



SCHOOL OF POSTGRADUATE STUDIES
AHMADU BELLO UNIVERSITY ZARIA

PG STUDENTS' CONFERENCE 2016
(ABUPGSC 2016)

BOOK OF PROCEEDINGS

THEME: CONSOLIDATING AHMADU BELLO UNIVERSITY
POSTGRADUATE STUDIES THROUGH ENHANCED
MANAGEMENT, DELIVERY AND TIMELY
GRADUATION

23rd - 24th November 2016 @ The School of Postgraduate
Studies, Ahmadu Bello University Zaria, Nigeria





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FOREWORD

The maiden Ahmadu Bello University Postgraduate Students' Conference (ABUPGSC) was held on the Main Campus of Ahmadu Bello University (ABU), Zaria, Nigeria between 23rd and 24th November 2016. The School of Postgraduate Studies, ABU, Zaria with its pleasant surroundings, was a delightful venue for the conference.

The conference was declared opened by the Vice Chancellor, Professor Ibrahim Garba, who was ably represented by the Deputy Vice Chancellor (Academics), Prof. Ezra Amans. The Dean, School of Postgraduate Studies (SPGS), Ahmadu Bello University, Zaria, Prof. Kabir Bala, the Chief Host, cordially welcomed the participants from across the University and gave a brief introduction of the University and its research and teaching activities. The conference was attended by Deans of Faculties, Heads of Departments, Assistant Deans of Faculties, Departmental Postgraduate Coordinators, Postgraduate students Supervisors, Postgraduate students and participants from within and outside the University. There were Keynote address from renowned scholars, presentations from the representative of the National Universities Commission (NUC) and resource persons within the University. In addition, a pre-conference workshop was held during which discussants contributed to issues relating to Regulations Governing Higher Degrees in the University.

The Scientific Programme consisted of plenary sessions and parallel sessions chaired by the Deans of Faculties. The papers presented at the technical sessions cuts across the various faculties in the University. The Plenary lectures and the papers presented by resource persons in various areas of specialization are as follows:

- Journey to Timely Graduation: The Role of Students, Supervisors, Examiners and SPGS - Prof. Kabir Bala, Dean SPGS
- Referencing and Abstract in Academic Writing - Prof. Ibrahim Umar, University Librarian.
- The Role of Statistics in Research -Dr. Mamman Musa, Head, Department of Science Education.
- Aligning Postgraduate Research Topics in Industrial Sectors: The Need for Specialization -Prof. A.Z. Hassan, Director Distance Learning Center.
- NUC Bench Mark with Regards to Postgraduate Programmes – Dr. B.G. Kumo, Director Academic Standards, NUC.
- Research Trends in the Faculty of Medicine: Prof. Aisha I. Mamman.



- The ICT and Analogue Methods of Searching for Information: The Trends, Directions and Publications in Administration and Legal Complexes: Prof. Yusuf Aboki.
- Utilization of Local Research Outputs: A neglected Issue in National Development: Prof. D.D Yusuf

The 2-day conference had over 500 participants. In total, **eight (8)** plenary talks and **226** contributed talks were given. The scientific participants had many fruitful discussions and exchanges that contributed to the success of the conference. The **226** abstracts that were presented during the technical section formed the heart of the conference and provided ample opportunity for discussion. The contents of many of these can be found in this book of proceedings. All the articles published in this book of proceedings were reviewed by competent assessors. The organizing committee has made efforts to ensure that no misleading information appears in this book of proceedings. The contents of the articles are the responsibility of the authors. Hence, the organizing committee accepts no responsibility or liability for the consequences of any misleading information in the articles.

We gratefully acknowledge the financial support from Ahmadu Bello University Zaria. We would also like to thank the staff of SPGS, the University Management and other members of the University Community for their contributions and help; without them we would not have been able to organize this great meeting.

In general, the Maiden ABUPGSC 2016 was very successful. The plenary lectures and the various presentations in the different fields made it possible for non-experts in a given area to gain insight into new areas. Also, included among the speakers were several young enthusiastic PG students attending a conference for the first time, who showed tremendous interest in this maiden ABUPGSC. Therefore, considering the number of papers submitted (242) and the number of participants (over 500) at this maiden conference, we expect that the future ABUPGSC conferences will be as stimulating as this first one was, as indicated by the contributions presented in this book of proceedings.

Dr. Muhammad Kabir Isa
Chairman
ABUPGSC 2016 Conference Committee



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TABLE OF CONTENT

Title of Article	Authors	Page
EFFECTS OF COMMUNITY POWER STRUCTURE ON COMMUNITY DEVELOPMENT IN SELECTED RURAL COMMUNITIES OF SABUWA LOCAL GOVERNMENT AREA OF KATSINA STATE	Abdul Hamidu Abdullahi	1-4
EFFECTS OF HUMAN RESOURCE MANAGEMENT PRACTICES ON CYBERLOAFING AT WORK	Abdulmalik Abubakar Yusuf and Muhtari Y. Abubakar	5-7
IMPACT OF FINANCIAL INCLUSION ON ECONOMIC DEVELOPMENT OF NIGERIA	Abu. Adegede Suleiman	8-11
WORKFORCE DIVERSITY AND EMPLOYEE PERFORMANCE: A STUDY OF ETISALAT NIGERIA KANO STATE	Abubakar O. Abubakar	12-14
CORPORATE GOVERNANCE AND PERFORMANCE OF PENSION FUND ADMINISTRATORS IN NIGERIA	Abuh Isah	15-19
EFFECT OF MOBILE BANKING ON THE PERFORMANCE OF DEPOSIT MONEY BANKS IN ZARIA	Adedokun Rofiat. R. and Bello Sabo	20-22
IMPACT OF MONETARY POLICY ON ECONOMIC GROWTH DURING ELECTIONEERING PERIOD IN NIGERIA	Adejo Benjamin Samson and Kabiru Jinjiri Ringim	23-26
THE IMPACT OF HOUSEHOLD SIZE ON RETIREMENT PLANNING	Ahmed Yabagi Muhammed and Bello Sabo	27-29
EFFECT OF MOTIVATION ON EMPLOYEES PERFORMANCE: A STUDY OF KADUNA ELECTRICITY DISTRIBUTION COMPANY (KAEDCO)	Aminah Bolaji, HASSAN	30-43
IMPACT OF MORTGAGE CREDIT ON ECONOMIC GROWTH IN NIGERIA	Ebire Kolawole and Bello Sabo	44-47
EFFECTS OF CAPITAL FLIGHT ON EXCHANGE RATE IN NIGERIA	Ebire Kolawole and Bello Sabo	48-53
ASSESSMENT OF NON-FINANCIAL ACTIVITIES OF MICROFINANCE BANKS ON PERFORMANCE OF SMALL AND MEDIUM ENTERPRISES IN OYO AREA, NIGERIA	Emmanuel Abiodun Alagbe and Muhtari Yusuf Abubakar	54-58
DEPOSIT MONEY BANK LEVEL FACTORS AND PRIVATE SECTOR CREDIT IN NIGERIA: A LONG RUN EFFECT DETERMINATION	Festus Uroko, Raphael	59-64
IMPACT OF ORGANISATIONAL JUSTICE ON EMPLOYEES' JOB SATISFACTION IN FIRST BANK KADUNA METROPOLIS	Haruna Bio Idris and Malachy Daudu Yini Olowu	65-68
EFFECT OF SMALL SCALE ENTERPRISES ON POVERTY REDUCTION IN SABON GARI AND KAURU LOCAL GOVERNMENT AREAS OF KADUNA STATE, NIGERIA	Hauwa'u J. Ibrahim Yero	69-82
EFFECT OF PRICE ON CUSTOMER LOYALTY IN THE NIGERIAN MOBILE TELECOMMUNICATION INDUSTRY; MODERATING EFFECT OF CUSTOMER SATISFACTION	Eseoghene Erukoghene Ojarikre and Mu'azu Saidu Badara	83-89
EFFECT OF BORROWER'S CAPACITY AND CAPITAL STRUCTURE ON LOAN PERFORMANCE IN NIGERIA DEPOSIT MONEY BANKS	Jimoh, Bolaji Akeem	90-93



WOMEN ENTREPRENEURS RELIGIOUS BELIEF AND PERFORMANCE OF REGISTERED SMALL- SCALE ENTERPRISES IN BIRNIN KEBBI METROPOLIS	Lawal Muhammad	94-96
TECHNOLOGICAL INNOVATIONS AND ORGANISATIONAL PERFORMANCE: THE ROLE OF I.T INFRASTRUCTURE FLEXIBILITY	Mohammed Aliyu Dantsoho and Kabiru Jinjiri Ringim	97-100
CURRENCY DEVALUATION ANNOUNCEMENT AND SHARE PRICES OF DEPOSIT MONEY BANKS IN NIGERIA	Nurudeen Jimoh and Salisu Abubakar	101-104
RELATIONSHIP BETWEEN INTRAPRENEURIAL BEHAVIOUR AND EMPLOYEE LEARNING IN SELECTED MANUFACTURING FIRMS IN PORTHARCOURT, NIGERIA	Oladele Thomas Oyetunde	105-108
EFFECT OF ENTERPRENUER TRAINING AND INTERNAL CONTROL SYSTEM ON FINANCIAL MANAGEMENT OF SMALL AND MEDIUM SCALE ENTERPRISES IN FEDERAL CAPITAL TERRITORY (FCT), ABUJA	Oyekunle Oyelakin	109-116
SERVICE QUALITY AND CUSTOMER SATISFACTION: A STUDY OF ETISALAT NIGERIA TELECOMMUNICATION COMPANY	Sahabi Usman	117-119
EFFECT OF FIRM CHARACTERISTICS ON TAX AVOIDANCE IN LISTED MANUFACTURING FIRMS IN NIGERIA	Salami Suleiman	120-123
THE ROLE OF ADVOCACY AND CAPACITY BUILDING IN FACILITATING COMMUNITY EMPOWERMENT AND PARTICIPATION IN DEVELOPMENT PROJECTS IN JEMA'A LOCAL GOVERNMENT AREA OF KADUNA STATE	Samson Doma, Adejo Odoh and Muhammad Kabir Isa	124-128
CONTRIBUTION OF FADAMA III TO RURAL EMPLOYMENT IN KUDANLOCAL GOVERNMENT AREA OF KADUNA STATE	Sani Abdullahi and Usman Abubakar	129-134
EFFECT OF MARITAL STATUS ON CONSUMERS' IMPULSE BUYING BEHAVIOUR IN SHOPRITE SHOPPING MALL, ILORIN	Sarafa Olalekan Hammed	135-140
THE CONTRIBUTION OF KACHIA LOCAL GOVERNMENT AREA TO ECONOMIC RECOVERY THROUGH AGRICULTURAL DEVELOPMENT	Sarki Babangida and Usman Abubakar	141-144
THE EFFECT OF GLOBAL ECONOMIC RECESSION (2008-2009) ON HEALTH SECTOR FINANCING IN AFRICA: LESSON FOR NIGERIA'S CURRENT ECONOMIC RECESSION (2016)	S.S. Bashir, I Ahmad, A.A. Umar and M.S. Ibrahim	145-148
ASSESSMENT OF DECENTRALISATION AND SERVICE DELIVERY IN SELECTED LOCAL GOVERNMENTS OF KADUNA AND ZAMFARA STATES	Umar Dahiru and Muhammad Kabir Isa	149-161
DETERMINANTS OF FINANCIAL PERFORMANCE OF LISTED PRIMARY MORTGAGE BANKS IN NIGERIA	Ummatkhairat Gombe Adamu and A.M. Abu-Abdissamad	162-165
WORK STRESS AS A PREDICTOR OF TEACHERS' TURNOVER INTENTION: THE MODERATING ROLE OF SELF EFFICACY	Yusuf Abdulrahim Otori	166-171
EFFECT OF DAY-OF THE-WEEK ON NIGERIAN STOCK MARKET RETURNS	Yusuf Olatunji, Oyedeko and Muhammed Zubairu	172-179



GROWTH AND DEVELOPMENT OF HABANERO PEPPER VARIETIES AS INFLUENCED BY NITROGEN APPLICATION AT SAMARU	A. Y. Abubakar, B. A. Babaji, B. M Sani, A. A. Muhammad, A. I. Sharifai, A. A. Mukhtar	180-185
PROSPECTS FOR NITROGEN FIXATION OF GROUNDNUTS (<i>Arachis hypogaea</i> (L.)) DUE TO PHOSPHORUS ON A P-DEFICIENT MINJIBIR ALFISOL	A.I. Gabasawa, A.A. Yusuf, E.N.O. Iwuafor and C.A. Echekwu	186-190
EFFECT OF POULTRY AND LIQUID ORGANIC MANURES ON NODULATION AND BIOMASS OF COWPEA (<i>Vigna unguiculata</i> Walp)	Bello, S.K., Yusuf, A.A., Masso, C. and Aliyu, I.A.	191-193
EFFECT OF INTERCROPPING ON DRY MATTER YIELD OF FORAGE SORGHUM (<i>Sorghum almum</i>) WITH LABLAB (<i>Lablab purpureus</i>) IN SHIKA, NIGERIA	Ishiaku, Y. M., Hassan, M. R., Tanko, R.J., Abdu, S.B. and S.A. Abubakar	194-198
MILK UTILIZATION EFFICIENCY OF MULTIBREED CATTLE UNDER TWO DIVERGENT CLIMATIC GRADIENTS IN NIGERIA: LOW AND HIGH ALTITUDE	O.M. Akinsola, G.N. Akpa, B.I. Nwagu, P. Barje	199-203
PARTICIPATORY DEVELOPMENT COMMUNICATION FOR NATURAL RESOURCES MANAGEMENT IN NIGERIA	Aida Assama Muhammadu	204-206
A DEONTOLOGICAL CRITIQUE OF THE UTILITARIAN JUSTIFICATION OF CAPITAL PUNISHMENT	Bambale Zubairu Lawal	207-211
ANALYZING THE SYNTACTIC ERRORS IN SELECTED DISSERTATIONS OF STUDENTS OF AHMADU BELLO UNIVERSITY, ZARIA	Elom, Philomena N. and Okoye, Raphael Ikechukwu	212-216
IN DEFENCE OF CARTESIAN DUALISM	Nura Ibrahim	217-226
THE NEED FOR DIALOGIC RELATIONSHIP BETWEEN THE SUPERVISOR AND SUPERVISEE FOR TIMELY GRADUATION OF STUDENTS IN AHMADU BELLO UNIVERSITY POST-GRADUATE PROGRAMME	Omogunwa Hemobayo John	227-230
THE IMPERATIVE OF PHILOSOPHY TO THE NIGERIAN SOCIETY; AN INTRODUCTION TO DEONTOLOGY OF THE MOTHER-DISCIPLINE	Shuaibu Yahaya Adams	231-237
BIOGAS PRODUCTION FROM COW DUNG AND KITCHEN WASTE FOR HEAT ENERGY APPLICATIONS	A.A. Ibrahim, L.S. Kuburi, O.S. Siyaka, M.B. Balogun, M.U. Kisan and A. Aliu	238-240
LIFE CYCLE COST COMPARISON OF SOLAR PV VERSUS PETROL PUMP WATER PUMPING SYSTEM FOR IRRIGATION FARMING AT FAKKARA FARMS B/KEBBI, NIGERIA	A.A.Sahabi, U. Samaila and F.O. Anafi	241-244
EVALUATION OF MECHANICAL PROPERTIES OF EPOXY/ BORASSUS PALM (<i>Borassus aethiopicum</i>) LEAF STALK FIBRE COMPOSITE	Alabi, A.S., Shehu, U. and Ause, T	245-248
SYNTHESIS, CHARACTERIZATION AND APPLICATION MIXED IRON CATALYST FOR FENTON OXIDATION OF TANNERY EFFLUENT	Aliyu Abdullahi Ahmed, Diya'uddeen Basheer Hasan and Abdulhamid Hamza	249-254
ASSESSMENT OF THE LEVEL AND PRACTICES OF DISASTER PREPAREDNESS IN NEW ZARIA WATER TREATMENT PLANT SITE	Aliyu Bamaiyi Usman, Adewale Adedokun, Abdulmumin Ahmed Shuaibu and Al-Amin Danladi Bello	255-258
DEVELOPMENT OF <i>Eucalyptus tereticornis</i> COMPOSITE FOR THE ADSORPTION OF CHROMIUM (VI) AND LEAD (II) IONS FROM THEIR SIMULATED SOLUTIONS	Aminu Z.I., Galadima M.S., Isa M.T., Ameh A.O., Abdulkarim A.	259-262



EVALUATION OF THE FACTORS AFFECTING SELF-PURIFICATION CAPACITY OF RIVER KADUNA, NIGERIA	K. Patrick, O.R Momoh, P. Okonkwo and B. Patrick	263-266
INVESTIGATING THE EFFECTIVENESS OF ALOE VERA MUCILAGE IN DRAG REDUCTION	L. C. Edomwonyi-Otu, N. Yusuf, A. Baba, M. N Abdallah	267-269
EVALUATION OF MECHANICAL PROPERTIES OF Al-3%Mg/SiC _p COMPOSITE FOR MARINE APPLICATION	L. S. Kuburi, M. Dauda, S. A. Yaro and M. Abdulwahab	270-274
COMBUSTION CHARACTERISTICS OF MAIZE COB IN FLUIDISED BED BOILER FOR STEAM ENERGY GENERATION	M.B. Balogun, C.O. Folayan, D.M. Kulla, F.O. Anafi, S. Umaru, and D.O. Obada	275-278
EFFECT OF <i>MORINGA OLEIFERA</i> OIL ON THE OXIDATION STABILITY OF JATROPHA AND SOYBEAN BIODIESEL	Mohammed I. B., Mohammed-Dabo I. A. and Muhammad J. A.	279-282
MODELING AND OPTIMIZATION OF FENTON OXIDATION OF TANNERY EFFLUENT USING α -FeOOH	Nasiru Yusuf, Diya'uddeen Basheer Hasan and Abdulhamid Hamza	283-287
EFFECTS OF MERCERIZATION TREATMENT ON TENSILE PROPERTIES OF KENAF FIBRE REINFORCED HDPE COMPOSITE	Ndubuisi I. Mbada, Ofa Aponbiede, Terter Aisu ¹ , Umar Shehu, M.T Isa	288-290
TENSILE ELONGATION AND MICROSTRUCTURAL PROPERTIES OF WELDMENTS PRODUCED FROM MILL SCALE ELECTRODE TYPE E6024 COMPARED WITH OERLIKON ELECTRODE	O.A. Owolabi, C.O. Folayan, M. Dauda, D.O. Obada, M.B. Balogun and A.A. Ibrahim	291-294
INVESTIGATION INTO THE PRODUCTION OF FURFURAL FROM ALGAE	Oguche J.E, Ameh A.O. and Tanimu Y.	295-298
SYNTHESIS AND APPLICATION OF KF/EGGSHELL CATALYST FOR SINGLE STAGE TRANSESTERIFICATION OF NEEM OIL: OPTIMIZATION USING CENTRAL COMPOSITE DESIGN (CCD)	Oladipo S.A., Ogunyemi S.S., Nurudeen Y., Atta Y.A., Ajayi O.A.	299-304
IMPROVEMENT OF ABUJA DISTRIBUTION NETWORK SYSTEM RELIABILITY BASED ON HYBRIDIZATION PETRI-NETS AND FAST RESTORATION AGENTS	P. U. Okorie , U. O. Alyu, B. Jimoh	305-309
EFFECT OF AUSTEMPERING TIME ON THE HARDNESS OF NODULAR CAST IRON AUSTEMPERED IN SESAME OIL	S. Abdulhamid, T. Ause ¹ , O Aponbiede	310-313
PERFORMANCE EVALUATION OF A NATURAL CONVECTION SOLAR CROP DRYER	S. Abubakar, F.O Anafi, S. Umaru, A.A. Sahabi	314-317
FIRE AND GAS DETECTOR MAPPING STRATEGIES: A COMPARATIVE ASSESSMENT	S.A. Ridwan, U. Abubakar, and S.M. Waziri	319-321
CORROSION INHIBITION OF AL-SI-MG ALLOY IN 3.5WT.% NaCl SOLUTION BY METHANOLIC LEAVE EXTRACT OF <i>FICUS EXASPERATA</i>	S.M. Adams, M. Abdulwahab and S. A. Yaro	322-328
PREDICTION OF FOUNDATION SETTLEMENT BASED ON STANDARD PENETRATION TEST RESULTS USING EMPIRICAL METHODS AND NUMERICAL MODELLING	Salahudeen A. B., Ijimdiya T. S., Eberemu A. O. and Osinubi K. J.	329-335
ANALYSIS OF PRECIPITATION VARIATION IN HADEJIA JAMA'ARE RIVER SUB-BASIN UNDER THE IMPACT OF CLIMATE CHANGE IN NORTHERN NIGERIA	Sanni I.M., Adie D.B.,C.A. Okuofu,Shaibu-Imodaghe E.M, Ahmed H.A.A Ismail, and M.A.Ajibike	336-339



HYDRAULIC PERFORMANCE OF GRAVITY DRIP IRRIGATION SYSTEM UNDER DIFFERENT OPERATING PRESSURES	Suleiman, I.T., Yahaya, M.N. and Ajikashile, J.O.	340-344
DEVELOPMENT OF LUFFA REINFORCED WASTE LOW DENSITY POLYETHYLENE COMPOSITE	Y. Adamu, M.T. Isa, J.A. Mohammed	345-348
INFLUENCE OF SECTION THICKNESS ON THE GRAPHITE FLAKE MORPHOLOGY OF COPPER ALLOYED GREY CAST IRON	Z. Musa, O. Aponbiede, T. Ause	349-352
EFFECT OF COPPER ADDITION AND SECTION THICKNESS ON TENSILE AND HARDNESS PROPERTIES OF GREY CAST IRON	Z. Musa, O. Aponbiede, T. Ause	353-356
AN ASSESSMENT OF UTILISATION OF RISK IDENTIFICATION TECHNIQUES AMONG NIGERIAN CONSTRUCTION FIRMS	A.A Ibrahim, A.M Ibrahim and M. Abubakar	357-365
ENHANCING THE THERMO-PHYSICAL PROPERTIES OF RAMMED EARTH BY STABILIZING WITH CORN HUSK ASH	Abodunrin Joshua A., Batagarawa Amina L. and Sagada Musa L.	366-371
AN APPRAISAL OF ULI MOTIFS FOR THE DESIGN OF MTN RECHARGE CARDS	Anyaocha Nkechinyere Jennifer	372-375
A CONTEXTUAL ANALYSIS OF MUYIDEEN ADIO JAJI'S STUNTED SCULPTURE	Adewumi Kehinde Christopher	376-379
A TWO-DIMENSIONAL VISUAL RECREATION OF KWAGH-HIR PUPPETS INTO PAINTINGS	Agaku Saghevwua Amos	380-382
CONTEMPORARY VERNACULAR ARCHITECTURE AS A TOOL FOR CULTURAL REJUVENATION: A CASE STUDY OF BIDA, NIGER STATE	Ahmad Sulaiman Ibrahim, Joy Joshua Maina, Musa Lawal Sagada	383-385
DEVELOPMENT OF CONTEXTUALIZED ALPHABET MULTIMEDIA INSTRUCTIONAL MATERIALS (AMIM) FOR PRE-PRIMARY EDUCATION IN SAMARU-ZARIA, KADUNA STATE, NIGERIA	ANGYOL, Michael Adawus	386-394
USING DICK AND CAREY MODEL TO DEVELOP A MULTIMEDIA PROGRAMME FOR TEACHING ELEMENTS AND PRINCIPLES OF DESIGN IN DEMONSTRATION SECONDARY SCHOOL, AHMADU BELLO UNIVERSITY ZARIA, NIGERIA	Baba Jonah	395-400
EXAMINING THE INFLUENCE OF THE PROSPECTUS PUBLICATION AMONG UNDERGRADUATE ADMISSION APPLICANTS IN AHMADU BELLO UNIVERSITY, ZARIA	Bonaventure Zirra	401-405
AN INVESTIGATION INTO THE ROLES OF FACILITY MANAGERS IN THE INCEPTION STAGE OF BUILDING PROJECTS IN NIGERIA	F.N. Duniya, A. D. Abdul'Azeez and E. C. Osuji	406-412
OPTIMISING MICROCLIMATE DESIGN TO ENHANCE PASSIVE THERMAL COMFORT IN HOT DRY CLIMATES	Fatima Aminu Kani, Rukayyatu Bashiru Tukur, Ghaffar Mudashir	413-416
AN ASSESSMENT OF THE BARRIERS TO UNIVERSITY - INDUSTRY COLLABORATION (UIC) IN THE NIGERIAN CONSTRUCTION SECTOR	G. Odawn, S. Muhammad and M. Z. Muhammad	417-424
PERCEPTION OF GRAPHICAL SYMBOLS FOR COMMUNICATION	Gyang Sunday S.	425-429
PERCEIVED ASSOCIATION OF KNOWLEDGE MANAGEMENT PRACTICES ON CONSTRUCTION PROJECT PERFORMANCE IN NIGERIA	H. Idris, A. D. AbdulAzeez and S. Muhammed	430-439



PASSIVE COOLING STRATEGIES TO ENHANCE THERMAL COMFORT IN EDUCATIONAL BUILDING IN HOT DRY CLIMATE TALATA MAFARA, ZAMFARA STATE	Ibrahim Yusuf Chafe, Rukayyatu Bashiru Tukur and Musa Lawal Sagada	440-445
AN ARTICULATION OF THE LEGAL REQUIREMENT FOR THE APPLICATION OF LIFE-CYCLE COSTING IN THE NIGERIAN BUILDING INDUSTRY	Ibrahim, Aliyu Makarfi	446-449
A CONTEXTUAL ANALYSIS OF ART WORKS ON PEACE AND CONFLICT RESOLUTION	Jacob Enemona Onoja	450-453
AN EXAMINATION OF FORM AND CONTENT OF DAJO-POTTERY WORKS IN MAKURDI, BENUE STATE	Kunde Terkura Matthew	454-457
POTENTIALS OF NORTHERN NIGERIAN BARITE AND SERPENTINITE AS AGGREGATES FOR RADIATION SHIELDING CONCRETE	M. Mamman, O.G. Okoli, M.M. Garba and I.K. Zubairu	458-461
METHODOLOGICAL APPROACH TO ASSESSING CULTURAL INSENSITIVITY IN HOUSING: A CASE STUDY OF NUPE CULTURE	Michael Tsado Audu, Joy Joshua Maina and Musa Lawal Sagada	462-465
AYO AINA'S INSTALLATION EXPERIMENTAL SCULPTURES AND ITS SOCIAL IMPERATIVE	Obadofin, Samuel Bamidele	466-469
OPTIMIZING DAYLIGHT FOR ENERGY EFFICIENCY IN THE DESIGN OF TEACHING SPACES FOR PROPOSED FACULTY OF ARCHITECTURE, UNIVERSITY OF JOS, JOS	Odoemenam Courage David, Rukayyatu Bashiru Tukur and Hamza Babangida	470-472
EXPLORING THE POTENTIALS OF WASTE IRON FILINGS AS UNDERGLAZE EFFECT FOR AESTHETIC PURPOSE	Okewu Ebute Jonathan	473-476
REUSING PLASTIC BOTTLE WASTE FOR ARCHITECTURE: (A CASE STUDY OF THE FIRST PLASTIC BOTTLE HOUSE IN KADUNA STATE, NIGERIA)	Olorundare Ayokunle Oluwatoyin and Ahmed Sani Aminu	477-481
A PILOT STUDY ON USER DESIGN REQUIREMENTS IN STOREY-BUILDINGS	Oluwatosin Aminu, Iselowo, Musa Lawal, Sagada and Joy Joshua, Maina	482-485
ADVANCING THE PATRONAGE OF NIGERIAN INDIGENOUS ARTS AND CRAFTS ON A HYBRID E-COMMERCE RETAIL PLATFORM	Siyanbola Afeez B., J. Azi, Iyabo Tijani and Ema Ema	486-489
EFFECT OF PRENATAL ETHANOL GAVAGE ON MITRAL CELLS IN THE OLFACTORY BULB OF RAT PUPS (<i>Rattus norvegicus</i>)	Iliya, A.I., Hambolu, J.O. and Adebisi, S.S.	500-493
A SURVEY FOR RUBELLA VIRUS AND ANTIBODIES AMONG PREGNANT WOMEN IN KADUNA STATE NIGERIA, NOVEMBER 2016	A. B. Gubio, O.S. Olonitola, E. D. Jatau, M. A. Mukhtar ¹	494-497
PROTECTIVE EFFECT OF APPLE CIDER VINEGAR (ACV) ON LIPID PEROXIDATION IN CHRONIC RESTRAINT-STRESSED WISTAR RATS	Abdulrauf, R. A., Dawud, F. A., Umar, I. A., Emmanuel, N. S. and Muhammed, H. D.	498-501
EFFECTS OF CLOVE AND FERMENTED GINGER SUPPLEMENTS ON TOTAL BODY WEIGHT AND SERUM ELECTROLYTES LEVELS IN HIGH FAT DIET-INDUCED INSULIN RESISTANCE RABBITS	Abdulrazak, A., Tanko, Y., Mohammed, A., and Dikko, A.A.U.	502-506
PREVALENCE OF MALARIA PARASITE IN PATIENTS WITH SICKLE CELL ANAEMIA IN THE STEADY STATE	Abubakar, A.B., Mamman, A.I., Suleiman, M. M., Hassan, A., Idris, M.A.	507-509



ATTENDING HAEMATOLOGY CLINIC OF ABUTH ZARIA, NIGERIA	Hassan A., and Buba, A S Babale, A. I.	
HISTOLOGICAL STUDIES OF THE HEPATOPROTECTIVE EFFECT OF AQUEOUS AND ETHANOLIC FRUIT EXTRACTS OF <i>Phoenix dactylifera L</i> ON MERCURY INDUCED LIVER DAMAGE IN WISTAR RATS	Abubakar, M.G., Ibegbu, A.O., Hamman, W.O. and Agbon, A.N.	510-514
ASSESSMENT OF CD3 ⁺ AND CD4 ⁺ T-CELLS AND ASSOCIATED MICROBIAL INFECTIONS IN CHILDREN WITH SECRETORY OTITIS MEDIA IN ZARIA, NIGERIA	Ahmad A. E., Musa B. O. P., Jamoh B. Y., Nasir I.A., Sa'idu, H., Garba, N.	515-518
EFFECTS OF AQUEOUS EXTRACTS OF <i>Bryoscarpus coccineus (connaraceae)</i> ON ISONIAZID INDUCED LIPID PEROXIDATION IN ADULT MALE WISTAR RATS	Andrew, Kashini, Dawud, Fatima A. And Yau, Jamilu	519-522
COMPARATIVE STUDY OF THE EFFECTS OF CRUDE EXTRACT OF <i>TELFAIRIA OCCIDENTALIS</i> , FEROUS SULPHATE AND FOLIC ACID ON HAEMATOLOGIC INDICES IN ALBINO RATS	Avidime, OM., Olorunshola, KV, Goji, ADT ² , Tajong, H ¹	523-529
SERUM PROFILES OF CALCIUM AND PHOSPHATE IN PREGNANT WOMEN IN ZARIA, NIGERIA	Avidime, O.M., Randawa, A.J., Mohammed, A., Kawa, MU., Avidime, S.	530-533
MUCIN HISTOCHEMISTRY OF THE SMALL INTESTINE IN AFRICAN GRASSCUTTER (<i>Thryonomys swinderianus</i>)	Barnabas, K. K., Ibegbu, A O., Alawa, J. N., Oposola F. and Timbuak J. A.	534-538
EFFECT OF CHRONIC ADMINISTRATION OF LOCAL GIN (OGOGORO) ON LIVER ENZYMES IN ADULT MALE WISTAR RATS	C. N. Chima, M. Akor, Dewu, A. A. Abubakar	539-541
FASTING BLOOD GLUCOSE CONCENTRATIONS AND BLOOD PRESSURE IN OVERWEIGHT AND OBESE INDIVIDUALS IN KADUNA	Ciroma, F.L., Ayo, J.O., Mohammed, A., Akor-Dewu, M.B. and Kana, M.A.	542-544
HEPATOTOXICITY STUDY IN FEMALE LACTATING WISTAR RATS TREATED WITH METOCLOPRAMIDE AND SOME ATYPICAL ANTIPSYCHOTIC DRUGS	Emmanuel N.S., Bako I.G. and Buraimoh A.A.	545-547
CEPHALIC INDEX OF SCHOOL CHILDREN AGED 5-12 YEARS FROM KAZAURE EMIRATE OF JIGAWA STATE, NORTHERN NIGERIA	Gudaji, A., Danborno, B., Adebisi, S. S., Hamman, W. O and Lawan, H. A	548-549
EVALUATION OF THE EFFECTS OF AQUEOUS <i>ALLIUM SATIVUM</i> (GARLIC) EXTRACT ON LEAD-INDUCED CHANGES ON HISTOLOGICAL AND BIOCHEMICAL CHANGES ON THE HIPPOCAMPUS OF WISTAR RATS	Hamza G. A., Buraimoh A. A., Ibegbu A. O.	550-553
EFFECT OF CO-ADMINISTRATION OF AQUEOUS EXTRACT OF <i>Hibiscus sabdariffa linn (Malvaceae)</i> CALYX AND VITAMIN E ON CARBAMAZEPINE-INDUCED TESTICULAR CHANGES IN ADULT WISTAR RATS	I. Suleiman, A. Mohammed, Y. Tanko and M.H. Kawa	554-558
STEREOLOGICAL ESTIMATION OF VOLUMES OF THE HIPPOCAMPUS IN MICE (<i>Mus musculus</i>) FED WITH ALCOHOL AND ETHYL ACETATE FRACTION OF <i>Cannabis Sativa</i>	Iliya, B., Saleh, M.I.A., Alhassan, A., Iliya, A.I.	559-563
RELATIONSHIP BETWEEN FACIAL DISTANCES AND THUMBPRINT RIDGE MINUTIAE AMONG HAUSA ETHNIC GROUP IN NIGERIA	Lawan H. Adamu, Samuel A. Ojo, Barnabas Danborno, Sunday S. Adebisi, Magaji G. Taura	564-566



SUB-ACUTE EXPOSURE TO MOSQUITO COIL SMOKE AND SPATIAL LEARNING AND MEMORY OF ADULT WISTAR RATS	Mahmood Usman, Adebisi S. Sunday, Buraimoh A. Adebayo, Ahmed-Sherif Isa, Adamu S. Abubakar, Muhammad M. M, El-ladan I. Shehu	567-569
ANTIOXIDATIVE EFFECT OF TAURINE IN ALLOXAN-INDUCED TYPE I DIABETIC WISTAR RATS	Muhammed, K.A. Goji, A.D.T, Suraj, Y.M and Tanko, Y.	570-573
STUDY OF THE EFFECT OF PLACENTAL AND UMBILICAL CORD PARASITISATION ON NEWBORN ANTHROPOMETRY IN KANO STATE, NIGERIA	Musa Muhammad Kona, Samuel Sunday Adebisi, William Nuhu Ogala, Saad Aliyu Ahmed	574-577
EFFECTS OF <i>SENNA OCCIDENTALIS</i> LEAF SUPPLEMENT ON OXIDATIVE STRESS BIOMARKERS, LIPID PROFILE OF ALLOXAN-INDUCED DIABETIC WISTAR RATS	N.M. Gidado, Y. Tanko, N.H. Sada and A. Mohammed	578-581
RELATIONSHIP BETWEEN SOME ANTHROPOMETRIC PARAMETERS AND ACADEMIC PERFORMANCE OF PRIMARY SCHOOL CHILDREN IN ZARIA KADUNA STATE NIGERIA	Opoola, F., Adebisi, S.S., Ibegbu, A.O., Timbuk, J.A., Barnabas K.K., Balogun, S.U.	582-586
EFFECT OF FERMENTED SOYBEANS SUPPLEMENT ON BLOOD GLUCOSE LEVELS OF HIGH FAT DIET-INDUCED DIABETES IN RABBITS	Sada Naiya Maryam, Mohammed Aliyu, Tanko Yusuf, Dikko A.A. Umar, Zubairu Abdullahi Mubarak, and Aliyu Munira	587-590
EVALUATION OF THE EFFECT OF CURCUMIN ON BLOOD GLUCOSE AND SERUM ELECTROLYTE LEVELS ON DIABETIC WISTAR RATS	U.A Garkuwa, A.W., Alhassan, A. Yusuf, N.M. Gidado, B.Y. Adamu, Y. Tanko.	591-593
FACTORS AFFECTING UPTAKE OF NATURAL FAMILY PLANNING METHODS AMONG CLIENTS AT THE REPRODUCTIVE HEALTH CLINIC, ABUTH ZARIA	Umar Hauwa S. Ameh N, Bawa U.S, Bakari Fadimatu	594-597
CHANGES IN SERUM ELECTROLYTES OF POLOXAMER P407 INDUCED HYPERLIPIDEMIC WISTAR RATS TREATED WITH CAMEL MILK	Zuberu J, Saleh M I A, Alhassan A.W, Adamu B Y, Aliyu M and Iliya B I	598-600
PHYTOCHEMICAL SCREENING AND ANTI-INFLAMMATORY ACTIVITIES OF THE SOLUBLE FRACTIONS OF AQUEOUS CRUDE EXTRACT OF THE LEAVES OF <i>MICROTRICHIA PEROTITH</i> DC (ASTRACEAE)	A. M. Nuhu; N. Ilyas, H. Ibrahim and K.Y. Musa	601-604
EVALUATION OF DRUG THERAPY PROBLEMS IN A PRIMARY HEALTH CARE FACILITY IN DALA, KANO STATE	Bello, N., Maiha, B.B., Mohammed, S. and Shehu, A.	605-610
EXPRESSION OF CYTOKINES BY KETOGENIC DIET SUPPLEMENTATION AND TAMOXIFEN CHEMOTHERAPY IN 1-METHYL NITROSOUREA (MNU) INDUCED MAMMARY TUMOR IN RATS	Muhammad, Z., Ya'u, J., Danjuma, N. M., and Mohammed, B.	611-617
ANTIPYRETIC EFFECT OF METHANOL STEM BARK EXTRACT OF <i>UAPACA TOGOENSIS</i> PAX. ON BREWER'S YEAST INDUCED PYREXIA IN WISTAR RATS	Olorukooba, A. B., Maiha, B. B., Chindo, B. A. and Ejiiofor, J. I.	618-622



HOW AVAILABLE AND EXPENSIVE ARE ANTI-MALARIALS IN ZARIA, NORTHWESTERN NIGERIA?	Shehu, A., Maikano, K. A., Labaran, K. S., Abdu-Aguye, S. N. and Bello, N.	623-628
MARKOV DECISION MODEL FOR EARLY STAGE BREAST CANCER: LUMPECTOMY AND MASTECTOMY	Aisha Sheikh Hassan	629-631
SOME INEQUALITIES FOR THE CLASS OF HYPONORMAL OPERATORS	I. A. Fulatan and M. S. Shagari	632-636
DENSITY FUNCTIONAL THEORY (DFT) BASED QUANTITATIVE STRUCTURE TOXICITY RELATIONSHIP (QSTR) MODELLING OF THE ACUTE TOXICITY OF PHENOLS	Ameji Philip John, Adamu Uzairu, Gideon Adamu Shallangwa	637-641
CLASSIFICATION, SEDIMENT DISTRIBUTION AND BEST PRESERVATIVE METHOD OF AHMADU BELLO UNIVERSITY KUBANNI RESERVOIR. (LOCALLY CALLED KUBANNI DAM)	C.I Eze, K. Shoeneich, S.A Alagbe, M.L Garba and T. Najime	642-646
GEOGRAPHICAL VARIATION IN THE PERCEPTION OF RURAL QUALITY OF LIFE IN KANKARA LOCAL GOVERNMENT AREA, KATSINA STATE, NIGERIA	Enwerem, I.J., Adefila, J.O. and Yusuf, R.O.	647-651
STOICHIOMETRIC AND KINETIC INVESTIGATION OF OXIDATION OF 3-AMINO-7-DIMETHYLAMINO-2-METHYLPHENAZINEHYDROCHLORIDE BY NITRITE ION IN AQUEOUS ACIDIC MEDIUM	I. Ibrahim, S. O. Idris and A. D. Onu	652-655
AN IMPROVED PRIORITY BASED ROUND ROBIN SCHEDULING ALGORITHM (AIPBRR)	Ibrahim Zakariyan, Saleh F. Abdullahi and Barroon Ismaeel Ahmad	656-663
ISOLATION AND CHARACTERIZATION OF BETULIN FROM STEM BARK OF <i>Uapaca pilosa</i> (HUTCH.)	J.A. Atibioko, M.S. Sallau, I.G. Ndukwe	664-667
PATTERN OF HOUSEHOLD ENERGY USE AMONG RESIDENTS OF UTAKO DISTRICT IN ABUJA, NIGERIA	Muhammad Isma'il, Shehu Abbas, Ova Zahirah Ohuswa, Hafiz Aminu Umar	668-675
PHYTOCHEMICAL SCREENING AND ANTIMICROBIAL EFFECT OF <i>VERNONIA AMYGDALINA</i> LEAF EXTRACTS ON MICROORGANISMS	R. B. Danladi, A. A. Nuhu and Isah M. E.	676-679
DETERMINATION OF HEAVY METAL POLLUTION IN SOIL AND MILL TAILING SAMPLES FROM ANGWAN MAIGERO GOLD MINING SITES, NIGER STATE, NIGERIA	S. O. Esiole, I. G. E. Ibeanu, Y. I. Zakari, M. A. Onoja	680-684
ANALYTICAL SURVEY OF SOME PROPERTIES OF ATMOSPHERIC AEROSOLS WITH RELATIVE HUMIDITIES USING OPAC PACKAGE	S. Uba, B. I. Tijjani, R. Nasiru and G.I. Balogun	685-690
ORGANIZATIONAL IN-HOUSE POLICY AND JOURNALIST'S PROFESSIONAL DUTIES: A STUDY OF RADIO NIGERIA NETWORK CENTRE ABUJA	Abdul-Hameed Wodi, Suleiman Salau and Maryam Ibrahim	691-696
NATIONAL DIRECTORATE OF EMPLOYMENT (NDE) AND EMPLOYMENT GENERATION IN NIGERIA: AN ASSESSMENT OF VOCATIONAL SKILLS DEVELOPMENT PROGRAMME IN GOMBE LOCAL GOVERNMENT AREA OF GOMBE STATE (2007-2014)	Abubakar Idris	697-700
A SURVEY OF COMPUTER APPLICATION USAGE BY THE ACADEMIC STAFF OF AHMADU BELLO UNIVERSITY, ZARIA	Abubakar, A. S. and Shamsuddeen, M.	701-704



AN EMPIRICAL STUDY OF THE EFFECTS ON THE PHASING OUT OF MULTI -FIBRE AGREEMENT ON NICHEMTEX TEXTILE INDUSTRY LAGOS, 2001-2010	Ahmed Aliyu Tanko	705-710
THE POLITICS OF SHARIA IMPLEMENTATION IN NIGERIA: A STUDY OF KADUNA STATE: 1999-2013	Ahmed Buba	711-713
MODES OF AUTHORITARIAN REGIME TRANSITION TO DEMOCRACY AND CONSOLIDATION OF DEMOCRACY (COD) IN WEST AFRICA (COMPARATIVE STUDY OF NIGERIA'S DEMOCRATIC TRANSITION IN 1998/1999 AND BENIN REPUBLIC'S IN 1991)	Baba Hassan	714-717
PREVALENCE AND PATTERN OF PREMARITAL SEX AMONG UNDERGRADUATE STUDENTS OF AHMADU BELLO UNIVERSITY, ZARIA	Binta Mohammed, Bashir Tanimu and Tijjani Halliru	718-720
AFRICAN TRADITIONAL FORMS OF COMMUNICATION IN MARRIAGE AMONG THE JUKUNS IN THE SOUTH OF TARABA STATE	Gani, Nissi Kande and Ibrahim Jimoh	721-728
AN ASSESSMENT OF THE ADOPTION OF INTERNET TOOLS BY AFRICAN INDEPENDENT TELEVISION-AIT AND NIGERIAN TELEVISION AUTHORITY-NTA NETWORK SERVICE	Gimba Mafo Doris, Iadi S. Adamu and Ibrahim Jimoh	729-738
THE IMPLICATIONS OF NIGERIA'S EXTERNAL DEBT BURDEN: AN EMPIRICAL EVIDENCE (1980 - 2014)	Gyong Yerima Emmanuel	739-744
VIOLATIONS OF THE STANDARD MINIMUM RULES FOR THE TREATMENT OF PRISONERS IN KADUNA CONVICT PRISON	Hillary Christopher Biya and Tijjani Halliru	745-747
THE NATURE AND INTENSITY OF MOBILE PHONES FEATURES/SERVICES USAGES AMONG RURAL HOUSEHOLDS IN KATSINA STATE	Ilyasu Ibrahim and Dahiru Suleiman	748-753
AN EMPIRICAL ANALYSIS OF SOCIO-ECONOMIC IMPACTS OF MOBILE PHONES SERVICES ON RURAL HOUSEHOLDS IN KATSINA STATE	Ilyasu Ibrahim and Dahiru Suleiman	754-758
ETHNICITY AND POLITICAL INTEGRATION IN NIGERIA: A STUDY OF <i>JASAWA</i> COMMUNITY IN PLATEAU STATE	Inusa Salisu Hassan	759-763
RISING NON-PERFORMING LOANS IN NIGERIAN: A TREND ANALYSIS OF DEPOSIT MONEY BANKS (1998-2016)	Kevin Diltokka Gideon	764-768
DEMOGRAPHIC IMPLICATION OF HIV/AIDS IN NIGERIA: A TREND ANALYSIS	Lawal Rahanatu and Shehu Ibrahim	769-775
REACTIONS OF STOCK MARKET TO MONETARY POLICY COMMITTEE MEETINGS: 2000-2016	Mahmud Alhassan Idris	776-780
AN ASSESSMENT OF THE ROLE OF TRADITIONAL RULERS IN ENSURING SECURITY IN GOMBE STATE, 1999 TO 2015	Manga Adamu	781-784
COMPARING THE ACTIVITIES OF <i>KALARE</i> AND <i>SARA-SUKA</i> POLITICAL THUGS, IN GOMBE AND BAUCHI STATES OF NIGERIA 2011-2015	Naziru Haruna Gombe	785-788
OBSTACLE TO EFFECTIVE FIGHT AGAINST CYBER-CRIME IN NIGERIA: AS PERCEIVED BY MEMBERS OF THE PUBLIC IN KADUNA METROPOLIS	Polycarp John and Tijani Halliru	789-793



KNOWLEDGE AND USE OF MODERN FAMILY PLANNING METHODS; AMONG MARRIED WOMEN IN BIDA METROPOLIS OF NIGER STATE	Rabi Tafa Akanbi, A.J Oluwabamide and Halliru Tijjani	794-804
THE IMPACT OF SECURITY EXPENDITURE ON ECONOMIC GROWTH: EVIDENCE FROM NIGERIAN ECONOMY	Sabitu, Abubakar and Idris, Salamatu. I.	805-814
AN EVALUATION OF THE NIGERIAN COMMUNICATIONS COMMISSION (NCC) CONSUMER OUTREACH PROGRAMME (COP)	Yakubu Usman, Shittu A.R.A. and Ibrahim Jimoh	815-820
MORPHOMETRIC STUDIES OF THE LOWER RESPIRATORY SYSTEM OF JAPANESE QUAIL (<i>COTURNIX COTURNIX</i>)	Imam, J., Malosan, T., Sulaiman, M. H., Nzalak, J. O., Ali, M. N., Abdullahi, A., Onyeanusi, B. I., Ojo, S. A. And Umosen, A. D.	821-823
EFFECT OF ASCORBIC ACID ON BEHAVIOURAL RESPONSES IN PACK DONKEYS DURING THE COLD-DRY (HARMATTAN) SEASON IN ZARIA, NIGERIA	Folashade Olaiifa, Joseph Olusegun Ayo, Sulaiman Folorunsho Ambali and Peter Ibrahim Rekwot	824-826



Carbonic anhydrase: A new frontier in diabetes treatment. Ibrahim, S. Ismail, Ameh, D. Amodu, Atawodi, S. Ene-Ojoh and Umar, I. Alhaji.....	827
Nitrous acid-induced variations in some quantitative traits of the Foxtail Millet <i>Setaria italica</i> (L.) P. Beauv. Esson, A.E., Adamu, A.K., Adelanwa, M.A., and Adebola, M.I.	831
Synergistic effects of fast neutrons and ethyl methane sulphonate on some agro-morphological traits of <i>Phaseolus vulgaris</i> (L.). Ikani, V.O. Adelanwa, M.A. & Aliyu, R.E.	835
Proximate and amino acid profile of <i>Cirina butyrospermi</i> (Vuiloti), <i>Dermestes maculatus</i> (Degeer), <i>Musca domestica</i> (L.) and <i>Phyllophaga</i> sp. (Saylor) larvae as potential catfish feed ingredients. Yusuf, A., Alhassan, A. B., Wada, Y.A., Umar R., & Micah, A. D.....	841
Effect of some heavy metals on the biocontrol activity of <i>Trichoderma</i> sp. Persoon, 1794 against <i>Glomerella graminicola</i> (Ces.). H. J. Abdullahi, S.O. Alonge & A. B. Zarafi.....	845
Induction of genetic variability in the Bambara Nut, <i>Vigna subterranea</i> (L.) Verde. Using Fast Neutrons. Adebola, M. I., Adamu, A. K., Adelanwa, M.A., Mohammed, M. S. & Esson, A. E.....	850
Bioethanol production from waste banana peels using co-cultures of <i>Aspergillus niger</i> and <i>Saccharomyces cerevisiae</i> . Chechet, J. N. Ameh, J. B. & Whong, C. M. Z.	853
Bacteriological quality assessment of packaged drinking water brands sold in Zaria, northern Nigeria using 5-Bromo-4-Chloro-3-Indolyl-B-D-Glucuronide. Enenya, P. R. Yakubu, S.E. & Ado S.A.....	856
Prevalence and possible risk factors associated with rotavirus diarrhoea among children under five years in Kaduna State. Aliyu A. M., Aminu, M., Ado, S. A. & Jatau, E. D.....	859
Prevalence of intestinal parasites and its associated risk factors in children 0-5 years with gastro-enteritis in Kaduna Town, Nigeria. Sikiru, M. T., Ella, E. E. & Otonitola, O. S.	863
Optimization of the production of glutamic acid from rice husk using a mutant strain of <i>Corynebacterium glutamicum</i> (Cg ^{nta}). Musa, B., Ado, S.A & Abdullahi, I. O.....	867
Human papilloma virus infection and squamous intra-epithelial lesion correlates of women in some parts of Kaduna State, Nigeria. Magaji, S. J., Aminu, M., Inabo, H. I. & Oguntayo, O. A.....	870
Isolation and determination of biofilm formation by <i>Staphylococcus aureus</i> in wastewater from the treatment plant of Ahmadu Bello University. Nusa, R. K., Machido, D. A. & Whong, C. M. Z.....	874
Seroprevalence of <i>Toxoplasma gondii</i> antibodies and associated risk factors among school children in parts of Kaduna State. Lawal, M. S., Inabo, H. I., Ella, E. E.	878
Prevalence and antibiotic susceptibility patterns of some enteric pathogenic bacteria isolated from waste dumps in Zaria, Nigeria. Nyandjou, Y. M. C., Yakubu, S.E., Abdullahi, I.O & Machido, D.A.....	882
Antibiotic resistance profile of <i>Listeria</i> species isolated from raw chicken meat sold in Zaria metropolis, Kaduna State, Nigeria. Nusa, S. M., Ado, S. A. & Yakubu, S. E.....	886
Abundance and diversity of macrobenthic invertebrates of an urbanized stream in Kaduna, Nigeria. Yisa, A. G., Gadzama, I. M. K. & Oniye, S. J.	889
Evaluation of the larvicidal potency of the seed extract of <i>Parkia biglobosa</i> Jacq. in some mosquito species. Kamba, B., Nock, I. H. & Adebote, D. A.	894
Seasonal variation in the concentration of some heavy metals in Makwaye and Kubanni Reservoirs in Zaria, Nigeria. Alhassan, A. B., Balarabe, M.L., Gadzama, I.M.K., Sha'aba, R. I. & Ramadan, M.....	897



TOWARDS TIMELY GRADUATION AND GROUND-BREAKING RESEARCH AMONG POSTGRADUATE STUDENTS OF AHMADU BELLO UNIVERSITY (ABU), ZARIA: A STUDY OF THE FACULTY OF ADMINISTRATION	Abubakar Faruk and Abolaji Jamiu Atobatele	901-903
PROSPECTS FOR NITROGEN FIXATION OF GROUNDNUTS (<i>Arachis hypogaea</i> (L.)) DUE TO PHOSPHORUS ON A P-DEFICIENT MINJIBIR ALFISOL	A.I. Gabasawa, A.A. Yusuf, E.N.O. Iwuafor and C.A. Echekwu	904-908
EFFECT OF SELECTION FOR SHORT TERM EGG PRODUCTION ON EGG QUALITY TRAITS IN JAPANESE QUAIL (<i>COTURNIX COTURNIX JAPONICA</i>) IN NOTHERN GUINEA SAVANNAH, NIGERIA	Abbaya H.Y., Akpa G. N., Adedibu I. I. and Attah E. O.	909-913
ASSESSMENT OF HBV CO-INFECTION AMONG HIV INFECTED PATIENTS BY SEX AND INFLUENCE OF SEVERE IMMUNOSUPPRESSION ON HEPATIC TRANSAMINASES LEVELS IN SOKOTO, NORTH WESTERN NIGERIA	B Hali, B O P Musa, A I Mamman and A Yakubu	914-917
EFFECTS OF JIGSAW IV COOPERATIVE LEARNING ON INTEREST AND ACADEMIC PERFORMANCE OF SECONDARY SCHOOL STUDENTS IN GEOMETRY IN KADUNA STATE, NIGERIA	J.M. Timayi, C. Bolaji and Y.K. Kajuru	918-923
BEST PROXIMITY POINT THEOREM ON A CLASS OF MULTIPLICATIVE R-CYCLIC CONTRACTION MAPPINGS	A. I. Fulatan and S. Yahaya	924-927
ASSESSMENT OF PROFESSIONAL'S PERCEPTION ON KNOWLEDGE MANAGEMENT PRACTICE ATTRIBUTES IN THE NIGERIAN CONSTRUCTION INDUSTRY	H. Idris, A. D. Abdul'Azeez, and S. Muhammed	928-931
PREVALENCE OF HOOKWORM INFECTION AMONG PEASANT FARMERS IN SELECTED LOCAL GOVERNMENT AREAS OF KADUNA STATE, NIGERIA	Chock, J.J., Ado, S.A., Whong, C.M.Z., Aminu-Mukhtar, M.	932-935
THE ACUTE TOXICITY OF ETHANOL LEAF EXTRACT OF <i>TERMINALIA AVICENNIoidES</i>	Musa, F.M., Ameh, J.B., Ado, S.A., Olonitola, O.S.	936-938
POSSIBLE ANTIDEPRESSANT EFFECT OF RUTIN SUPPLEMENT IN SWISS ALBINO MICE USING OPEN SPACE FORCED SWIM AND TAIL SUSPENSION TESTS	Yusha'u Y., Muhammad, U.A., Nze, M., Egwumah, J.M., Igomu, O.J. and Abdulkadir, M.	939-942



AN ASSESSMENT OF UTILISATION OF RISK IDENTIFICATION TECHNIQUES AMONG NIGERIAN CONSTRUCTION FIRMS

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ABSTRACT

Risk identification is considered the most important step in the risk management process, it also attempts to uncover the source and type of risk right from the project planning stage to finishing. It has been widely reported that the output of building construction in Nigeria is usually characterised by poor quality of work, cost and time overruns as a result of non-utilisation of risk identification. Therefore, the aim of this paper is to assess the utilisation of risk identification techniques by Nigerian construction firms, with a view to identifying the most utilised techniques. Descriptive statistics was used to analyse the data collected using likert scales. The findings shows that, the risk identification techniques which were mostly adopted among various categories of firms were, checklist analysis (mean = 3.94, rank=1st), documentation review techniques (mean = 3.82, rank = 2nd), and information gathering techniques (mean = 3.80, rank = 3rd), while assumption analysis techniques (mean = 2.62, rank = 6th) is least common among various categories of firms due to low level of knowledge of the techniques. Also, the result of the ANOVA test suggests that there is significant difference between the perceptions of construction firms concerning the risk identification techniques mostly used by Nigerian construction firms. It is recommended that Construction firms should train their personnel on how to utilise assumption analysis risk identification technique, in order to further enhance their risk identification capabilities.

Keywords: Assessment, Firms, Risk Identification, Risk Management, Utilization.

INTRODUCTION

Inadequate identification of risks at different phases of project construction has led to cases of cost and time overruns of most construction projects. According to Odumabo and Oduosa (2013) which stated that building construction in developing countries like Nigeria is still characterised by poor quality work, cost and time overruns, resulting from the inability of the construction firms to properly take into consideration certain risk factors during project planning and implementation stage. While other developed countries across Europe and America are already taking the lead in the application of Risk Management RM, the extent of usage and application amongst Nigerian construction firms is still reported to be at its infancy.

Various definitions of risk management have been put forward over time, and thus it is difficult to choose one which is most appropriate. Each author provides his own perception of what risk means and how to manage it, this perception depends on the profession, project and type of business (Samson, 2009).

The Australian/New Zealand Standard, (2004) described risk management as the culture, processes and structures that are directed towards realizing potential opportunities whilst managing adverse effects. This involves establishing an appropriate infrastructure and culture and applying a logical and systematic method of establishing the context, identifying, analysing, evaluating, treating, monitoring and communicating risks associated with any activity, function or process in a way that will enable organisations to minimize losses and maximize gains. One of the nine knowledge areas propagated by the Project Management Institute PMI is the Risk management RM which are; integration, scope, time, cost, quality, human resource, communications, risk, and procurement management (Project Management Institute PMI, 2008). Zou *et al.*, (2007) describe risk management in the construction project management context as a systematic way of identifying, analyzing and dealing with risk as associated with a project with an aim to achieve the project objectives. But according to Smith *et al.* (2006) risk management RM cannot be perceived as a tool



to predict the future, since that is rather impossible. Instead, as a tool to facilitate the project in order to make better decisions based on the information from the investment. In this way, decisions based on insufficient information can be avoided, and this will lead to better overall performance. From the various definitions the concept in which the authors defined risk differ, however the core information is the same. Banaitiene and Banaitis (2012) affirm that RM helps the key project participant's client, contractor or developer, consultant, and supplier to meet their commitments and minimize negative impacts on construction project performance objectives. It also helps to identify those areas in which they are likely to face challenges and the measures to be taken to avert, prevent or reduce the effect of such challenges. Similarly, Akintoye and Macleod, (1997) Stated that RM is essential to construction activities in minimizing losses and enhancing profitability. Baker *et al.*, (2010) also noted that Risk management is imperative to the achievement of project objectives. This study views risk management as the deliberate action taken to organise potential risk factors into groups, assess the level of severity of each risk factors and respond to them base of the level of their impact of project objectives.

Although, there are various model of the risk management process available in literature, their main steps are still the similar. According to Smith *et al.* (2006) Risk Management Process (RMP) is simply described as the basic concept of understanding, monitoring and controlling risks in a project in which the main phases of the RMP are; identification, analysis, response and review. Risk identification is the first and perhaps the most important phase in the RMP, this is because it develops the basis for the next phase which are; risk analysis, risk response and risk review of risk. Similarly, Carbone and Tippett (2004) also considered risk identification to be one of the most significant steps in managing successful projects.

A number of studies have been conducted in the area of risk management without specific emphasis on the risk identification techniques mostly adopted by Nigerian construction firms. This paper focused on the assessment of utilisation of risk identification techniques

among Nigerian construction firms with a view to identifying the most often utilised technique, laying emphasis on the perception of top and middle level management personnel in building construction firms within Abuja, the Nigeria Federal Capital Territory (FCT). The top and middle level managers of construction contracting firms which include, Directors, Deputy directors, Project managers and other senior personnel who are involved in the decision making and are likely to have more knowledge regarding the risks identification techniques mostly adopted by their firms were the respondents. The scope of the risk identification techniques to be assessed is limited to the following, documentation review, information gathering, checklist analysis, assumption analysis diagram techniques and SWOT analysis techniques. These techniques were extracted from the literature.

LITERATURE REVIEW

Concept of Risk Management Process

Risk management process RMP involves the systematic application of management policies, procedures and practices to the tasks of communicating, establishing the context, identifying, analyzing, evaluating, treating, monitoring and reviewing risk (AS/NZS, 2004). The ISO 31000 listed the following as the core element of the RMP, communication and consultation, establishing the context, risk assessment risk treatment and finally monitoring and review (ISO-IEC 31010, 2009). But, according to Smith *et al.* (2006) RMP is simply described as the basic concept of understanding, monitoring and controlling risks in a project in which the main phases of the RMP are; identification, assessment and analysis, and response as shown in Figure 2.1. All steps in RMP should be included when dealing with risks, in order to efficiently implement the process in the project. There are many variations of RMP available in literature, but most commonly described frameworks consist of those mentioned steps. In some models there is one more step added, and the majority of sources identify it as risk monitoring or review as was stated in the Australian/New Zealand standard. This paper focused on the risk identification phase of the RMP will be focused on, in order to assess the level of utilisation of risk identification techniques among



construction firms in Nigerian.

Risk Identification

As there is no problem that can be solved without proper identification of the source and cause of such a problem. Risk identification is an important step of the RMP which involves finding, recognizing and recording of risk event, situation or circumstances that might exist or occur which could have a material impact on project objectives and the nature of that impact. Bu-Qammaz (2007) also described risk identification as a critical aspect of RMP in which without it, the succeeding phase (i.e. risk assessment) would not be achieved. The risk identification can be done in various ways in various ways depending on the organisation and project team. Mostly, identification of risks relies on past experience of the organisation on similar projects (Winch, 2002). The purpose of identifying risks is to obtain a list with potential risks to be managed in a project (PMI, 2004). In order to find all potential risks which might affect the delivery of a project, different techniques can be applied. It is important to use a method that the project team is most familiar with. Reasonable degree of risk identification will lead to stoke of feasible risk. Then, the identified risk must be categorised to facilitate the assessment process. Risk identification can be done using evidence based approach, examples of which are check-list and review of historical information. Others are, using systematic team approaches where a team of experts follow a systematic process like brainstorming to identify risks (ISO/IEC 31010, 2009). Table 2.1 shows list of risk identification techniques extracted from (Ewelina and Mukaela, 2011).

METHODOLOGY

Wood and Haber, (1998) described Research design as a framework that the researcher creates to plan or organise scientific investigation. Designing of a research study involves the development of a plan or strategy that will guide the collection and analyses of data. To achieve the objectives set for this study, a four step research process was followed. The summary of the sequence is illustrated in figure 3.1 below.

In order to realise the objective of this research, quantitative research approach which involves the use of structured questionnaire as data collection instrument, data analysed to be use to

make comparison of mean and findings of the study to be applicable to other population. This according to Johnson and Christensen, (2008) can be considered as a quantitative research. The population for this research was the Nigeria Construction firms; while the sample frame was the construction contracting firms within Abuja. According to data received from Federal Inland Revenue Service FIRS, (2014) which shows that there are 814 tax-paying building construction firms within the FCT. The sample size for this research was calculated using the formulae for determining sample size found in Bartlett *et al* (2001) and Rose *et al* (2015) in which the sample size was calculated to be 105 after applying the correction formular:

$$n = \frac{M}{1 + \left(\frac{M}{N}\right)} \text{ ----- (1)}$$

This research adopts a non-random sampling technique of purposive and convenience sampling method to select the 105 firms that participated in the research.

The rationale for adopting purposive and convenience sampling method was to ensure that selected or sampled firms have adequate knowledge and experience to respond to the questions in the questionnaire and are willing to be part of the research.

Descriptive and inferential statistical tools were employed to analyse the set of data collected for this paper using the Statistical Product and Service Solutions (SPSS) software.

RESULTS AND DISCUSSIONS

Response rate

A total of 105 questionnaires were administered to construction firms, of which 49 was completed and returned. This represents about 47% effective response rate, which was retrieved and used for analysis, this percentage response rate is said to be adequate according to Moser and Kalton (1971) found in Abubakar *et al* (2014) which stated that response rate not lower than 30-40% of the sample size could be considered significant.

Position of respondents in the firm

The respondents to the questionnaire belong to the top and middle management level of the organisation that took part in the research. Most of them have clear understanding of the policies of the organisation, and have knowledge and experience as it relates to risk factors affecting their organisation. Table 4.1 shows that the senior management personnel of the



organisation forms (33.1%) of the total respondents followed closely by Project managers which are (31.7%). The C.E.O's represents (9.2%) of the respondents, while Directors are (5.6%), leaving the remaining (20.4%) to other positions which includes; senior engineers, builders, quantity surveyors and so on.

Table 4.1: Positions of respondent in the firm

Position	Percentage %
C.E.O	9.2
Director	5.6
Project manager	31.7
Senior mgt personnel	33.1
Others	20.4
Total	100

Source: Field survey, 2015

Size of the firms

Table 4.2 shows the sizes in terms of full-time employees of the firms that participated in the research. The sizes are categorised as micro with 0-9 employees and they constitutes about (33.1%) of firms that took part in the research, while the highest participant fall into the categories of firms with 10-99 employees (small) with (35.2%) and the third category 100-299 (medium) which represents just (6.3%) and finally firms with employees above 300 (large) which constitutes (25.4%) of the firm that responded to the questionnaire.

Table 4.2: Size of firms

Category	Percentate%
0-9 (micro)	33.1
10-99 (small)	35.2
100-299 (medium)	6.3
300 and above (large)	25.4

Source: Field survey, 2015

Firms experience in the construction industry

Table 4.3 shows that majority of the firms that took part in the survey have long years of experience, this indicates that the responses provided by these firms during the research are quite significant and their experience is of high importance in assessing the impact of Global Risk Factors affecting construction industries. About 61.3% of them have been involved in construction for more than 10 years. While 29.6% of the firms have 5-10 years experience in the construction industry, and about 9.2% of

the firms have less than 5 years of experience in the construction industry

Table 4.3: Firms years of experience

Years of involvement in construction activities.	Valid Percent
Less than 5 years.	9.2
5-10 years.	29.6
more than 10 years	61.3
Total	100.0

Source: Field survey, 2015

Region(s) in which the firms have executed project in the last five years

The information regarding the region(s) in Nigeria in which the construction firms have executed project in the last five years, is important to verify if the response from the firms could be used to reflect the perception of construction firms in other part of the country in which the survey could not cover

Table 4.4 Region(s) in which firms have executed project in the last five years

S/N	Region	Number of Firms
1	less than North-West	30
2	North-East	16
3	North central	49
4	South-West	19
5	South-East	18
6	South-South	19

Source: Field survey, 2015

Table 4.4 shows the six geo-political zones in Nigeria and numbers of respondent's firm that have executed project in each of the six geo-political zones. Aside from north-central (Abuja) which is the study area for the research that has 49 firms, other zone in which the firms have executed project include north-west with 30 firms, 19 firms have executed project in south-west and south-south, 18 firms has executed project in the south-east and finally north-east with 16 firms which has the lowest number of firms that have executed project in that zone in the last 5 years. This may be as a result of insurgency in that region. These further justify the choice of Abuja as the study area in which a quit significant number of the respondent firms have executed project in other geo-political zones.

Utilisation of risk identification techniques.



The assessment of the utilisation of risk identification techniques was based on The ISO/IEC standard 31010, (2009) which contains some of the global best practices of risk identification. The table below shows the level of adoption of the various risk identification techniques across different categories of firms.

Table 4.5 shows that amongst the micro firms the following risk identification techniques were "Often" utilised; information gathering techniques with a weighted mean of 4.00 followed by checklist Analysis with mean of 3.71, documentation review with mean of 3.67, SWOT analysis with mean of 3.59 and diagram techniques with a weighted mean of 3.50, while assumption analysis with mean of 2.72 is "sometimes" utilised. Similarly, for small firms, items 1,2,3,4 and 5 are "Often" utilised, while item 6 (Assumption analysis) is "sometimes" utilised. The table further shows that items 1 and 3 are "Often" used by medium firms, while items 2, 4, 5 and 6 are utilised "sometimes". Finally, for large firms, documentation review techniques with mean of 3.86, checklist analysis with mean of 3.71 and information gathering technique with mean of 3.57 are "often" utilised, while SWOT analysis with mean of 3.23, diagram techniques with mean of 3.36 and assumption analysis with mean of 2.62 are "sometimes" utilised. Table 4.6 shows the overall ranking of the risk identification techniques mostly used by different categories of construction firms. The table revealed that checklist analysis is "often" utilised by construction firms as it was ranked 1st with the highest weighted mean of 3.94, while assumption analysis techniques with the lowest weighted mean of 2.62 was ranked 6th. The low ranking of the assumption analysis may be as a result of inadequate knowledge of the technique by most firms, as most respondent find it difficult to validate most of their assumptions.

Test of Research Hypotheses

In order to conduct an inferential test for the study to identify the significant differences in the means of the four categories of construction firms assessed in this study the following hypothesis was postulated i.e. H_0 = there is significant difference between the perceptions of construction firms concerning the risk identification techniques mostly adopted. Table

4.7 shows the results of the ANOVA statistic test for the null hypothesis.

The results of ANOVA statistic test in table 4.7 shows the P calculated values for all the items listed are greater than 0.05 level of significance (i.e. P is significant at $p \leq 0.05$) which suggested that the null hypothesis should be accepted i.e. there is significant difference between the perceptions of construction firms concerning the risk identification techniques mostly used by Nigerian construction firms.

CONCLUSIONS AND RECOMMENDATIONS

It was found that out of the six identified risk identification techniques assessed, checklist analysis with mean value of 3.94 was ranked 1st, documentation review with mean value of 3.82 was ranked 2nd, information gathering with mean value of 3.52 and was ranked 3rd were found to be "often" utilised by construction firms. This finding was contrary to that of previous study by Baloi (2002) which found that checklist analysis is rarely used by construction firms.

Conclusion

The assessment of the utilisation of risk identification techniques among Nigerian construction firms is necessary in order to unravel areas that needs to be improved upon, so as to reduce the cases of poor quality of work, cost and time overrun that characterised construction activity in Nigerian as a result of the inability of the construction firms to utilise the risk identification techniques. The risk identification techniques mostly adopted by Nigerian construction firms was found to be Checklist analysis technique and documentation review technique which were relatively easy to use when compared to diagram techniques and assumption analysis.

Recommendations

In view of the finding and conclusion, the following recommendation was put forth. Construction firms should train their personnel on how to utilise assumption analysis risk identification technique among other risk identification techniques, in order to further enhance their risk identification capabilities.

REFERENCES

Abubakar, M., Ibrahim, Y. M., Kado, D. & Bala, K. (2014). Contractors Perception of the Factors Affecting Building Information Modeling (BIM) Adoption In The Nigerian



- Construction Industry. *Computing in civil and building engineering ASCE*. 167-178.
- Akintoye, A. S., & MacLeod, M. J. (1997). Risk Analysis and Management in Construction. *International Journal of Project Management*, 15(1), 31-38.
- Australian/New Zealand Standard, (2004). *Risk management (AS/NZS 4360:2004)* Sydney and Wellington: Standards Australia/Standards New Zealand.
- Baker, S., Ponniah, D., & Smith, S. (2010). Risk Response Techniques employed currently for major projects. *Construction Management & Economics*, 17(2), 205-213.
- Baloi, D. (2002). *A Framework for Managing Global Risk Factors Affecting Construction Cost Performance*. (A Doctoral dissertation, Loughborough University). Retrieved from: <https://dspace.lboro.ac.uk/2134/6808>.
- Banaitiene, N., & Banaitis, A. (2012). Risk Management in Construction Projects. *Risk Management – Current Issues and Challenges*, 429-448. doi.org/10.5772/51460
- Bartlett, J. E., Kotrlik J. W & Higgins, C. C (2001). Organizational Research: Determining Appropriate Sample Size in Survey Research. *Information Technology, Learning, and Performance*, 19, (1), 43-50.
- Bu-Qummaz, A. S. (2007). *Risk Assessment of International Construction Projects Using The Analytic Network Process* (M.Sc thesis, Middle East Technical University).
- Carbone, T. A. & Tippett, D. D. (2004). Project risk management using the project risk FMEA. *Engineering Management Journal*, 16(4), 28–35.
- Ewelina, G., & Mikaela, R. (2011). *Risk Management Practices in a Construction Project – a case study* (M.Sc Thesis, Chalmers University of Technology).
- Federal Inland Revenue Service (FIRS). (2014). *Corporate Taxpayers by Business Line – building and construction*.
- International standard/ International Electro-technical Commission, ISO/IEC (2009). *Risk Management- Risk Assessment Techniques (IEC/FDIS 31010)*. International Electrotechnical Commission.
- Johnson, B., & Christensen, L. (2008). *Educational research: Quantitative, qualitative, and mixed approaches* (34). Thousand Oaks, CA: Sage Publications. Retrieved from www.xavier.edu/library/students/pdf.
- Moser, C. A. & Kalton, G. (1971). *Survey Methods in Social Investigation*. UK: Heinemann Educational.
- Odimabo, O.O., & Oduoza, C. T. (2013). Risk Assessment Framework for Building Construction Projects in Developing Countries. *International Journal of Construction Engineering and Management*, 2(5), 143-154. doi: 10.5923/j.ijcem.20130205.02.
- Project Management Institute PMI. (2004). *A guide to the project management body of knowledge: (3rd ed.)*. Pennsylvania: Project Management Institute, Inc.
- Project Management Institute PMI. (2008). *Guide to the project management body of knowledge: (4th ed.)*. Newtown Square: Project Management Institute.
- Rose, S., Spinks, N., & Canhoto, A. I. (2015). *Applying the Principles- Formulae for Determining sample size*. Management Research. Retrieved from <http://documents.routledge-interactive.s3.amazonaws.com>
- Samson, S., Reneke, J. A., & Wiecek, M. M. (2009). A review of different perspectives on Uncertainty and risk and an alternative modeling paradigm. *Reliability Engineering and System Safety*: (94) 558– 567.
- Smith, N. J., Merna, T. & Jobbling P. (2006). *Managing Risk in Construction Projects*. Oxford: Blackwell Publishing.
- Winch, G., (2002). *Managing construction projects, an information processing approach*. Oxford: Blackwell Publishing.
- Wood, G., & Haber, J. (Ed). (1998). *Nursing research: methods, critical appraisal and utilisation*. Mosby-Year Book.
- Zou, P. X. W., Zhang, G., & Wang, J. Y. (2007). Understanding the key risks in construction projects in China. *International Project Manage*: 25(6):601-614.

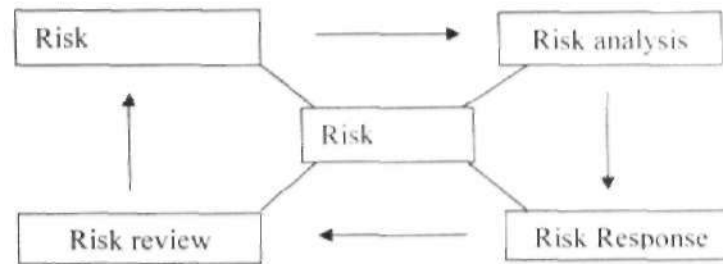


Figure 2.1 Risk Management Process RMP (Smith et al 2006)

Table 2.1 Risk Identification Techniques

Techniques	Types
Information gathering	Workshops Brainstorming Interviews Questionnaires Benchmarking Consulting experts Past experience Delphi technique Risk breakdown structure Visit locations
Documentation	Databases, historical data from similar projects Templates Checklists Study project documentation (plan, files etc.)
Research	Study specialist literature Stakeholder analysis Research assumptions Research interfaces

Source: Ewelina and Mukacla, (2011).

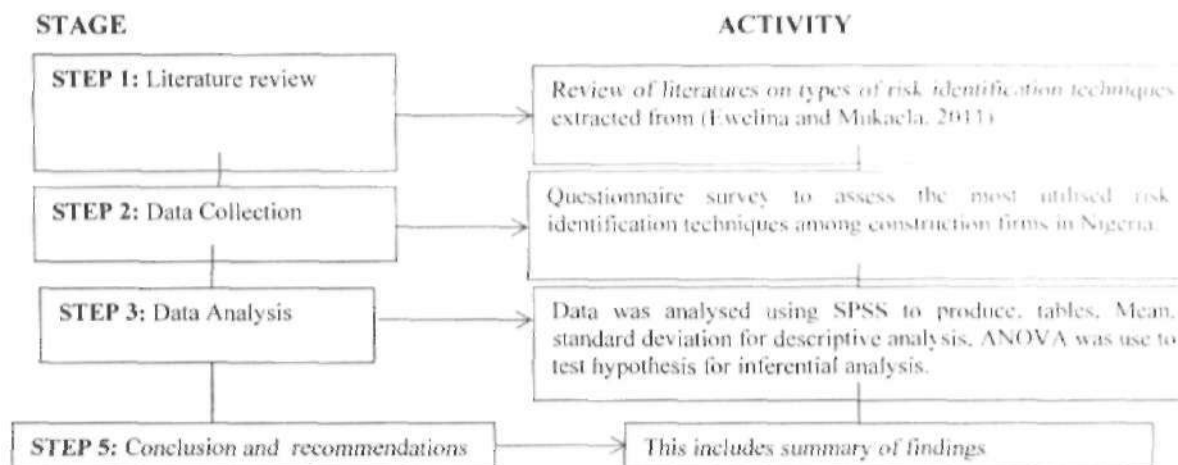


Figure 3.1: Research Design.

Source: field Survey, 2015



Table 4.5: Utilisation of Risk identification techniques among various categories of construction firms

S/No.	Risk identification Techniques	Micro firms			Small firms			Medium firms			Large firms		
		N	Mea n	SD	N	mea n	SD	N	mea n	SD	N	mea n	SD
1	Checklist Analysis	17	3.71	.985	14	4.36	.745	3	4.33	.577	14	3.71	.825
2	Documentation Review	18	3.67	.970	14	4.07	.616	3	3.33	1.15	14	3.86	.770
3	Information Gathering	18	4.00	1.02	14	3.71	1.06	3	4.00	1.00	14	3.57	.938
4	SWOT Analysis	17	3.59	1.06	13	3.77	1.16	3	3.33	1.52	13	3.23	1.36
5	Diagram Techniques	18	3.50	1.15	14	3.71	1.26	3	3.00	1.73	14	3.36	1.15
6	Assumption Analysis	18	2.72	.826	13	2.38	.961	3	3.00	1.00	13	2.62	.961

Source: Field survey, 2015.

Table 4.6. Overall utilisation of Risk Identification Techniques among Construction firms.

S/No.	Risk identification Techniques	N	Mean	Std. Deviation	Rank
1	Checklist Analysis	48	3.94	.885	1
2	Documentation Review	49	3.82	.834	2
3	Information Gathering	49	3.80	1.000	3
4	SWOT Analysis	46	3.52	1.188	4
5	Diagram Techniques	49	3.49	1.192	5
6	Assumption Analysis	47	2.62	.898	6

Source: Field survey, 2015.



Table 4.7 Result of ANOVA test for null hypothesis two.

S/N	Test Items		Sum of Squares	Df	Mean square	F	Sig. (p)
1	Documentation review	Between groups	2.037	3	.679	.976	.412
		Within groups	31.310	45	.696		
		Total	33.347	48			
2	Information gathering	Between groups	1.673	3	.558	.542	.656
		Within groups	46.286	45	1.029		
		Total	47.956	48			
3	Checklist analysis	Between groups	4.545	3	1.515	2.066	.118
		Within groups	32.268	44	.733		
		Total	36.812	47			
4	Assumption analysis	Between groups	1.341	3	.447	.538	.659
		Within groups	35.765	43	.832		
		Total	37.106	46			
5	Diagram techniques	Between groups	1.673	3	.558	.377	.770
		Within groups	66.571	45	1.479		
		Total	68.245	48			
6	SWOT analysis	Between groups	2.079	3	.693	.474	.702
		Within groups	61.400	42	1.462		
		Total	63.478	45			

Source: Field survey, 2015. Df = Degree of freedom, F = F- test, sig. (p) = probability value.



ENHANCING THE THERMO-PHYSICAL PROPERTIES OF RAMMED EARTH BY STABILIZING WITH CORN HUSK ASH

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ABSTRACT

Conventional building materials such as sandcrete and concrete blocks have high thermal conductivity and low specific heat capacity which increase thermal discomfort in comparison to rammed earth in buildings. However, rammed earth is susceptible to cracking as a result of shrinkage due to the drying effect of the sun. The aim of this study is to investigate the potential of corn husk ash as a stabilizer for the production of rammed earth blocks to improve thermal comfort in buildings. Three different levels of stabilization (0%, 10% and 20%) using corn husk ash are adopted for this study, beyond which the strength of the material is known to fail. The samples were moulded and subjected to thermal conductivity, specific heat capacity and density tests. In general there is a significant improvement in the thermal conductivity of stabilized rammed earth blocks. From the thermal conductivity test results, thermal conductivities of 0.996w/k.m', 0.637w/k.m', and 0.489w/k.m' were obtained for samples admixed with 0%, 10%, and 20% corn husk ash respectively. The 0%, 10%, and 20% samples had specific heat capacities of 962.1 j/kg.K, 984.9 j/kg.K and 993.1 j/kg.K and density increased with the increase in the amount of ash from 862.3kg/m³ to 942.5kg/m³ and 959.5kg/m³ respectively. Overall the 20% sample performs best when compared to the 0% and 10%. Stabilizing rammed earth with corn husk ash can improve the thermal properties of rammed earth blocks, making them suitable for use as a building material in enhancing thermal comfort.

Keywords: Corn husk ash, rammed earth blocks, thermal conductivity, specific heat capacity, Density

INTRODUCTION

As evident in developing countries such as Nigeria, it is challenging to fulfill the immense requirements for shelter with conventional construction techniques and building materials such as sandcrete blocks, concrete, aluminum and steel which are noted for their high energy consumption during production and associated negative environmental impacts (Minke 2006). This leads to a need to source for, modify and make use of locally available materials for construction.

Stulz and Mukerji (1993) reports that earth is a natural resource which is one of the oldest and versatile that is commonly used throughout the world as building material. It is cheap, has excellent heat insulation capacity and strong in compression. Rammed earth has been played down for use in the building construction industry because of its low strength, thermal conductivity inconsistencies, and need for heavy maintenance due to cracking in shrinkage mode (Kamang 1998). Earth can be stabilised so as to increase compressive strength, reduce shrinking and swelling, reduce or exclude water absorption, reduce cracking, reduce expansion and contraction using fibres.

This has led to the stabilization of soil blocks with sand and clay, lime and pozzolanas, portland cement, gypsum, bitumen, sodium silicate, cow dung or horse urine, plant juices, resins, molasses, whey, animal products such as hair, termite hills, plant products such as cob and husk of stale crops such as rice and corn to improve its properties even though most of these stabilizers are costly and unsustainable. Stabilization of rammed earth is the process of modifying the soil properties in relation to its strength, texture, voids and water resisting properties, to obtain permanent properties compatible with a particular application (Rigassi, 1985). Stabilizing rammed earth leads to irreversible change in the physical properties of soil depending on the quality of building design, materials employed, economic aspects of the project, or on issues of durability. Previous studies on rammed earth have shown that for experimental purposes, the stabilizers are added in 10% increment by weight and beyond 20% increment of ash, the strength of stabilized earth has been known to fail (Fatih & Umit, 2001; Okinade, 2008).

Corn husks along with corn stalk and leaves are usually disposed either by burning or tilling into