (400) of the projects were further selected and modified with econometric factors like inflation index, cost entropy and entropy factor and were used to form and train neural network used. Probability technique was used to generate risk impact matrix and influence of entropy on the cost centres. A parametric model similar to hedonic models was generated using the utility parameters within the early and late dichotomy. The model was validated through comparative analysis of the econometric loading attributes using Monte Carlo technique of SPSS software extracting the contingency coefficient. This attributes would enable a builder or contactor load cost implication of an unseen circumstance even on occasion of deferred cost reimbursement.

Keywords: neural network, econometric, model, escalator, risk, dichotomy, adjudication, entropy.

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Lekan M. Amusan, Ayo K. Charles and Timothy O. Mosaku (2013) Expert system and econometric entropy-based model for residential building project cost adjudication *In: Laryea, S. and Agyepong, S. (Eds) Procs 5th West Africa Built Environment Research (WABER) Conference, 12-14 August 2013, Accra, Ghana, 493-509.*

EXPLORING THE BENEFITS OF E-TENDERING FOR INFRASTRUCTURE PROJECT PROCUREMENT IN NIGERIA

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Assessments of public infrastructure procurement systems in most of the developing countries have consistently indicated weaknesses in the used of manual tendering processes. The use of this manual tendering technique is perceived to be labour intensive and dominated by paper work thereby making it costly and inefficient. However, studies revealed that information technology system could engender efficient tendering method that can provide the foundation for cost reduction and transparency in infrastructure project procurement. Despite these relative advantages, the use of e-tendering in Nigeria is influenced by several factors such as: poor state of electricity power supply, lack of established procedures, and legal issues surrounding its application. Though, the motivation for this paper stemmed from identifying an immediate opportunity for Nigeria to actively participate in and be instrumental in developing e-tendering in infrastructure project procurement. It is based on this premise this report on a study that explores the relative benefits of e-tendering. Data used in the study were sourced from the literature reviewed and a survey that was conducted among major participants in infrastructure project development in Nigeria. The main findings of the study show the major benefits of e-tendering in order importance: reduce cost and time; effective tender processing; provides transparency and accountability; and improve communication and knowledge sharing. These factors/benefits formed a clear reflection of the good achievement of e-tendering application. Furthermore, the study would serve as a way of sensitizing public sector towards embracing the application of e-tendering capable of eliminating the high tendering costs in infrastructure project procurement in Nigeria.

Keywords: construction, e-tendering, infrastructure, procurement, Nigeria.

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FACTORS AFFECTING THE IMPLEMENTATION OF BUILDING REGULATIONS (L.I.1630) IN GHANA

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The National Building Regulation (L.I. 1630) was enacted in 1996 in Ghana to regulate the erection of buildings, alteration of building structures and execute works or install fittings in connection with any building. Although, this regulation has been enacted, its implementation is questionable. The aim of this research therefore is to identify factors affecting the implementation of the Building Regulations in Ghana. Interview and questionnaire survey were the two principal methods used to elicit data from 180 respondents. Three (3) key groups of respondents were targeted for the study, namely local authority staff, building practitioners and building owners. The research findings indicated that the most important factors affecting the implementation of the Building Regulations in Ghana are: corruption; bureaucratic procedures; lack of public education about the building regulations; inadequate resources for implementers; and political interference. The paper therefore recommends that the implementation system should be restructured to identify implementers who compromise the regulations as a result of their selfish interest. Such persons should be sanctioned to deter others from compromising with the regulations. Local authorities should streamline the implementation procedure such as the procedure for obtaining building permits to reduce the bureaucracy. Local authorities and government agencies must also formulate programs to educate and sensitize the public about the purpose and importance of the National Building Regulations and the need to cooperate with implementers. There is the need to establish or set aside a special fund by all local authorities to provide resources for the implementation of the National Building Regulations.

Keywords: national building regulation, implementation, local authorities, Ghana

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FACTORS MILITATING AGAINST PRIVATE PRACTICE BY GRADUATES OF ARCHITECTURE IN THE NORTH-WEST GEO-POLITICAL ZONE OF NIGERIA

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This study uncovered the factors militating against the registration and setting up of private practice by graduates of architecture in the North-west geo-political zone of Nigeria. The study is necessitated by the absence of visible private practicing firms in five of the seven states that constitute the zone. Stratified purposive sampling technique was used. Questionnaires were administered on graduates of architecture and Schools of Architecture in the zone, as well as, the Nigerian Institute of Architects (NIA). The only hypothesis of the study assumed no relationship between the opinion of stake holders on the factors militating against licensing and the setting up of private practice by graduates of architecture in the zone. Chi-square was used for the analysis. The establishment of centres for internship / licensing and, joint partnerships were recommended as solutions for the near absence of private practice in the zone.

Keywords: Architecture, graduates, non-registration, private practice.

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GEOSPATIAL ANALYSIS OF PRE AND POST 2012 FLOOD DISASTER IN LOKOJA AND ENVIRONS, NIGERIA

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In the past couple of decades, Lokoja and environs in Nigeria have not experienced any serious flood events, despite its location as the confluence of Rivers Niger and Benue. However, in October 2012, the entire region was devastated by flood, causing huge destruction to the urban infrastructure (roads, buildings, drainages, bridges, powerlines, etc) and socio-economic lives of the area. The flood event, which brought untold hardship on the people and residents of Lokoja and environs, requires comprehensive geospatial mapping for emergency management and flood contingency planning in the affected areas. This study therefore aims at the geospatial analysis of pre and post 2012 flood disaster in Lokoja and environs for the effective management of the menace. The datasets used for the study include, topographic map, Global Positioning System (GPS) coordinates, settlement map, digital photographs, high resolution satellite imagery, TerraSAR data, MODIS Images of October 13, 2012, and October 20, 2008 and Shuttle Radar Topography Mission (SRTM) digital elevation model (DEM). The study showed a flood height of between 12.5-15m in most affected areas, with a total estimate of 490,582 internally displaced persons (IDPs). The vulnerability of the study area to flood hazard and risk was classified into six categories of highly vulnerable (0-100m), moderately vulnerable (101-200m), non-vulnerable (201-260m), higher ground (261-400m), hilly regions (401-700m) and summit (701-892m). This implies that, areas of ground elevations between 201m and 892m AMSL are in all circumstances not liable to flooding. Apart from the excessive rainfall experienced in 2012, anthropogenic factors such as unapproved land uses, uncontrolled buildings and infrastructures at the river banks and spill ways were major contributors to the flood disasters in the study area. Also, the impact of the floods was exacerbated due to strong cultural affinity to the flood plain by the affected communities.

Keywords: Geospatial Analysis, Mapping, Flood Disaster, Flood Risk, Urban Infrastructure

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GEOSPATIAL TECHNIQUES IN RISK MAPPING OF OIL PIPELINES IN OBIO/AKPOR AREAS OF RIVERS STATE, NIGERIA

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The location of oil pipelines within or near settlements poses great dangers which have been mostly overlooked in Nigeria. Hence, the focus of this study on mapping of settlements in some areas of Obio/Akpor local government area of Rivers State that are exposed to the potential risks using field surveys and GIS softwares like ArcGIS 9.3, TatukGIS calculator and Microsoft office suites. The level of risk or vulnerability of residents was based on distance from pipelines (The closer to a pipeline, the higher the risk). Settlements that fall within the 50m buffer are termed a high-risk zone, those within the 100m buffer termed medium-risk zone and those within the 150m buffer a low-risk zone. Some settlements fell into these zones and their areas (in hectares) were calculated and represented; 0.397 hectares of settlements cut into the Row, 8.747 hectares of settlements cut into the high-risk zone, 42.484 hectares of settlements cut into the medium-risk zone and 87.294 hectares of settlements cut into the low-risk zone. The study also assessed the awareness of the inhabitants of such areas on the related risk using questionnaires with target sample size at 150 and 100 responses using systematic and stratified sampling methods; oppositional streets close to the pipeline locations within the area were selected and houses at every seven house interval were interviewed. The responses from the respondents were presented in percentages using Microsoft excel showed that 78% were not aware of the existence of pipelines in their neighbourhood, 84% not aware of their locations, 36% don't intend to relocate and 42% didn't know who to contact in case of emergency. Finally, the study further shows that with remote sensing and GIS methods, oil pipeline management and monitoring is made easier but the Government has to play the larger role by initiating public enlightenment in collaboration with concerned non-governmental organizations and appropriating laws that will reduce risk exposure due to oil pipelines.

Key words: Remote sensing, Geographic Information Systems (GIS), Oil pipeline, Risk mapping, Settlements, Vandalism.

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GO-AHEAD ELEMENT OF DOMESTIC ARCHITECTURE: SOCIO-ECONOMIC AND CULTURAL CHARACTERISTICS OF THE RESIDENTS IN BENIN

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The domestic architecture of a traditional settlement is greatly influenced by the socio-economic and socio-cultural characteristics of its residents. Benin City which is the focus of the paper is a case of a traditional settlement undergoing Domestic Architectural evolution with the changing times influenced by factors of growth and development. The paper has examined the effect of socio-economic and socio-cultural characteristics as factors that partly determine the design, style, pattern, space use, organization, location and meaning as well as land use of the Domestic Architecture of Benin. The study employed the use of questionnaire administered to residents across the cross-section of the city. In the end, descriptive frequency tables were used to analyse the data collected from the residential zones in Benin. The research has been able to corroborate the theory that socio-economic and socio-cultural factors are some of the determinants/elements of domestic architecture of a people.

Keywords: Go-Ahead Element, Domestic Architecture, Socio-Economic and Socio-Cultural Characteristics

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GOVERNING CONSTRUCTION PROJECT PROCUREMENT TO MITIGATE CONTRACTOR'S OPPORTUNISM: A CONCEPTUAL FRAMEWORK.

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The opportunism construct has received limited attention in the construction procurement literature. Yet it has been shown that opportunism is inimical to value creation in interorganizational exchanges. This work focuses on contractor's opportunism, synthesizing insights from the transaction cost economics literature, agency theoretic literature, relational exchange theory and the construction procurement literature into a testable conceptual framework that answers the questions: What causes construction contractors to behave opportunistically? What governance devices are in use for mitigating contractors' opportunism? The work deploys a desk-top review and synthesis of relevant construction project management and business management literature. Since this work is conceptual, future researches will test the hypotheses embodied by the conceptual framework. Hypothetical propositions that specify the mitigating impact of governance structures on contractor's opportunistic behaviours are developed. Sound procurement policies that improve project delivery in the public sector cannot be crafted without a deep understanding of the opportunism construct. This study illuminates our understanding of contractor's opportunism, while providing a basis for assessing the efficacy of extant governance devices in a future empirical questionnaire survey.

Keywords: contractor's opportunism, procurement.

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HEALTH AND SAFETY PERFORMANCE IN THE UGANDA CONSTRUCTION INDUSTRY

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The construction industry is possibly the most hazardous industry in regards to health and safety (H&S) of workers. In Uganda, there has been poor management of H&S at construction sites and as a result, the industry registered increased frequencies of safety incidences with high fatalities. These incidences have led to loss of lives, injuries, damage to properties and equipment, reduced productivity and loss of revenue amongst others. Unfortunately, these H&S incidences are reported after the occurrence and do not show preventive measures undertaken. This study aimed at analysing the H&S performance in Uganda's construction industry in order to propose measures for effective management. Construction firms that had active construction projects within Kampala, Mukono and Wakiso districts during the study period were studied. The data on subjective performance were collected using questionnaires and observation checklists. Data on accident records were collected using accident forms. The results showed that contracting firms were generally aware of the need to uphold good H&S practices. However, only 35 percent of the H&S programmes were implemented at good level and above. On average, 40 percent of the construction sites practices were unsafe. Objectively, H&S performance was characterised by high accidents injury rate (20.2), non-fatal injury rate (18.2) and fatal injury rate (2.0) per 100 equivalent full-time workers (EFTW). Uganda government should cause implementation of the seventeen H&S programmes into a regulation and strengthen the laws governing H&S in construction industry. Construction firms should train their workers on H&S requirements in order to improve their H&S regimes.

Key words: accident, health and safety, performance, Uganda.

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HOUSING PROCUREMENT IN INFORMAL SETTLEMENTS: A CASE STUDY OF AYOBO, LAGOS, NIGERIA

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Informal settlements have often been associated with poorly constructed houses and appalling environmental conditions, hence research on how to improve the living conditions of residents in such settlements in the developing countries are on the increase. This study examined housing procurement and the challenges associated with it in informal settlements using Ayobo, Lagos, Nigeria, as a case study. Based on data derived from household surveys conducted between 2011 and 2012, it was observed that housing procurement in the study area is based on informal land acquisition process, household savings as the principal source of housing finance and the non-utilisation of relevant professionals in the design and construction of houses. Lack of access to adequate housing finance, non-regularization of land titles and high cost of labour and materials were the key challenges confronting housing procurement in the study area. The paper argues that the current situation has implications for the quality of housing environment, and indeed the living conditions of people living in informal settlements in Nigeria and suggests that some policy actions are needed to redress the situation.

Keywords: Informal Settlements; house procurement; housing environment , Nigeria

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HOW DOMESTIC SPACE EMBODIES STATUS: A COMPARATIVE STUDY OF KITCHENS AND CULINARY PRACTICE IN ILE-IFE, NIGERIA

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Many ethnographic studies identify the kitchen as a gendered space, and argue that because gender defines status and power relations in society, such distinctions will be manifested in the way space is designed and used. A gendered space is therefore a status space. The purpose of this study is show how status is manifested and to measure this manifestation by analysing the distribution of culinary practices in space. This paper discusses how status is manifested in domestic space, by undertaking an ethnographic study of culinary practices in seventy-five households in Ile-Ife, Nigeria. By using a combination of architectural morphology tools based on the 'space syntax' theory, which has been developed at the Bartlett School of Graduate Studies, University College London, since the 1970s, and descriptive statistics, the study shows how the shared patterns of presence and separation of persons, objects, activities, and food in space may be used to measure the interrelationship between space and social status. The study finds that there is a tendency for the status attributed to these phenomena to be influenced by other variables that share the same spatial environment.

Keywords: social status, domestic space, culinary practice, kitchen, gender,

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IDENTIFICATION OF CONSTRUCTION DELAY FACTORS: PERCEPTION OF MULTINATIONAL AND INDIGENOUS CONSTRUCTION FIRMS IN NIGERIA

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The study is to identify the factors responsible for construction delay in Nigeria construction industry from the perception of the multinational and indigenous contractors. To achieve the objective of the study a research survey was adopted. A total of fifty-eight (58) questionnaires were used for the analysis using descriptive and inferential statistics. The study revealed that cash flow problems, shortage of construction materials, client's financial difficulties, inadequate consultant experience, incompetent project team, poor design, and delay in design, inadequate contractor experience, lack of communication and coordination, project financing problem and change are the most influencing factors affecting the two firm's types. The study also established an empirical relationship between the perceptions of the two firm's types.

Keywords: Construction, Contractor, Client, Delay, Indigenous, Multinational

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IDENTIFICATION AND CHARACTERISATION OF WETLANDS FOR SUSTAINABLE DEVELOPMENT IN EDE REGION, SOUTHWESTERN NIGERIA.

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The study was undertaken to identify and characterize wetland with a view to exploring them for productive activities in Ede region, Southwestern Nigeria. Data for the study was collected from primary and secondary sources. Global Positioning System (GPS) which equally served as a primary source of data was utilized for ground truthing and also to obtain coordinates of wetlands. Topographic map (1962) served as secondary data was digitized and a point map of wetlands created. Plants samples were collected and taken to the herbarium for identification. The wetlands in Ede Region generally, were characterized by standing water or shallow inundations or saturation at near the surface, hydromorphic soils and the presence of hydrophytes as the dominant plant species which was in concordance with The Committee on Characterization of Wetlands 1995. Therefore, based on these characteristics, three types of wetlands were identified: riverine, lacustrine and palustrine system. They could offer opportunities for water supply, fish farming, cattle ranching throughout the year, cultivation of maize three times in a year, yam twice a year and rice three times in a year whose maximal exploitation requires the incorporation of the principles of sustainable development.

Keywords: characterization, point map, sustainable development, wetlands, poverty.

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IMPACTS OF ROAD TRANSPORTATION ON REGIONAL DEVELOPMENT OF IGBOMINA REGION OF OSUN STATE, NIGERIA

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The only functional means of transportation in Nigeria and the study area in particular is the road transport system. The aim of this paper is to examine the impact of road transport on regional development of Igbomina region of Osun state, Nigeria. The paper identified modes of transportation often used in the region. It also examines the effects of road transportation on the socio-economic characteristics of the people in the region. People's productivity in relation to transportation of goods and services in the region was also determined. Three hundred and sixty questionnaires were randomly distributed in the three major cities in the region based on their areal extent and population. Focus group discussion was also used to obtain information from commercial motor drivers and motorcycle riders. Descriptive and analytical statistical methods were both employed to analyze the data gathered. The findings showed that road transport has both positive and negative impact on the regional development of the area. However, the bad conditions of the road in the area affect cost of transportation of goods and services in the region, which in turn affect the regional development of the area. This study therefore, suggests that an improvement in the road transport system will enhance regional growth and development of the area.

Keywords: Road transportation, road condition, region, development.

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IMPLICATION OF HOUSING DEVELOPMENT ON WETLAND LOSS IN ETI OSA LOCAL GOVERNMENT AREA OF LAGOS STATE, NIGERIA

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This study examined the relationship between housing development and wetland loss. Over the years, the amount of wetland that has been lost to housing development for various uses cannot be over emphasised. This was as a result of the wetland reclamation exercises carried out due to the increasing demand for land for various public (government) and private (individual) housing development projects. There is the need to introduce the principle of sustainable development into the use of wetland zones. The data for this research were obtained from both primary and secondary sources obtained from the field, literatures and interview sessions with staff of the Land Registry. Through multi-stage, cluster sampling technique used to administer questionnaires the total area of wetland lost to land reclamation, within the study area was determined. It was discovered that in the 2012, a total of 4,185.56 hectares (28.86%) of wetland was lost to land reclamation for various housing development projects as against the initial 14,500 hectares of wetland as recorded by the Lagos State Government in the 1980 – 2000 regional development master plan, leaving a balance of 10,314.44 hectares (71.14%) of wetland in EtiOsa local government area of Lagos state. Thus, increasing the rate of housing development, housing provision and delivery in EtiOsa Local Government Area of Lagos State at the detriment and loss of aquatic life and wetland ecosystem at an alarming rate that needs to be checked and attended to. This paper discusses the consequences of wetland loss; and develops alternative management strategies for the preservation, conservation and sustainable utilization of the remaining wetlands.

Key words: housing development, environmental sustainable development, wetland zones and loss

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IMPROVING LAND GOVERNANCE IN NIGERIA: THE CASE OF COMPULSORY ACQUISITION AND COMPENSATION PRACTICE

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This paper examines land policies on acquisition and compensation practice in Nigeria with the aim of minimizing conflicts in land acquisition and compensation. It further explains the implications of uncoordinated land allocations arising from informal transactions. The paper used self administered questionnaires on all the (15) fifteen registered estate firms in the 2009 NIESV Directory in Benin City, Edo state to obtain information that helped to determine the fairness of compensation practice and causes of conflict in some communities in the state. The paper revealed that the compensation on acquired landed properties in Nigeria violated the principles of good governance as against what is obtainable in advanced countries. It also observed that inadequacy of compensation paid and delay in payment are the causes of conflict between the acquiring authorities and the affected community / people. The paper concluded that a review of land policies on acquisition and compensation will be a panacea for achieving the principles of good governance

Keywords: Good Governance, Acquisition, Compensation

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Odebode Adedayo Ayodeji, Olaleye Abel and Oladokun Timothy Tunde (2013) Improving land governance in Nigeria: the case of compulsory acquisition and compensation practice *In: Laryea, S. and Agyepong, S. (Eds) Procs 5th West Africa Built Environment Research (WABER) Conference, 12-14 August 2013, Accra, Ghana, 695-703.*

IMPROVING THE STRUCTURAL CHARACTERISTICS OF EARTH BLOCKS AS AN INPUT OF AFFORDABLE HOUSING FOR LOW-INCOME NORTHERN COMMUNITIES OF GHANA

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There is a high incidence of poverty in the three northern communities of Ghana and as a result many of the inhabitants cannot afford the high cost of cement-based building materials such as sandcrete blocks. Buildings are therefore predominantly constructed with earth occasionally stabilized with cow-dung. Such buildings suffer rapid deteriorations due to the prevalent adverse weather conditions and rampant events of flooding especially in low-lying areas. To forestall this perennial problem, this study investigates the structural characteristics of earth blocks stabilized with cement and cow-dung. Three different types of earth blocks were prepared from cow-dung only; cow-dung and cement and cement only. For the cow-dung-only earth blocks, four samples were prepared with cow-dung additions of 5%, 10%, 15% and 20% by volume. Also, for the cow-dung and cement earth blocks, four samples were prepared with cow-dung additions of 3%, 8%, 13% and 18% with 2% cement added to each sample; whilst for the cement-only earth blocks, one sample was prepared by adding 2% cement to earth. The blocks were cured for 28 days and tested for compressive strength. The 28-days average compressive strength of cow-dung-only earth blocks were 0.36N/mm², 0.37N/mm², 0.53N/mm², and 0.43N/mm² for 5%, 10%, 15% and 20% cow-dung additions respectively. Similarly, for the cow-dung and 2% cement earth blocks, the results were 0.85N/mm², 0.95N/mm², 0.62N/mm², and 0.33N/mm² for the 3%, 8%, 13% and 18% cow-dung additions respectively. Finally, for the 2% cement-only earth blocks, the compressive strength was 0.72N/mm². It was concluded that the compressive strength of earth blocks improves significantly when nominal amounts of cement are added to cow-dung; and hence should be adopted for affordable and sustainable housing delivery in the three northern regions of Ghana where cow-dung abounds.

Keywords: Earth blocks, Cow-dung, Cement, Affordable housing, Compressive strength

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INFLATIONARY TRENDS AND THE PRICES OF SOME SELECTED CONSTRUCTION PLANTS

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This research presents data on the prices of some selected construction plants. (Excavator, Concrete Mixer, Grader and Wheel Loader) and the inflationary indices for the period (2001-2010) which have impacted negatively on goods and services, causing variations in tender and post contract figures. Data for the prices of the plants were obtained from vendors situate in Port Harcourt metropolis (Nigeria), while data on inflationary indices are national figures obtained from the Federal Office of statistics. Using the statistical technique of regression set at 5% significance level, the research analyzed the relationship between the research parameters. The annual mean values of prices of each of the plant types and the inflationary indices within the research period were used for the analysis. Research findings established that the degree of relationship between the tested parameters were significant, recording R-Square and P-Values that ranged between (88 – 96%) and (0.00 – 0.004) respectively. The dependent variable price, can be predicted from the independent variable inflation, for time series outside the research period. The research concludes that the inflationary indices explain the unstable price trends of the selected construction plants. This trend can be minimized through the formulation of macro-economic stability policies (Monetarist and Keynesian), to curb excessive liquidity and to fine tune the economy. Programmes on import dues, taxes and license concessions are other potent complementary stabilization measures.

Keywords: construction plants, price concept, price determinant, inflation, macro-economic instruments.

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INFLUENCE OF ORGANISATIONAL CULTURE ON CONSTRUCTION WORKERS' COMMITMENT IN LAGOS, NIGERIA

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Culture is a unique characteristic of any organization and it is the result of common learning experiences among the workers in any organisation. Organisational culture through its dimensions has remarkable influence on the commitment of construction workers and this engenders organisational outcomes. Despite extensive research into organisational culture and workers' commitment in the manufacturing, hospitality, financial and healthcare sectors very little attention has been received by the construction sector in this genre. The purpose of this study is to investigate the influence of selected dimensions of organisational culture on construction workers' commitment in Lagos. Questionnaire survey was conducted on different management cadres in the construction companies in order to obtain the data for the determination of the influence in selected construction companies in Lagos. The results demonstrate that organisational culture has fairly strong and positive influence on workers commitment and that power culture and normative commitment is dominant among majority of the companies. The study concludes that culture and workers' commitment in construction companies matter as both co-vary and can affect organisational outcomes through their interaction. The paper recommends among others that affective commitment and people culture should most attract organisational attention in order to reap positive organisational outcomes.

Key words: organisational culture, dimensions, workers' commitment, construction companies

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INVESTIGATION INTO THE COSTS OF PRELIMINARIES AND RELATIONSHIP BETWEEN THESE COSTS AND TOTAL COST OF BUILDING PROJECTS

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This study investigates the costs of preliminaries and their relationship with the total cost of building projects. Bill of Preliminaries is made up of components and items of work and it describes the work the contractor shall do in order to carry out the actual construction work successfully. The study set out to find out the extent of pricing of the components and items in the bill of preliminaries and whether there is any relationship between the cost of preliminaries and the total costs of building projects. Questionnaires were designed and administered to respondents who are mainly consultants in the construction industry. Priced bills of quantities for projects were also collected to get data for this study. Data collected from the questionnaires and the priced bills of quantities were analyzed using descriptive statistics and Pearson correlation. The result of the study shows that only about 21 and 13 percent of the components and items of preliminaries in the bill of quantities respectively are priced; most of the contractors priced the bill of preliminaries rather than insert lump sum or percentage of the cost of the project. The location and nature of the site of the project rank first and second respectively among factors affecting the nature and extent of pricing of preliminaries and it reveals that water for works, temporary store/workshop temporary office, lighting/security as well as scaffold/plants in that order are the frequently priced components of preliminaries. The study finally concludes that there is high correlation between total costs of projects and costs of preliminaries and this correlation is very high for high rise building project. The study therefore recommends that only the components and items of Preliminaries relevant to the proposed projects are included in the preliminaries bill in order to reduce the volume of computer and paper work and save time and cost. It is also recommended that pricing of preliminaries should be properly done by pricing all the relevant items in preliminaries bills so that contracting organizations do not loose money due to non pricing of these items.

Key words: Cost, Preliminaries, relationship components and items.

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IS THE QUALITY OF CEMENT A CONTRIBUTING FACTOR FOR BUILDING COLLAPSE IN GHANA?

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Sub-standard (poor quality) materials have been mentioned as one of the major causes of building collapse worldwide. The main materials mostly identified as sub-standard are cement, reinforcement bars, timber and aggregate. This Paper assesses whether the quality of Type I Portland cement use in Ghana - contribute to the recent building collapse in Accra and Kumasi. This was achieved through experimental study by comparing the properties of Ghana cement with that of UK cement. The study found that the dry density of Ghana Grey cement was higher than both the UK Grey and UK White cements. Furthermore, the Ghana Grey cement performed better in resistance to water absorption than UK Grey cement, while the UK White was better than both Ghana Grey and UK Grey cements. In addition, while UK White cement performed better in compression than Ghana Grey and UK Grey cements, the Ghana Grey was better than the UK Grey cement. The results of the experiment clearly reveal that the quality of Ghana's cement is comparable to that of UK. Therefore, the paper concludes that the quality of Ghana's cement might not be the factor causing building collapses in Ghana. Further studies are therefore recommended for the identification of the sub-standard materials that contribute to building collapse in Ghana.

Keywords: Building Collapse, Cement, Compressive Strength, Concrete, Dry Density, Water Absorption.

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KEY COMPETENCIES OF VALUE MANAGERS IN LAGOS STATE, NIGERIA

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Competency is the ability of a professional to function as expected in discharging professional duties as a result of training, skills, knowledge, experience and innovative thinking ability. It is a set of behaviours that encompass skills, knowledge, abilities and personal attributes that are critical to work accomplishment. This research work examined the competencies and personal skill attributes of value managers with a view to ascertaining the key and important ones. Primary data were collected via questionnaire administered on construction professionals that were eligible to be a member of value management team. Percentile, mean internal score, Cronbach's alpha and Kruskal-Wallis test were employed in the analysis and testing of the hypotheses generated. The research showed that innovation and mental alertness are the most significant of the identified areas of competencies of value managers while conflict management is the least. Smart thinking is the most significant personal skill attributes of value managers, however, the result also depict that all the identified personal skill attributes of value managers are significant except "no preconceived ideas" that was ranked below average. The study finally recommended a need for construction professionals to keep themselves abreast with various forms of innovation and new ideas in the international construction market - especially in the area of value management - in their quest to function and participate effectively in value management workshop.

Keywords: Competencies; Personal skill attributes; Value manager; Value management; Nigeria

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KNOWLEDGE MANAGEMENT PERCEPTIONS: THE CASE OF CONSTRUCTION PROFESSIONALS IN NIGERIA

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Knowledge management (KM) has been studied extensively in recent years. Contemporary perspectives even consider knowledge and its management to be strategically important resources within organisations. However, the fragmented project-based and task-oriented nature of most construction activities have often times made knowledge management implementation challenging within the construction industry. Utilising semi-structured interviews, this paper examined the perceptions of knowledge management among professionals within the Nigerian construction industry. The major findings indicated that even as professionals in the Nigerian construction industry may be aware of knowledge management and its benefits, its systematic application still remains largely uncommon during practice. The paper also highlighted the need for shifts in organisational culture as a means of facilitating a more knowledge management conscious construction industry in Nigeria.

Key words: construction industry, knowledge management, Nigeria, organisational culture.

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MANAGING END-USERS' SATISFACTION DURING CAPITAL DEVELOPMENTS BY ADOPTING VALUE ENGINEERING AS PROJECT MANAGEMENT TOOL

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The burden of translating the end-users' project briefs into the development of functional support facilities that enhance the performance of the core functions of the organisation require the use of dynamic modern project management methods. In the course of developing capital assets, it is inevitable that original designs are modified, some sections redesigned while some facilities or components are out-rightly removed due to budgetary, time or other constraints. It is imperative, therefore, to incorporate the end-users into the development process, so that managing changes, trade-offs, commissioning and project close-outs will be smooth and enhance the achievement of customers' satisfaction. Customers' satisfaction, in the context of this paper, is viewed in the light of how effective and functional the completed facilities enhance the performance of the core functions of the organisation. The case study method of qualitative research was used in this research. The research data were collected through semi-structured questionnaire complemented with interviews. The thematic method was used to analyse the interview data. The client and end-users provided information on the level of their satisfaction with the performance of the capital development unit as well as identified some areas of concern that require improvement. Recommendations made include the use of Value Engineering as a project management tool; considered suitable for the management of design or scope changes and 'trade-offs', in order to improve on the level of customers' satisfaction.

Keywords: End-users, Managing changes, Trade-offs, Customers' satisfaction, Value Engineering.

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METAMORPHING BARRIERS: BOWLDERIZING THE NIGERIAN WALL

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As long as most can remember, the wall has been one of the most significant elements of Nigerian architecture and in turn, building. However, the wall has reached a stage where clear manifestations are beginning to directly infer the fact that it has out-lived its capacity for redefining space and human activity at certain levels of design. Here, the surreptitious but implicative inadequacies of the wall in Nigerian architecture are discovered, delineated, and dogmatically deliberated on with an aim to mutate it in response to the radically imposing environmental problems facing Nigerian architecture and building today. Concepts of biomimetics, computational and algorithmic design are carefully and contextually employed to aid the proven imperative motive of rethinking the wall as a skin and a membrane. An attempt is also made to blur and recalibrate to an extent the idea of 'inside' and 'outside' in relation to the functional integrity of the wall. It is discovered that the classical wall and the motive through which it exists is actually inadequate in engaging and solving new design problems currently arising in Nigeria. This is majorly as a result of the recalcitrance of Nigerian architecture to continually ordinate classical design systems to solve contemporary problems. The need is therefore sensed for walls to exist in allotropes based on environmental and design requirements in order for the Nigerian wall to be repositioned as an active elemental generator of sustainable design and autopoietic development.

Keywords: Bowdlerize, Skin, Membrane, Biomimetics, Autopoiesis.

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ORGANISATIONAL QUALITY POLICY PRACTICES OF NIGERIAN BUILDING DESIGN FIRMS IN RELATION TO NUMBER OF EMPLOYEES

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Ensuring availability of resources (including human) is among the requirements of quality management system. This paper is aimed at investigating the relationship between Organisational Quality Policy of Nigerian Building Design Firms and their number of employees. Organisational Quality Policy is among 20 quality management sections contained in various design standards. Questionnaire survey was used to generate data for the study. Average Prevalence, Regression and Correlation Analyses were adopted for data analysis. The overall average quality practice prevalence values recorded by the firms indicated that only firms under the group of 'Over 20 Employees' attained the status of 'Require Slight Improvement' with overall average quality practice prevalence value of 76.17%. All the remaining groups require serious improvement as indicated by their respective overall average quality practice prevalence values that generally fall below 75%. Improvement in practice was noted to increase with increase in number of employees. A correlation coefficient of 0.74 indicated that there is a strong correlation between the quality practice performance of the Nigerian Building Design Firms and their number of employees. It is recommended that the Nigerian Building Design Firms need to improve in all aspects of Organisational Quality Policy practices, particularly in the areas of staff improvement.

Keywords: quality management, quality policy, design firms, quality practices, employees.

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OPERATION GREEN LAGOS PROGRAMME AND ITS IMPLICATION FOR SUSTAINABLE DEVELOPMENT

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The focus of the environmental management strategy of Lagos State government in Nigeria is “to foster a clean, healthy and sustainable environment for the wellbeing of the citizens through the application of best practices in environmental management”. In pursuance of the above objective, the operation green Lagos programme was initiated as an environmental regeneration programme. It targeted degraded and misused urban open spaces which were subsequently converted to green spaces. This paper examines the operation green Lagos programme with a view to identifying its various dimensions and underscoring its importance to sustainable development. The research adopted focus group discussion as a method of data collection alongside secondary data from literature as well as direct observation method. It was found that apart from the initial veiled resistance to the programme, it has been accepted as a positive intervention to the environmental challenges of Lagos. Similarly, it has contributed positively to environmental sustainability by making the environment cleaner and more beautiful as well as through its climate change mitigation potential. In addition, its ability to generate direct and indirect employment especially of people involved in the horticulture and landscape architecture business has contributed to economic sustainability. It has also contributed to social sustainability by reducing crime rate especially among the street urchins or “area boys” that previously held sway in the degraded areas. Challenges facing the programme were identified and strategies for deepening its penetration and for widening the active stake-holders base were adduced.

Keywords: Climate change, Green infrastructure, Lagos, Sustainable development

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PERCEPTIONS OF FINAL-YEAR FEMALE UNDERGRADUATES ON THEIR PROPENSITY TO PARTICIPATE IN CONSTRUCTION PRACTICE

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Education is one of the means for promoting development and improving the capacity of individuals to address environmental and development issues. This paper aims to examine the perceptions of final-year female undergraduate students in construction disciplines on their propensity to participate in construction practice. A questionnaire survey was undertaken of fifty-seven (57) female respondents in three higher institutions in the Northern part of Nigeria and a semi-structured interview of fifty of the respondents was conducted. The quantitative data were analysed by obtaining the measures of central tendency (means) and frequencies while the data from the interview were treated using content analysis. The barriers common to the respondents are poor image of the industry, sexual harassment and the difficulty in gaining acceptance. The results of the interview revealed further that social and cultural factors such as traditional women's role will likely influence their decision to practice. It was concluded that though the female undergraduates face barriers, they have confidence that they can develop the requisite skills to exercise their professional abilities. Marriage, societal culture and religious affiliations influence the choice of whether or not to continue in the construction profession. It is recommended that modalities need to be worked out whereby women are encouraged to explore their potentials in the industry such as a forum where the female members of professional construction bodies can provide role models to the younger women in tertiary institutions.

Keywords: women, gender, construction undergraduates, education, barriers

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PERCEPTION OF THE FINANCIAL SECTOR TOWARDS REAL ESTATE INVESTMENT IN SUB SAHARAN AFRICA: A CASE STUDY GHANA

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Interest rates in the Real Estate sector compared to other investment assets are on the high side hence require large sums of money to invest in it. The primary aim of the study is to provide empirical insights into the perception of the financial sector towards real estate investments in Ghana. Through the use of quantitative methodology it was established that the Ghanaian financial sector has engaged in some form of Real Estate investment in recent past, but mainly in the housing sector. It views Real Estate as a highly risky form of investment asset as the market is riddled with problems in the macro economy and lacks professional regulation of the market. However, majority of contingents in Ghana's financial sector envisage a long term investment plan in the Real Estate market although seen as dependent on the maintenance of the stabilised economy, regulation of professional bodies in the Real Estate market and education of its investors. The paper recommends that, legal policy measures that seek to govern the Real Estate market should be ensured by the government and calls for the establishment of a credit rating agency that would link the financial sector with the real estate market.

Keywords: finance, Ghana, investment, property, real estate

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POST OCCUPANCY EVALUATION OF PUBLIC SECONDARY SCHOOLS FACILITIES

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This paper explores the state of public secondary Schools facilities in Ikorodu Local Government in Lagos State, Nigeria. The study examines the state of physical condition of the five selected public secondary schools facilities and identified the most affected facilities. In achieving the set objectives, the study adopted research survey technique. A total of 50 questionnaires were administered to the end-users of the facilities. Data collected were analysed using descriptive and inferential statistics in relation to Post Occupancy Evaluation technique. The findings of the study revealed that most of the facilities were in a state of disrepair and the users are not satisfied with the state. Damaged internal doors, ceiling fans, defects in roof covering, broken window and window railings, classroom ceiling, dampness on toilet walls were identify as most noticeable facilities defects and problems in the learning environment. The study also reveals that the five selected schools were prone to the same facilities defects and problems.

Keywords: disrepairs, end-users', local government, maintenance, school facilities,

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POST-CONTRACT CONSTRUCTION DISPUTES IN THE GHANA HEALTH SECTOR: CAUSES AND EFFECTS

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Construction projects complexity is characterized by of disputes. Disputes have become part of the nature of construction projects due to the existence of human relationships in contract formation. Disputes normally arise from disagreements and may have far reaching consequences on the projects as well as the objectives of the project. The health sector is one of the paramount areas in nation development where infrastructure is critically needed to save lives. The aim of this paper is to find out how post-contract disputes arise and the negative effects they have on success of construction projects in the health sector in Ghana. Desk-based study of relevant documents and reports was carried out to examine the existence of disputes in construction projects in the Ghana health sector. To saturate the desk-based study stakeholders within the health sector were interviewed. A survey was further carried out to inquire from parties working on construction projects about the causes and effects of post-contract disputes on the success of the projects. It was found out that poor communication amongst contract parties and stakeholders, excessive delays in honoring payment certificates and reluctance to seek clarification of consultant's instructions are the major causes of disputes in the construction industry. Also delays and cost overrun, loss of professional reputation both national and international, poor health care delivery and even loss of lives are important effects of post-contract disputes.

Keywords: causes and effects, disputes, Ghana, health sector, post-contract disputes

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POVERTY AND SOCIO-ECONOMIC ADAPTATION STRATEGIES IN LAGOS METROPOLIS, NIGERIA

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This paper investigates the survival mechanisms of the urban poor in Lagos Metropolis. The study considers their socio economic characteristics as well as their livelihood patterns and other safety mechanisms employed in the absence of formal social security systems. The research adopts a purposive selection of thirty one low income residential neighbourhoods in the Lagos Metropolis. Data was obtained by the administration of structured questionnaires and analysis was done by both parametric and non-parametric methods. Random sampling of 396 household heads was carried out. The research revealed the importance of informal activities, particularly home based enterprises, as a major source of employment, income and social security in the study area. Furthermore, participation in social organizations are essential safety mechanisms identified in the study. The study concludes by recommending means of exploiting the identified strengths of the informal systems and these include the adoption of pro-poor planning strategies including civic engagement.

Keywords: survival, Lagos, pro-poor, informal enterprises

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PROCUREMENT FOR NATIONAL TRANSFORMATION: ADOPTING MODERN TECHNOLOGY METHODS THE ALTERNATIVE FOR ADEQUATE HOUSING DELIVERY IN NIGERIA

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Nigeria is fast growing in population with concomitant problems of adequate provision of basic amenities and infrastructures. One of these basic facilities needing adequate attention is housing. Nigeria's past governments' effort have been aimed at direct provision of housing for the public. Regrettably, all their ambitious housing programmes have consistently failed to meet the expected target. The proponents have argued that the laudable attention accorded the issue of housing provision for the teeming population of this country was developed by the apparent inadequacies in our housing programmes and delivery systems. Some proponents opined that these inadequacies are due to the fact that the commonest project delivery method being used in Nigerian public sector is still the traditional design-bid-build method, which involves the appointment of consultants, contractor with much of the finance coming from the government. This paper assesses Traditional method of housing procurement using SPSS statistical tool, percentages and ranking from which conclusion was drawn. The study found out that the Traditional Methods of procurement in use in Nigeria cannot help the Nation's adequate housing problems, hence, it proffers suggestions for adoption of modern technology methods as an alternative for adequate housing delivery in Nigeria.

Keywords: housing; procurement; traditional procurement; modern technology methods.

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PROJECT COST RISK AND UNCERTAINTIES: TOWARDS A CONCEPTUAL COST CONTINGENCY ESTIMATION MODEL

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The application of deterministic approaches in the estimation of cost contingency for developmental projects is challenging because it is full of subjectivity, dwelling greatly on experience and organisational process asset. To date however, the built environment lacks standardized methods to be adopted in the estimation of cost contingency, further hampered by the lack of understanding and application of risk methods. In response to the above challenge, a systematic risk methodology for the estimating of cost contingency based on empirical judgment has been the driving force behind this research. The failure mode effect analysis (FMEA) and the theory of evidence are presented as qualitative and quantitative risk tools respectively. The research adopted quantitative methods with data gathered through structured questionnaires distributed to built-environment professionals based on the theoretical framework. Analysis of data using the failure mode effect analysis (FMEA) and evidential reasoning method revealed that systemic risk accounted for the approximately two-thirds of the cost drivers related to construction cost uncertainty mainly in the form of design and economic risk. The substructure, finishes and essential building services were identified as work sections prone to high scope changes and scope creep, with a propensity to causing cost overruns. To this end, a four stage conceptual model was developed which translated into a 3-phase implemented model. The proposed risk management framework for the estimation of cost contingency is presented by an integrated cyclical evolutionary process contemporaneous with the design management process. The process selects high priority risk and work sections based on the data sources and hypotheses to generate the mass, belief and plausibility based on the Dempster's combination hypotheses. Using the hyper text pre-processor (php) as the as the system requirement, the model was tested and evaluated using an action exercise which found values to be realistic in comparison to the actual closing account figures of completed projects.

Key words: cost risk, systemic risk, project specific risk, mass, belief, plausibility, hyper text pre-processor

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RECONCILING THE PROVISIONS OF THE LAND USE ACT AND THE KWARA STATE LAND CHARGE LAW

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The need for more internally generated revenue has brought about the current paradigm shift in internal generated revenue of state government to land resources against other sources of revenue as experienced in some state in South-West Nigeria. The provisions of the Land Use Act (LUA) CAP L5 of 2004 and Kwara State Land Charge Law (N0. 7) of 2009 (KSLCL) in respect of ground rent and land charge respectively was examined since it is a recurrent income. The aim of the paper is to identify the areas of conflict between the two laws. The study is a descriptive research and secondary information was used. The paper revealed that the charging of land charge on all right of occupancy by the state is illegal, the basis for establishing the charge is questionable, and this might lead to litigation and subsequently abandonment of properties; land charge in Kwara State is ground rent; the state House of Assembly has acted ultra-vires by enacting the law, as the amendment of the LUA is in the Exclusive Legislative List. The paper therefore concluded that the KSLCL should be repealed because of its conflict with the LUA which is a 'Parent Law'.

Key words: KSLCL, LUA, ground rent, land charge, Kwara State.

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REDESIGNING BUILDINGS FOR EFFICIENT UTILIZATION OF SOLAR ENERGY SOURCE IN KAURA NAMODA, NIGERIA

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Economic, technical, non-technical and structural constraints are among the various factors militating against efficient utilization of solar energy source for generation of electricity in buildings in Nigeria. The interplay of these factors are felt more in the rural countryside in the Northern Nigeria, where there is intense insolation all year round without the benefits of utilization for generation of electricity for household and communal uses. Factors such as space management, building form, roofing system design and building orientation contribute in constraining the use of solar energy in rural Kaura Namoda. This paper presents case studies of these constraints in four selected buildings which were not originally designed with energy consciousness but were recently installed with solar photovoltaic systems. The methodology undertaken for the case studies involves examination of the buildings in respect of their orientation, angle of insolation, and changes made to them with respect to installation of solar photovoltaic systems. Findings show that these buildings need redesign - spatial adjustments to accommodate the solar system components, roof slope and orientation adjustment, electrical installation redesign. The paper therefore suggests criteria for building redesign of these case studies and generally emphasises the imperatives of integrated design process to avoid future redesign.

Keywords: building redesign, energy consciousness, integrated design, solar energy

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REDUCING VARIABILITY IN CONCRETE ACTIVITY LABOUR PRODUCTIVITY TO IMPROVE LABOUR PERFORMANCE

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The management of daily labour productivity variability on site is an important aspect of construction management thinking. The lean technique suggests that reducing variability gives better labour performance. Therefore this paper examines the analysis of labour productivity data of concrete activity from sixty one construction sites of single storey buildings in Abuja metropolis. The objective was to determine the relationship between labour productivity variability and labour performance in concrete activity. The data used were collected from sixty one live projects within the study area. The daily method of data collection was adopted in this research. A total of 778 data points were observed for all concrete activities from these sites. The analysis of the performance index that is Project Waste index (PWI) revealed that some the projects studied were poorly managed because the projects had low productivity rating. While some other projects performed well. The PWI values computed for the project studied ranged from 0.12 to 0.67. It was observed that low outputs were accomplished with high labour inputs. The values for coefficient of variation in labour productivity range from 0.09 to 0.48. These values and the performance indexes calculated for all projects were tested for correlation analysis. The coefficient of correlation for the two variables was found to be 0.601**, which is significant at 0.01 confidence level. The result showed that the variability in daily labour productivity is more highly correlated to project performance than workflow output variability which means that reducing variability in labour productivity appears to have a significant effect on performance. Also the performance gap value for concrete work was found to be 3.62 man hrs/m³. It was recommended that the site managers should determine to get more output with a reduction in input.

Key Words; variability, labour, management, performance, productivity, input, output.

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REVERSING THE BUSINESS FAILURE RATE AMONG SMALL AND MEDIUM SIZE CONSTRUCTION FIRMS IN SOUTH AFRICA: A PROGRESSIVE STUDY

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The construction industry development board (CIDB) register of contractors shows that small and medium sized enterprises (SMEs) outnumber established firms in South Africa. The failure rate of SME businesses, which has increased in recent years, however constitutes a source of concern in the industry. This situation is reflected in the limited number of successful construction SMEs as a percentage of the total registered firms in the industry. The research design for the study reported on entails semi-structured and unstructured interviews, which will be conducted over an extensive period of time to gather sufficient information from the research participants. However, the preliminary findings that form the nexus of this paper are based on the reviewed literature and a pilot study that was conducted among a purposive sample of construction SMEs - Grades 3 to 6 on the CIDB register. It is notable that the initial findings suggest that construction SMEs often encounter difficulty in securing projects, fail to realize core organizational objectives and goals, and are unable to gain cost advantages over their immediate rivals, which affects their business performance. Thus it appears that more effort is required to improve the business performance of construction SMEs in South Africa.

Keywords: construction industry, historically disadvantaged individuals (HDIs), small and medium size enterprises (SMEs), South Africa

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SHARING, COOPERATION AND CONFLICTS: MULTIHABITATION AS AN URBAN LOW INCOME HOUSING STRATEGY IN ACCRA

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Multihabitation in housing is a social situation within a specific space in which people who consider themselves or do not consider themselves as one household share a living space. The high frequency of interaction and contact with other members in a multihabited house increases the likelihood of conflicts but also allows for a greater deal of cooperation between households. Regardless of all the conflicts associated with multihabitation, it has been recognized as an efficient and economical means of addressing urban low income housing needs in developing countries. This paper presents the living arrangements of households under multihabitation. It further examines the perception of the households with regards to multihabitation as an urban low income housing strategy. Using both quantitative and qualitative methods of data collection, four low income communities in the Greater Accra Metropolitan Area is studied. It was observed that even though conflict was rife in multihabitation, respondents concluded that the benefits derived from existing and new social ties under multihabitation far outweighs the disadvantages of conflicts associated with multihabitation. However, there were suggestions for the modification of the housing design.

Keywords: multihabitation, low income, housing, compound housing, Accra, Ghana

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SICK BUILDINGS SYNDROME, HEALTH ISSUES AND LIFE EXPECTANCY OF RESIDENTS IN NIGERIAN CITIES

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Sick building syndrome (SBS) is a building phenomenon in research which is a building related concern today. Amongst the repercussion of the building related concerns are health issues such as Building Related Illness (BRI) on the occupants of such ill-constructed buildings. Where not detected and treated early enough would ultimately lead to reduction in the life expectancy ratio of residents in cities and metropolis. Therefore the focus of the study was to examine sick building syndrome (SBS) with all its health implications in order to recognize and document it as one of the causes of reduction in life expectancy ratio in Nigerian cities. The paper has attempted to provide some form of remedy to the growing phenomenon. Hence, the research was conducted using descriptive documentation and experimental/qualitative approaches to explain observations in the research. Conversely, the knowledge and awareness generated on the danger in building material for different climate and environment documented in the paper will improve consumers, manufacturers and property developer choices.

Keywords: sick building syndrome, health issues, life expectancy ratio and Nigerian cities

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SOCIO-ECONOMIC CHARACTERISTICS AND LIVELIHOOD ASSETS OF WETLANDS USERS AT EDE REGION, SOUTHWESTERN NIGERIA

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The study examines the socio-economic characteristics of the users of wetlands, the relationship between their status and their resources with a view to land reform in the region. The study employed primary and secondary data. Primary data explored 566 structured questionnaires administered on wetland users using the snow-ball method soliciting information on; respondents' indicators of livelihood assets, resources, human capital, socio-economic characteristics, quality of dwelling, sanitation and ownership of land. Secondary data was sourced from conventional sources. Data was analysed using descriptive and inferential statistics. Results show that over 70% of respondents were above 41 years of age and were predominantly small scale food-farmers. Furthermore, 59.4% of respondents lived in Brazilian type of houses "face me I face you" with 49.0% of the houses in faire state that need maintenance, 60.3% had bare ground floors while 44.3% were personal houses and 31.7% family houses. Similarly, it was established that the depth of poverty in relation to landed assets showed that 58.6% of the rich compared to 20.7% of the moderate poor and 20.7% of the poorest ranked households owned more than 10 ha of land. The implications of this is that a greater proportion of productive assets (Land) in Ede region were in the hands of the non-poor ranked households which has continued to widen the gap between the rich and the poor and if poverty has to be tackled, then there must be a way forward through "land reform" to make this very important livelihood asset available to the extreme poor.

Key words: land reform, poverty, housing conditions, livelihood assets, wetlands.

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SPATIAL ANALYSIS OF FIRE DISASTER AND EMERGENCY SERVICE LOCATION IN JOS METROPLIS

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The effect of fire outbreak in any built up environment is known to be very disastrous if proper measures for emergency response service is not properly put in place. In Jos metropolis evidence from research has clearly shown that emergency response service providers are ill-equipped to cope with the rising problem of urban fire disasters from various causes. This partly is as a result of the improper distribution of fire stations within and around the city to arrest any inferno through a reduced drive time. This research aims at using geospatial intelligence to identify and assess the settlement at risk of urban fire disaster around the various gas stations in Jos Metropolis. Spatial data of the city were extracted from the satellite image with specific reference to buildings/settlement, roads, infrastructure and service location within the study area. The geospatial analysis of the acquired image and the datasets obtained using Geographic Information System (GIS) techniques shows that only three major fire stations are in the whole of Jos metropolis. Further analysis did however reveal that most of the adjoining buildings to these gas stations do not conform to the international and urban planning building codes, which infers that most of such buildings in any event of an uncontrolled inferno or explosion in the gas stations are at the risk of being consumed and the result could be very disastrous. This study made useful recommendations to the relevant bodies to plan and provide for more fire service stations at some strategic location in the city to reduce the 'drive time' of fire fighters to gas stations in an emergency situation. And also the provision of hydrant facilities within the metropolis for the emergency need of all residences and gas stations.

Key words: risk assessment, fire disaster, emergency response service, spatial analysis.

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STRENGTH EVALUATION OF LOW DENSITY POLYETHYLENE AS AN ADMIXTURE IN HOT MIX ASPHALT CONCRETE

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This work investigates the effect of waste low density polyethylene bags on the strength properties of Hot Mix Asphalt using Marshall Method of asphalt mix design. The variation of the Marshall Stability, flow and Voids in Mix (VIM), Voids Filled with Bitumen (VFB) and Voids in Mineral Aggregates (VMA) were monitored as the proportion of the polyethylene increases at 4.5%, 5.5%, 6.5% and 7.5% bitumen content respectively. For the various percentages of bitumen content, polyethylene was added at 1%, 2%, 3% and 4% respectively and briquettes were casted with the Marshall properties noted. Optimum Bitumen Content for all percentages of polyethylene was 6.5% and the optimum polyethylene Content for the asphalt mix was 2%. Stability values increase as the percentage of polyethylene increases and the flow properties of the mix decreases. Stability increased in the range of 4-15% while flow decreased in the range of 15-20%. It can be concluded that modifying bitumen with Low Density polyethylene in Hot Mix asphalt increases its stability and decreases flow and thus can be of better resistance against deformation.

Keywords: hot mix asphalt, Marshall method, bitumen, polyethylene, strength

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SUITABILITY OF BAGASSE ASH AS A FILLER MATERIAL IN HOT MIX ASPHALT (HMA) CONCRETE

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Several waste and used material from different sources such as mineral, agricultural, domestic and industrial are generated every day in large quantities and their safe disposal has been a major concern. However, these wastes have been found to be useful in the stabilization and/or improvement of construction materials, such as soil and concrete. Amongst these techniques is the use of Bagasse Ash (BA). It is in this light that a laboratory based investigation for the possible use of BA as filler that can partially replace Ordinary Portland Cement (OPC) in Hot Mix Asphalt (HMA) was conducted. Tests were conducted on the materials used and a trial mix of 10%BA and 90%OPC at bitumen contents of 4.5%, 5.5%, 6.5% and 7.5% respectively were prepared using the Marshall Method. The results show that the stability of the samples was maximum at 5.5% bitumen content, the flow at optimum bitumen content was 2.5mm, the compacted density of mix increased up to a bitumen content of 5.5% and then began to fall with increase in bitumen content, the voids in mixed aggregates increases with increase in bitumen content which gave 20.1% of void in the mixed aggregate and the volume of void in the mix at 5.5% bitumen content was 4.0%. The optimum bitumen content for the experiment was 5.5%. This study proves that BA can be used as a filler partially replacing cement in HMA.

Keywords: hot mix asphalt, Marshall method, bitumen, bagasse ash, strength

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SUSTAINABILITY AND THE BUILT ENVIRONMENT: A CASE STUDY OF THE HAUSA MIGRANT SETTLEMENT, SABO, IN ILE-IFE, NIGERIA

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The built environment in *Sabo*, a Hausa migrant settlement in Ile-ife Nigeria, has existed for over a century (since 1903). This community bears features of sustainable architecture and accommodates a homogenous group with respect to social and cultural qualities. A good understanding of the relationship between the built environment of Sabo (which in itself is a prototype of migrant communities spread all over the country) and sustainability issues reveals certain qualities. These qualities help in understanding the state of the built environment of Sabo, its merits and drawbacks, and how sustainable it is in its present state in relation to cultural practices. In other words the study seeks to understand the role culture plays in the community in the journey towards achieving sustainability. Therefore while exploring the community as a whole: the buildings, the people, other environmental features, as well as their cultural practices (as a homogenous community), it is evident that plausible ways of achieving better sustainability calls for culture change. This exploratory study of the Hausa migrant settlement in Ile-Ife involved the administering of 203 questionnaires to at least one (1) resident/house in the enclave as well as 11 structured/ open-ended interviews. The environmental attitudes of residents were subjected to principal component analysis and 'Community Attachment' emerged the strongest with explanations rooted in culture.

Keywords: built environment, culture change, cultural practices, homogenous community, and sustainability

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SUSTAINABLE SUPPLY CHAIN MANAGEMENT IN CONSTRUCTION FIRMS

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Environmental change is happening everywhere. Turbulent weather patterns - heat waves, rains, snowfalls, hurricanes and stormy rains are becoming extreme in every sense throughout the world. These climatic changes are today a concern of every individual and world leader alike. The burning of oil and other fossil fuels releases carbon dioxide, which rises, blankets the earth and traps heat causing severe changes in weather patterns. Not only do we have climate problems but we are also dealing with a resource depletion issue. The construction industry has a major impact on the environment because 50% of the material resources for construction are taken from nature. The huge consumption of resources by the construction industry has called for sustainable practices in construction. Sustainable supply chain provides economic, social and environmental requirements in material and service flows occurring between suppliers, manufacturers and customers. Sustainable development has taken the centre stage among different countries of the world. During the 1992 Earth Summit in Rio, the governments and other international organizations decided to take useful measures to protect the environment for long term social and economic development. This paper aims at investigating the compliance of the construction industry to environmental regulations. In this paper, the construction industry of Lagos state in Nigeria was used as a case study.

Keywords: construction industry, environmental regulation, sustainability, sustainability development

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THE 10% STANDARD OR LUMP SUM - A STATISTICAL ANALYSIS OF ESTIMATING CONSTRUCTION CONTINGENCY ACCURACY

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A budget estimate has two main components; the consultant estimate and contingency. Both components represent the sponsor's estimated final cost of the project. Contingency is an amount set aside to cater for the uncertainty associated with the delivery of the project. It is important for project sponsors to know the level of accuracy being achieved in estimating construction contingency. The aim of this paper is to apply statistical techniques to estimation of contingency accuracy. In creating wide correlations, the paper generally sets aside crucial issues; how accurate are construction contingencies? Are there project variables that have relationship to the accuracy of project cost contingency? In order to answer the highlighted questions, the objectives of the paper are to quantitatively analyse cost data of completed building projects to attempt to answer these research questions. The cost data for 49 building construction projects completed by a Nigerian government organisation were statistically analysed using descriptive statistics to describe the characteristics of the sample, Standard variation, coefficient of variation and simple correlation to explore relationships between variables. It was found that the average construction contingency was 4.90% of the award contract sum while the average value of contract variations was 24.43%, which means that contingency is far less than the total approved variation by an average of 19.53%. The organisation used a traditional percentage approach for estimating construction contingency. In seeking an alternative estimating method of contingency, this paper proceeded to recommend and analyse statistically the correlation between selected project variables and contingency. It was revealed that there is a strong positive correlation between contingency and project location. A weak positive correlation exist between contingency and project size, gross floor area, project type and project duration. This indicates to the organisation that there is enough room for improvement in estimating construction contingency.

Key words: construction contingency, variation, project variables

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THE INFLATION HEDGING POTENTIAL OF COMMERCIAL PROPERTY INVESTMENTS IN IBADAN, NIGERIA

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The study examined the inflation hedging characteristics of commercial property investments in Ibadan metropolis in Nigeria. A random sample of 38 (75%) of the 51 estate surveyor firms in Ibadan was carried out to obtain data on rental and capital values of commercial property in the city over the study period (2000 to 2010). Actual inflation was calculated from percentage changes in the Commodity Price Index (CPI) over the study period (2000 -2010). Expected inflation was calculated from data on three month Treasury bill rates in CBN Statistical Bulletins and Official Reports covering the study period. Unexpected inflation was calculated as the difference between actual and expected inflation. The results showed that property returns were a poor hedge against actual inflation, a partial hedge against unexpected inflation and almost a complete hedge against expected inflation. These results suggested that commercial properties may not offer as much protection against inflation as is usually expected by investors.

Keywords: inflation hedging, commercial property investments

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THE MISSING LINKS BETWEEN CONSTRUCTION SECTOR AND DEVELOPMENT IN NIGERIA: A POLYCENTRIC PLANNING PERSPECTIVE

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This paper uses the Institutional Analysis and Development (IAD) framework in tandem with Knowledge Management (KM) tools to analyze the missing links between construction industry and socio-economic development in Nigeria. The paper found that KM tools are not properly utilized to transform raw materials into building/construction materials. This is because the stakeholders in construction sector operate on parallel lines as against collegial interactions. Though raw materials that are used in producing building materials are available in large quantity in the country, they have to be exported to other nations where they are transformed into products for construction industry. This, invariably, places the country as a technology consumer rather than a producer, thus, making the country vulnerable to external shocks. The central argument is that: it is what people are doing at home that should form the basis of development in the built environment and construction industry. It is not enough to learn from abroad; development cannot be imposed from above or from outside. This requires a rethink on the current methods, approaches and strategies of operation in the built environment. This paper charts courses of actions that scholars and professionals in the built environment could take in tandem with public officials to become “organic” in their operations and use endogenous knowledge as agents of change to reform the construction industry and thereby impact positively on their communities. Consequently, the paper adopts: (1) African Education Reform Model (AERM) for reforming higher education system; (2) African Development Institutional Mechanism Model (ADIM) for ensuring smooth working relations between public officials and scholars; and (3) African Development Brain-Box (ADBB) that will influence turning knowledge to reality for consequent utilization of local resources for the benefit of the construction sector.

Keywords: missing links, construction, polycentric planning, development, Nigeria

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THE OROWA HOUSE: A TYPOLOGY OF TRADITIONAL YORUBA ARCHITECTURE IN ILE-IFE, NIGERIA

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Beyond generic descriptions of Nigerian traditional architecture as ‘adobe walls, domes, courtyards and overhanging hipped roofs’, or in response to the oft-posed question: *What exactly is Indigenous Nigerian Architecture?* This paper presents a spatial typology from Ile-Ife town core area. The study identified the distinctive features of the traditional Ile-Ife Orowa House; key function spaces e.g. the Orowa (central hall), a comprehensive pattern of space use in the dwelling, the organizational (spatial) criteria, and morphological characteristics using Hillier and Hanson (1984) Space Syntax methods. Key spatial relationships between the core functional spaces in the Orowa house that define its morphology were identified, which extend beyond the descriptive studies of Yoruba traditional domestic architecture more regularly found in existing literature. The use of space syntax allowed for measurable analyses of the twenty-four houses surveyed, and contributes to the documentation of traditional dwellings in Nigeria. While differences in space use pattern exist between the Orowa house and contemporary houses found in the larger sample from which this paper is derived, some space use patterns persist in both; indicative of a ‘Nigerian’ or at least a Yoruba way of living that survives in newer architectural forms.

Keywords: traditional Yoruba architecture, domestic space, space syntax, Orowa house.

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THE PROBLEMS AND PROSPECTS OF THE TAGWAI DAM, MINNA, NIGER STATE, NIGERIA

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Water, it is said, is life; but unfortunately, the fresh water needed by man for his development and well being is not evenly distributed globally. And where it is available, it, depending on the season, varies in quantity. Thus, one of the ways of ensuring an all-year round availability of water for human usage is through dam construction. But the damming of water is noted for the problems and dangers it poses on the people living downstream of the dam as well as on the environment. Therefore, it was as a result of the need to undertake its statutory responsibility by providing the residents of Minna with potable water that the Niger State government constructed the Tagwai dam in 1978 to augment the Chanchaga dam. This paper thus set out to assess the problems and prospects of the Tagwai dam; and in order to achieve this, both the primary and secondary sources of data collection were employed to obtain useful data and information for the study. The data obtained from the field was thereafter analyzed and presented using descriptive statistics. The result of the research revealed that the Tagwai dam is facing some pollution-related problems owing to the numerous human activities taking place around the dam, thus dead fishes can be found lying on the bank of the river and it is as well, experiencing incidences of algal bloom. The paper therefore recommended the development of a comprehensive plan for the operation, maintenance and rehabilitation of the dam in order to mitigate the negative effects of the dam as well as regulating human activities around it.

Key words: prospect of dam, downstream, human activities, immediate environment, potential benefits

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TOWARDS EFFICIENT PROVISION OF PHYSICAL INFRASTRUCTURE IN RESIDENTIAL AREAS OF MAKURDI, NIGERIA

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One of the problems of urban development in Nigeria is the fragmentation of physical planning responsibilities. This situation has greatly affected the provision of physical infrastructure in residential areas in many parts of the country. Generally, the institutional framework, which is a critical aspect in the provision of physical infrastructure, appears to be weak. In a study carried out in Nyiman Layout, Makurdi, information was obtained from the agencies and individuals involved in the provision of physical infrastructure on their functions, level of involvement in the implementation of planning schemes and the method employed in the provision of infrastructure. The study found that about seven different agencies are involved in the provision of physical infrastructure in residential areas of Makurdi. This leads to duplication of functions, overlaps and role conflicts between the various participants involved. These service providers are virtually independent of each other and operate without consultations with one another. It was also discovered that there is no framework for the provision of infrastructure; and none of the agencies has the mandate to coordinate the activities of the others to ensure adequate and sustainable infrastructural provision. As a result, Makurdi town is growing without adequate provision for basic infrastructure. The culminating effect is unsatisfactory urban living conditions and the likelihood of the development of slum conditions in the area. The study recommends that a central coordinating machinery should be put in place to oversee the implementation of residential layouts and management of physical infrastructure in Makurdi.

Keywords: physical infrastructure, institutional framework, residential areas, urban service providers

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URBAN DEGREENING, EROSIONAL IMPACT AND HOUSING QUALITY IN OSUN STATE, NIGERIA: MITIGATING FLOODING THROUGH POLYCENTRIC ENVIRONMENTAL PLANNING

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This paper uses the Institutional Analysis and Development (IAD) framework to analyse the missing links between urban development policy on the one hand and environmentalism and ecosystemic balance on the other hand with the intension of proffering possible solution to the problems of urban degreening, erosion and flooding in Nigerian cities. The study sampled 263 houses from the core, intermediate and new areas across the two major cities in Osun State - Osogbo and Ilesha. The paper found that, in spite of the deteriorating conditions of housing stock in Osogbo, the state capital of Osun State within the last fourteen years, there has not been any specific urban renewal programme that was carried out. Using specific housing indicators such as building conditions, waste disposal, water supply, electricity and open space conditions, analysis confirms that the quality of housing in the two cities is low. Buildings in the core areas of the two cities are exposed to erosional impact due to lack of green cover and paving. As a result, about 9,788.76 m³ of sand and top soil had been washed away over the years, thereby exposing foundations of most buildings, thus reducing their quality and stock, exacerbating dysfunctional infrastructure and inducing flood. Using Polycentric Environmental Planning Strategy, this paper adopts African Polycentric Sustainable Environment Model (APSEM) and African Polycentric Urban Renewal Model (APURM) for synergizing the efforts of three major groups - governments, financial organizations and community institutions in addressing the problem of urban decadence and slums. The adoption of the models would enable local people and professionals/practitioners in the built environment to have a robust dialogue with local government officials in order to reposition urban councils to effectively manage urban environment and improve housing quality.

Key Words: urban degreening, erosion, flooding, housing, polycentric planning

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WHOLE LIFE COSTING PRACTICE IN PROCUREMENT OF PUBLIC BUILDINGS IN NIGERIA: MYTH OR REALITY?

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Global best practices have adopted the use of whole life costing (WLC) along with the provision of definitive guides for achieving Value for Money (VfM) in construction. It is in this regards that the Federal government of Nigeria accepted the recommendations of the country procurement assessment report (CPAR) team that evaluated public procurement in Nigeria in 2000 and subsequently enacted the Public Procurement Act (PPA) in 2007. The Act established the Bureau for Public Procurement (BPP) to regulate and set standards for the procurement of public projects through, inter alia, the application of value for money (VfM) standards and practices. The BPP has produced documents (the standard bidding document and the public procurement manual) towards improving procurement but none addressed WLC concept therein, thereby presuming WLC practice is established in Nigeria. Thus, this study undertook an appraisal of WLC practice within client organizations and quantity surveying firms. The instrument for data collection was through the use of semi-structured interviews; analysed using constant comparative analysis method. The findings revealed that WLC practice is a myth in the procurement of public buildings in Nigeria due to political barriers, absence of standards and inadequate teamwork. Hence this study recommends that a standard guideline be put in place to facilitate WLC practice in Nigeria.

Keywords: Nigerian construction industry, public procurement act, value for money, whole life costing

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