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BOOK OF ABSTRACTS

**Utilization of Internet Tools: A Strategy For Repositioning Curriculum in Marketing in
Chukwuemeka Odumegwu Ojukwu University, Anambra State**

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This study investigated utilization of internet tools as a strategy for repositioning curriculum in Marketing. The study was done in Chukwuemeka Odumegwu Ojukwu University, Anambra State. Descriptive survey design was adopted for the study. The population of the study consisted of 25 lecturers from Department of Marketing and 14 lecturers from the Department of Social Sciences Education (academic planning unit) and 50 undergraduate students of Marketing. Three research questions guided the study. A questionnaire containing 17 items was used as instrument for data collection. The instrument was validated by three experts, two from Department of Marketing and one from department Measurement and Evaluation. All the departments are in Nnamdi Azikiwe University, Anambra State. Cronbach Alpha Technique was used to determine the internal consistency of the instrument. Mean and standard deviation were used in analyzing the data. The major findings of the study revealed that integrating internet tools in the curriculum of marketing would aid the student to acquire explorative and constructive skills that would enable them become self-reliance in any venture of their choice. From the findings, it was recommended that the Ministry of Education should incorporate internet tools into the curriculum of marketing in order to enable the student become better entrepreneurs.

Keywords: *Education, Internet tools, Curriculum , Marketing*

A Wemos-D1-R2-Based Remote-Switching Module for Home Internet of Things Applications

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This paper reports the design and construction of an Internet of Things (IoT) module for remote-controlling home appliances via Wi-Fi connection and web browser interface. A WeMos D1 R2 board which is based on the low-cost ESP-8266 Wi-Fi microchip with full TCP/IP stack and microcontroller capability forms the basis of this design. The module is capable of switching eight (8) circuits independently and works in wireless local network as it operates in password-secured access point mode for a Wi-Fi-enabled device to connect, hence internet connection is not required. When all switching circuit are in operation, the device only consumes about 60W of power. The module cost about ₦5,000 to implement, hence a low-cost solution for home automation.

Keywords: *Control, automation technologies, Trends, Internet of Things (IoT)*

Creative/Visual Arts Education in a Multi-Disciplinary Action for Technological Enhancement in Nigeria

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This paper interrogates the United Nations Scientific, Educational, and Cultural Organization (UNESCO)'s Road Map for Arts Education, the 9-year Basic Education Curriculum (BEC) for Cultural and Creative Arts learning in Nigeria as well as the Cultural and Creative Arts curriculum from three technologically advanced countries of USA, Israel and Egypt. Results show that the UNESCO road map recognizes the importance of art education without which, the educational services rendered, especially at the early learning stages, cannot be said to be complete. While the three countries offer very robust and comprehensive art educational services, well-funded and given due priority, the Nigerian educational system is yet to embrace this best practice. The paper suggests a rapid and vigorous curriculum re-engineering and enforcement in the basic school system, provision of complete curriculum infrastructure and funding needed in schools especially public schools. Schools should give priority time allocation to art-teaching since it requires time for practical sessions. Art Educators should redefine their goals and include technological advancement as one major priority. Finally, cultural studies cannot be successfully divorced from sustainable technological development and therefore, should be properly embedded in the Cultural and Creative Arts curriculum.

Keywords: *Arts Education, Curriculum, Art Curriculum, cultural and creative arts, technological advancement, Nigeria*

Rescue the Local Textile and Fashion Design Industry in Nigeria

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Nigerian institutions of learning are annually turning out skilled indigenes who can establish and man industries that produce items needed for existence. Such items include toiletries, textiles, garments, agricultural products and carpentry. Yet, Nigeria as a nation is generally observed as a consumer of goods and not a manufacturer of goods. There is gross technological backwardness in the country which is buttressing abject poverty amongst the indigenes. Resources are not maximally attended to and tapped. Accordingly, this paper discusses the Nigerian local textiles and fashion design industries, their capacities, the issues hindering the advancement of such industries and the prospects of the industries. The study calls for the rescue of the local textile and fashion design industry in Nigeria from internal detractors and hindrances so that the industries can stand external competitors for the betterment of the country. At the end, recommends means by which the industry can be aided. Data for this paper were collected from newspapers, published books, internet, journal articles, observations and experiences of the researcher. The data assessment employed the qualitative research method.

Keywords: *Local Industries, Aids, Textiles, Fashion Design, Rescue*

Precision Livestock Farming Technologies: Status and Challenges

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'Precision Livestock Farming' (PLF) technologies are usually described as hi-tech management tools aimed at continuously and automatically monitoring different aspects of animal production, including production efficiency, environmental sustainability of the farming operation and the health and welfare of animals. There have been numerous new technologies available to aid farm workers with daily tasks, such as livestock feeding and general health monitoring with the aim to enhance animal productivity, improve animal health and welfare whilst reducing environmental impact. PLF integrates the use of 'smart' sensors into livestock farming, which links production processes into a complex network. These new technologies may be useful in terms of economic benefit and reducing manual workload. However, there may be tradeoffs concerning the adoption of new technologies and the impact this may have on human-animal relationships. This work will examine the recent status of precision livestock farming and the challenges usually encountered by farmers for adopting such technologies. It examines the technological principles upon which PLF is hinged on, highlights some existing applications of PLF, considers suitability of different livestock Processes for the implementation PLF approach, addresses whether PLF represents technology push or market pull, and stresses the need for a future bioethical analysis of PLF. Finally, this work gives a flavour of what could be the next generation of PLF technology, to demonstrate the interdisciplinary collaboration and engineering advances required to realize PLF solutions, and to obviously reveal that PLF research is essential at both laboratory and farm levels.

Keywords: *automation, precision livestock farming, Sustainability.*

Optimal Sizing and Placement of Distributed Generation to Power Distribution Network Using Analytical Approach

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Energy is the mainstay of growth and development. In Nigeria due to population outburst, industrialization, agricultural production, and improving living standards, there exists an increasing need for electrical energy. Nigeria is blessed with abundant primary energy resources enough to meet its present and future development requirement. With the recent initiatives on renewable energy coupled with the profound public assessment of the environmental impacts of using fossil fuels to generate electricity, penetration of renewable distributed generation into the distribution network has become increasingly important in recent years. The aim of optimal sizing and placement of DG to the distribution network using analytical approach is to provide best location and size of DG to optimize electrical distribution network operation and planning taking into account DG capacity constraints. This method requires less computation and offers more optimal solution.

Keywords: *Energy, Optimal sizing, Renewable.*

The Role of Technology in Improving Adult Education Curriculum Development in Nigeria

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The study investigates The Role of Technology in Improving Adult Education Curriculum Development in Nigeria. The design of the study adopted was descriptive survey design. The population of the study was all 60 adult instructors and all 168 adult learners in all the eight adult education centers in Jalingo urban. There was no sampling as the entire population was used for the study. The instrument adopted for the research was questionnaire which contains 20 structured items. The instrument was validated by three experts two from the Department of Adult Education and Extra-Mural Studies one from Measurement and Evaluation Unit, Science Education Department all in University of Nigeria, Nsukka. The reliability of the instrument was ascertained using test-retest method outside of area of the study. Using Pearson moment correlation coefficient, a reliability co-efficient of 0.84 was obtained. This indicates that the instrument was reliable for the study. Mean statistics was used to analyze data in order to answer the research questions and t-test statistic was used to test the null hypotheses that guided the study. The Findings revealed that technology will help in the provision of independent learning, entrepreneurship skills among others.

Keywords: *Curriculum, Technology, Nigeria*

Technology for Improved Health Services: The Role of Virtual Reality for Pain Management in Paediatric Patients

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In health treatment processes, patients must often endure painful procedures for various medical conditions. However, with advancement in technology and the advent of affordable consumer-grade equipment, clinicians now have access intervention for pain especially for pediatric patients. In this work, we review, design, implement and test an immersive (Virtual Reality)VR software solution for pain management in patients within the pediatric age. The immersive VR allows the user to become an active participant in a virtual world, as VR captures the visual, auditory and tactile senses, as well as the limbic sense of emotion. When someone is fully engaged and immersed in VR experience, their body releases endorphins that can produce an opioid-response that markedly reduces pain-related activities in the brain and consequently the patient's subjective pain. Our results show that there exists a viable market for VR solutions in the health sector as users report substantial immersion and distraction during painful procedures. In addition to providing relief from acute and procedural pain, emerging technologies like VR can also help to provide a corrective psychological and physiological environment to facilitate pain relief for patients suffering from chronic pain. The special qualities of VR such as presence, interactivity, customization, social interaction, and embodiment allow it to be accepted by children and adolescents and incorporated successfully into their existing medical therapies.

Keywords: *Virtual reality, Pain, Pediatrics, Tech4good*

**Advancing Local Manufacturing Status for Sustainable Entrepreneurship Development in Nigeria:
A Perspective Study**

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This study investigates the perception of entrepreneurs and entrepreneurship education of university tutors on the advancement of local manufacturing status for sustainable entrepreneurship development in Nigeria. To ascertain this target, three research questions and three hypotheses at 0.05 level of significance was developed and formulated respectively. The study was conducted in Enugu state, Nigeria. This study adopted descriptive survey research design. The participants for the study comprised of 68 local entrepreneurs and 59 entrepreneurship education University tutors within Enugu state. Structured questionnaire was used as instrument for data collection. The instrument was validated by three experts from faculty of vocational and technical education, university of Nigeria. The internal consistency of instrument was ascertained using CronbachAlpha reliability coefficient which yielded 0.79 reliability estimate for the overall questionnaire. Mean and standard deviation was used to answer research questions while t-test and one-way analysis of variance (ANOVA) was adopted to test hypotheses formulated at 0.05 level of significance. The findings depicted that foreign products are mostly incompatible to local culture and traditions. Study revealed that policy enacted by government does not favour the establishment of local manufacturing outlets in Nigeria. Finding also showed that spirit of entrepreneurship should be inculcated in Nigerian citizens, right from secondary school level. It is recommended that policies that favour the establishment of local industries should always be enacted.

Keywords: *entrepreneurship; local manufacturers; product*

Cloud Simulators as Learning and Teaching Tools for Cloud Computing Courses

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This study investigates the use of cloud simulators as learning and teaching tools for cloud computing courses in universities. The findings show that cloud simulators offer only limited help as teaching and learning tools for cloud computing courses. Therefore, for the purpose of education, simulators do not meet the needs of students learning application development, which has to do with Platform as a Service (PaaS). Without PaaS models implemented in the simulators, students cannot run their own applications on the cloud simulator as they can easily do with some of the real cloud platforms that offer free services for limited period and/or with limited functionalities. With most simulators having only specialized application use cases, and without support for interoperability with other tools, they lack the flexibility required to enhance students' learning of the different aspects of cloud computing. Another factor that plays down the use of simulators as learning tools is the fact that they are not web-based, and some require specialized environment such as virtual machines. Most of them also lack support for GUI. These factors make run. On the positive side, using the real cloud platforms to practice with running applications do not give the students a feel of data center configuration as would one using CloudSim, for example, where data centers can be set up and configured in different regions and be experimented with as one would like. Another advantage of using simulators in learning cloud computing is the fact that it does not require internet access to run the software. It is, therefore, possible to utilize simulators to have a feel of the configurations of cloud computing infrastructures in places without Internet access.

Keywords: *CloudSim, cloud computing, cloud simulators, GreenCloud.*

Ethical Consideration in Marketing of Agricultural Produce Globally

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Ethical compliance is the consideration of the stockholders in terms of economic, social and ecological perspectives. The quest for global product acceptance calls for institutional frameworks guiding product development and marketing within the global economy. For products to meet global standard or acceptance, it should not concentrate in single problems or questions but to extend on safety and global environmental issues. The objectives of the study are to; examine whether price, quality, culture and safety has positive significant effects on marketing of “**Rice World**” of Abakaliki, Ebonyi State, Nigeria, globally. Hypotheses were postulated in line with the above objectives. Exporters of Rice World within Abakaliki municipality constituted the respondents. Survey design was applied resulting to the use of questionnaire. Responses of the respondents were presented in tables and analyzed. The study hypotheses were tested using Multiples Linear Regression. Findings revealed that certain ethical indexes namely price, quality, culture, and safety have positive significant effects on marketing of Agricultural produce (Rice World) globally. The researchers concluded that ethical consideration across global economy is key to globalization. We therefore, recommended that major ethical variables which include, economic, social and environmental factors should be adequately considered by the participants in global businesses.

Keywords: *Ethics, Agricultural Produce, Marketing Globalization*

Effect of YouTube Instructional Technology on Male and Female Secondary School Students' Achievement and Retention in Economics in Mushin Local Government Area

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The purpose of the study was to experimentally determine the effect of YouTube instructional Technology on male and female secondary school students' achievement and retention in economics – in Mushin Local Government Area, Lagos State. The study adopted quasi experimental research design. Two research questions and two hypotheses guided the study. The population of the study was 1,261 Senior Secondary (II) students offering Economics in Mushin Local Government Area, Lagos State (2016/2017 session). The sample size for the study was 60 Senior Secondary School (II) students which comprises of 35 male and 25 female students. The sampling technique adopted was purposive sampling techniques. The instrument for the study was a 50 items multi choice objective questions of Economics achievement test and retention test adopted from West Africa Examination Council (WAEC) past questions on concept of demand, concept of supply and utility theory. Using Kuder Richardson 20 (K–R 20) and test – retest, the reliability coefficient of 0.98 and 0.77 were obtained on the academic achievement test and the retention test instruments. Lesson plans for both the experimental and control group were developed by the researcher. Research questions were answered using mean and standard deviation while hypotheses were tested at 0.05 level of significance using Analysis of Covariance (ANCOVA). The study found out that YouTube instructional technology is effective for improving both male and female students' achievement and retention in Economics. In addition, this finding showed that performance is a function of instructional technology adopted in the classroom, not gender.

Keywords: *Economics, gender, retention, YouTube, Achievement and Technology*

Challenges of Marketing Made-in-Nigeria Products: Issues of Mis-Match in Global Market

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As different nations exist, so are the legal, economic, social, technical, and promotional differences across the nations. This constitutes obstacles in global transactions. This study examines the differences amongst nations of the world in relations to legal, social, technical, and promotional factors and challenges. The hypotheses guiding the study is to: establish whether each of the aforementioned factors has significant negative effects on marketing made in Nigeria products globally. The study was anchored on basic theory of a target audience which holds that for marketing campaign to be successful, the target audience must be identified and understood. Shoe makers and rice farmers and exporters from Abia and Ebonyi states respectively constituted the population of the study. The study adopted survey design. Questionnaires were administered to a sample of 400 respondents for the study. Questions posed to the respondents were whether; differences in legal, social, technical and promotional factors amongst nations posed significant negative effects on marketing made in Nigeria products globally. Data collected from the respondents were tabulated and analyzed using tables and simple percentage. Hypotheses for the study were tested. Findings revealed that legal, social technical and promotional factors have significant negative effects on marketing made in Nigerian products in global markets. The study concluded that the heterogeneous nature of legal, social, technical and promotional variables among nations' accounts for the inherent challenges in marketing globally, and calls for caution among. It therefore recommended that countries wishing to exploit global market opportunities should endeavour to align with the global standard.

Keywords: *Challenges, Marketing, local, Product, Global market*

Technological Induced Waste to Wealth: Effects on the Economy of Nigeria

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Application of technology greatly assists waste materials agencies to effectively carry out their duties. In Enugu State, the nonchalant attitude attached to waste disposal is now giving way to the modus operandi of Enugu State Waste Management Agency (ESWAMA). The main objective of this study is therefore to: establish whether the application of technology in waste materials' management affect significantly the economy of Enugu State. Three specific objectives and hypothetical statements guided the study. Purposive sampling method involving 358 respondents (households and retailers of waste materials) was applied. Survey research design was used in this study. Questionnaire constituted the research instrument for eliciting responses from the respondents. The data from the respondents were presented in tables and analysed using simple percentage formular. The hypothesis for the study were tested with the aid of simple linear regression. Findings revealed that proceeds from the waste/materials significantly enhance economic lots ($p=0.335<0.05$). Waste collection activities significantly creates job opportunities ($0.642<0.05$), and finally use of technology in waste materials management significantly enhance the economic and environmental sustainability of Enugu State, ($0.023M<0.05$). The researcher concluded that the financial benefits, job opportunities, economic and environmental sustainability can be greatly achieved through effective waste materials management.

Keywords: *Waste management, Sustainability, technology*

Evaluation of Efficiency Reducing Factors in Power Transformers Winding Insulation

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Present day power infrastructure is burdened by the utmost need to deliver high quality power at a reduced cost of maintenance and high efficiency. However, due to the complicated nature of power system variables, this may not always be achievable. High voltage fluctuations, intermittent supplies, lightning, and transformer switching transients proves to be a major hurdle to overcome by the power system operators. Since virtually all disciplines depend on electric power and transformers play a major role. Electric power system instability has been an aged-long problem in the power industries and to the end-users devastating economic bottle neck. A lot of work have been carried out addressing this issue at the distribution levels but not in the transmission grid especially with respect to power transformer which is the primary component in the electric power system after generation. Switching effects in large high voltage power transformers may lead to power system instability and degradation of vital electrical power protection and control equipment which will in turn affect the quality of power generated by the power systems network (Efficiency). Currently, researches are being carried to improve the reliability of existing power system infrastructure by minimizing some of these effects. This paper investigates the pertinent issues on the switching effects on power transformers due to inrush currents and reviews the state of art approaches towards its mitigation leading to power and energy improvement for coordinated multi- discipline. The work has been able to establish process for isolation, diversion and inhibition of primary winding currents as well as eliminating the magnetizing residue flux using an all-inclusive and intelligent technique that is well affordable.

Keywords: *Power Quality, Power Transformer, Intelligent Switching, Inrush Current, Switching Effects & Mitigation*

Automation of Procedures for Experiment on Hybrid Crop Drying

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Effective crop drying is a critical element in the drive for food security. Researchers from across the globe have sought to study various factors that lead to effective drying of agricultural products. They have also sought to optimize the time and energy spent on the drying of such products. In this enterprise, manual measurement and logging of parameters like temperature, weight and wind speed have often presented some challenges. In this work, an effort was made to develop a general procedure for an automated measurement and logging of parameters like temperature, wind speed, relative humidity, weight, insolation and energy. A procedure was also developed for effective temperature control in a hybrid solar dryer. The system which was developed around Arduino microcontroller was demonstrated to seamlessly log and control drying regimes for tomato, pepper and Pudica moringa (leaves).

Keywords: *Hybrid, drying, automation, crops*

Simulation of Large-Scale Network Application Using CloudAnalyst

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In cloud computing, cloud simulators are employed to characterize and study the different aspects of the cloudcomputing environment without setting up the actual cloud infrastructure. This is necessary for experimental purposes and research. There are many kinds of cloud simulators, but there is insufficient literature to guide research scholars on how to use these simulators and how to assess them in terms of their suitability for various tasks. In this paper, a cloud simulator, the CloudAnalyst, is used to simulate a large-scale network application to demonstrate its use and to serve as a guide to future users of this cloud simulator.

Keywords: *CloudAnalyst, Cloud computing, Cloud simulators, Performance Evaluation, Simulation tools*

Religiosity and Industrialization in Nigeria: A Survey Data Evidence based Analysis

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Drive for industrialization has remained the goal of most governments of the world. It has been argued at the micro level that the religiosity level of Nigerians affects their perception, acceptance, and adopting of modern technologies. Also, it has equally been argued that the religiosity level has affected the drive for value creation and productivity in the country. This means that the level of productivity in the country is influenced by the level of religiosity in the country. The impact of this has remained overwhelming and is evident with the conversion of many previously used premises for production to religious houses. This means that the number of industries in the country is going down while the number of religious houses is increasing. Using primary data of 250 randomly selected Nigerians in the South East, the study intends to focus at the micro level by examining the extent religiosity has affected the drive for industrialization in Nigeria. It is expected that the result from this study will provide the base for recommendations that will not just solve the micro effects but also the macro effect and put Nigeria on the right path of industrialization.

Keywords: *Industrialization, Religiosity, Industry, Modern Technology Adoption, Productivity*

Nigeria's Technological Backwardness and Social Media Advertising: Experience of Selected Banks in Nigeria

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Growth driven by technological advancement is generally accepted as key to the industrialization of any nation. This has made many advanced countries to invest hugely on technology to improve their current state. In Nigeria, the nation has battled with technological backwardness which has affected productivity in all sectors. The impact of technological adoption and advancement has made many firms especially banks to adopt it. One of the ways in which banks use technology is in their Social Media Advertising. Through the use of social media advertising, banks have been able to showcase their services to their target markets. It is yet debatable how the social media advertising functions and how it influences consumer choices. This study examines these using a survey of 380 randomly selected undergraduates in Enugu state, Nigeria. The result of the study will expose how the social media works in advertising of goods and services. The result will equally showcase the types of adverts and social media platforms that influence people's choices. The recommendations of the study will guide banks in the best method to adopt in advertising their services using the social media.

Keywords: *Technological backwardness, social media advertising, growth, banks, Nigeria*

Design of a Low-Cost Printed Circuit Board Development System

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Mass production of electronic appliances by electronic engineers in underdeveloped and developing countries has been challenged by the high cost of sophisticated printed circuit board (PCB) production machines. Based on this technological challenge, the design of a low-cost PCB production system is proposed in this work to enable the reproduction of the circuit board of an electronic circuit design. The system prints the layout of the conducting parts of the circuit on a conducting side of a metallic copper board through a rectangular mesh that has the electronic circuit layout inscribed on it. The paint used for the printing is a Polyvinyl Chloride (PVC) type that has a plastic component which cannot be attacked by etching solvents such as iron (Ferric Chloride), cupric chloride (Cupric Chloride), etc. The transfer of the PVC paint unto the copper board through the circuit layout mesh is done by the proposed automated system which has a slide mechanism that squeezes the PVC paint through the tiny holes of the mesh. In this paper, the block diagram of the system was designed, the operation flowchart of the proposed PCB production system was developed, the algorithm for the system controller was written using C⁺⁺ programming language, and the electronic control of the system was designed to implement the operational sequence described in the flowchart. The mechanical structure of the system was designed and simulated using Solidworks software to observe the movement of the various parts of the system before the prototype of the system was implemented.

Keywords: *Printed Circuit |Board, Low cost, Mass production*

Religion and Industrialization

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History has placed religion as one of the major forces that controls the activities of man. Faith expressions have always been the watchdog in face of any moral controversy over industrial revolutions. The manifesto of changes materialized within the lives and work of individuals in many years of global innovations have ensured that the economic benefits of inventions of man are discharged for the benefit of man and not for his destruction. Before large factories began to replace the cottage industry and power-driven machinery was introduced, European religions served as the hub for the acquisition of great knowledge that birthed technological inventions. Before industrialization, manufacturing was done by hand or simple machines where people would work at home. "Domestic industry and rural handicrafts were interpreted as a transitional stage between handicraft and the factory and as household manufacture destined for trade, and consequently as an intermediate step between the factory proper as a handicraft; in these processes, religions gave the push through her stance on hard work. Religion ensures for example that many new machines powered and invented does not replace the human faculty. The focus of this work is thus set to place the position of religion in industrialization. A descriptive phenomenological research method was adopted. Questionnaires were distributed and gathered information analyzed. Results show that Religion has the moral role of checkmating the activities of human.

Keywords: *Religion, Industrialization*

Gully Erosion Control in Nigeria: World Bank/NEWMAP Perspective on Hydrological Data Analysis

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This work describes the use of World Bank / Nigeria Erosion and Watershed Management Project (NEWMAP) approach to review Ogane-Aji – Dekina gully erosion site. Forty-eight (48) years daily rainfall data from 1971 to 2018 were obtained from thirty-four (34) gauge stations in Nigeria. Maximum monthly rainfall (MMR) and the maximum annually rainfall (MAR) were deduced. The 24 hrs rainfall intensities extreme value (EV) distribution of the 2-Year, 5-Year, 10-Year, 25-Year, 50-Year and 100-Year return periods of all the 48 years flood events in the 34 stations in Nigeria were extracted into the hydrology software, ArcGIS 10.6.1 software. Local x, y, and z coordinate in decimal degrees of the World Geodetic System 1984 (WGS 84) for the most devastated location at the project site was also added in the software. This automatically generated the gully erosion site adjusted intensities for the respective return periods by the software using its inverse distance weighting interpolation tool-box. These values were inputted into the developed NEWMAP empirical template that allows 20% increase in rainfall and account for the extreme climatic variability in the future, to plot the intensity – duration – frequency IDF curve for the project site. Global Mapper 20.0 GIS software was then used to delineate the watershed into sub-catchments. The Coefficient of runoff, c for the sub-catchments was obtained based on the land-use/vegetation-cover of the watershed. Data acquired from Geodetic survey and orthophoto were used to establish the time of concentration of the sub-catchments according to Kerby-Kirpich models; leading to the respective discharges generation within the delineated watershed using the rational formula. Manning's formula was used to size the erosion/works in the various sub-catchments at the project site.

Keywords: *Gauge stations, Arc GIS software, Return Period, IDF curve, Global Mapper, Design discharge*

Challenges of Renewable Energy for Small Scale Businesses and Industrial Sustenance in South East, Nigeria

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This study is a survey. The population interviewed was two hundred and fifty (250) drawn from among the small scale proprietors in soap making, weaving, bakery, barbing saloon, wielding auto-electrician and vehicle panel beaters. The study was set to identify the challenges, usefulness, and the utilization of the renewable energy products by these small scale business and industrialist. The driving questions were: (1) How long are you in this business? (2) Are you aware of renewable energy products? (3) What type of renewable product do you know? (4) Do you use any of them to power or promote your machines/business? (5) If number two (2) above is yes, how often do you use it? (6) If 'No' to number two, why and what the challenges? (7) What do you recommend as the best solution for using renewable energy products in Nigeria? The results of the study include: Acquiring a renewable energy product is expensive; Most of the elements die frequently; Maintenance cost is high; we will not meet up with the cost, and it is meant for rich people, fraud and poor policy implementation.

Keywords: *Renewable, Energy, Small Scale Businesses, challenges and Sustenance*

Development of an Acoustic Sensor System for Measuring Suspended Sediment Concentration

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Useful measurements of Suspended sediment concentration (SSC) are often problematic when employing the usual methods of determination from collected water samples or optical sensors, because analysis of water samples tends to underestimate suspended sediments, and optical sensors often become useless from biological fouling in highly productive regions. Nowadays, acoustic sensors are routinely deployed to quantitatively estimate SSC from acoustic backscatter intensity. The measurement of SSC has always been a difficult task in that no single device or technique seems adequate for all requirements. Sediment affected water resources require frequent and accurate suspended sediment concentration (SSC) data for proper design, operation and management. The traditional method of collecting water samples is inadequate to provide such large amount of SSC data. In this view, the need to develop an acoustic sediment meter-based on high frequency of 210 kHz acoustic backscatter becomes imperative. The developed acoustic sediment meter was calibrated using a standard digital meter to measure the concentration of suspended sediment in mg/litre which would be displayed on LCD. The specified sensitivity of the developed meter is 10 mV is to 1 mg/l at the error of ± 0.04 with R^2 of 0.9917. Therefore, the meter is capable of reading up to 1023 mg/litre at error of ± 0.3 . It is recommended that the developed meter which is based on single-frequency acoustic system be upgraded to multi-frequency acoustic system. Multi-frequency acoustic instruments can provide both information on particle size distribution (PSD) as well as SSC. More so, it is a good practice to use more than one sediment monitoring technique in order to obtain independent SSC results.

Keywords: *Suspended sediment concentration, Single-frequency, Acoustic sensor, Calibration, Validation*

Designing for Environment, Manufacturing for Recycling: Ethical Analysis

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Life cycle analysis of various products has raised concerns on the environmental impact of products end of life (EOL). With increasing human population, annual waste generation statistics is also growing and is estimated to reach 2.2 billion tonnes per year by 2025. As circular economy in the utilization of resources gathers more support, need for recycling becomes more imperative. Product design has been seen to influence the ease of recycling hence the growing call for product stewardship which incorporates designing while looking at EOL environmental impact and fabricating with simplicity in recycling as a major consideration. Government policies and consumer preferences fueled by climate change education have driven some manufacturers to start looking at this. Compliance and the effect of on recycling cost and rate needs to be reviewed as products can be designed to be easily recycled but prevalent factors may hinder the achievement of intended result. The interplay between government, manufacturers, and consumers in achieving a resource efficient society using Nigeria as a case study will be analyzed. This paper aims at providing ethical reasons for embracing environmental consideration in design and manufacturing stage of products by local manufacturers in developing countries. Inference will be drawn from other developed countries that have strong policies on recycling and product design.

Keywords: *Design, Environment, Waste management, Recycling, Extended producer responsibility, Circular economy*

Renewable Energy Market in Nigeria: A Case Study of Local Paraphernalia

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The reliance of economic growth and technology advancement on energy is perspicuous. As such the ability of a nation to meet its energy demand is often considered as a measure of development. Compared to countries like Germany, Japan and Australia, Nigeria is still far behind in achieving its energy demand. Much reliance on fossil fuel, albeit, endowed with the natural potentials to generate energy from renewable sources have seen to the desolation in the renewable energy sector. Installation cost have always been viewed as a primary constraint. However, technological advancement backed by government policy like solar rebate practiced in Australia proved otherwise. This paper aims at reviewing the influence of local instrumentation on the development of the Nigerian renewable energy market. Existing infrastructure, government policy framework and level of implementation, technical knowledge and public sensitivity on use renewable energy will be analyzed and compared with other developed countries. Possible solutions and recommendations on how to improve the energy generation capacity of Nigeria will be pointed out. This will serve as a guide for policy makers in the energy sector.

Keywords: *Renewable Energy, Local instrumentation, Energy market, Policy framework, Solar PV system, Power generation*

Emerging Trends in Theatre Design and Technology: The Nigerian Experience

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Theatre design is an effort to create a suitable environment for dramatic performances. One of the problems of theatre design over the years has been to seek alternative means to battle challenges that impede theatre design from adequately assisting and aiding dramatic messages or intended meanings for the theatre audience. The theatre design of the 21st century thrives on technological innovations, and in recent time, transcends the creation of stage scenery, exhibition sets, television and film locations, and such environments that require the aesthetic and artistic input of a theatre designer. The emergent designer on the other hand combines the skills of a painter, lighting designer, interior decorator, furniture maker and so on. The main objective of the study is to discourage stereotypes in theatre design & technology thereby encouraging the innovations and developments the 21st century has brought with it which has prompted a shift in our perception and the multifaceted approach to art and communication. This paper will, in the process of discourse, establish why technologically-advanced theatre design is important in modern day theatrical productions, and also, why the art of stagecraft is based on discovery of new and innovative ways to make the dramatic environment useful and contributing to the performance. The study will adopt Theodor Adorno's Aesthetic Theory as the principle framework for the study.

Keywords: *Theatre, Design, Technology, Environment, Nigeria*

Drying Characteristics of Boiled Cassava Slices (*Abacha*) Using Oven and Solar Dryers

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Drying is an important unit operation in post-harvest processing of agricultural products. This is because it reduces the moisture content of the material thereby reducing the microbial activities and increasing the shelf life of the products. Traditionally, this is being done by open-air sun-drying and this has been a challenge because the products are being exposed to contaminants and pests. This has given rise to the need to study the drying characteristics of boiled cassava slices commonly known as *abacha* in south eastern Nigeria. *Abacha* slices were obtained locally from the market and dried in the oven at three different temperatures (50°C, 60°C, and 70°C) and also dried passively and actively using a solar dryer. It was also sun dried as a control experiment. The weights of the samples were recorded every 30 minutes until no more weight loss was observed. The drying time was seen to reduce as the temperature increased in the oven drying. The active drying was seen to be faster than that of the passive drying and the open air drying. The drying rate of the boiled cassava slices at the oven temperature of 50°C, 60°C, and 70°C was 0.272, 0.295, and 0.506 kg water/kg dry matter/hr respectively while that of active, passive and open air drying was 0.273, 0.209, and 0.265 kg water/kg dry matter/hr. The average drying rate was greatest at the beginning of the drying process when the moisture content was highest for all the drying conditions possibly due to evaporation and moisture from the *abacha* surface which later declined with decreasing moisture content. This study will enable engineers design suitable dryers for *abacha*.

Keywords: *Abacha, drying, solar*

The Non-Linearity of Type K Thermocouple Using Mikro-C

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This paper discusses the nonlinearity input and output characteristics of the Type K thermocouple, how to minimize these errors in measurement, and the significance of temperature control in several industrial processes. Although thermocouple is by far the most widely used temperature sensor for industrial instrumentation and its favorable characteristics are not limited to: good inherent accuracy, suitability over a broad temperature range, relatively fast thermal response, and great versatility of application. It is important to minimize to a great extent, the errors encountered during the use of Type K in measurement. Mikro-C language was used to conduct corrections on its nonlinearity. The Mikro-C program was embedded in PIC16F877 Microcontroller.

Keywords: *Non-linearity, Type K, Mikro-C, PIC16F877*

Modelling of Some Geotechnical Properties of Lateritic Soil Stabilized with Cement and Microsilica for Use as Pavement Material

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An experimental program was conducted to explore the impact of microsilica and cement stabilizers on the geotechnical characteristics of lateritic soil. Portland limestone cement was added in varying proportions of 2%, 4%, 6%, 8%, and 10% by weight of dry soil and combined with microsilica, which was added in proportions of 0%, 2%, 4%, 6%, and 8% by weight of dry soil. Compaction tests, CBR tests, and UCS tests were carried out on various samples with different combinations of the stabilizers. Experimental results show that the addition of cement led to a slight decrease in OMC and an increase in maximum dry density for all percentages of cement added to the soil. The addition of microsilica resulted in further increase in OMC and a slight decrease in MDD of the soil-cement mix. The peak value of maximum dry density for the modified lateritic soil was obtained at 8% cement and 2% microsilica content, which gave 2.10g/cm^3 and OMC of 15.49%. CBR (soaked and unsoaked) values for all percentages of the soil-cement mix increased when microsilica was added up to 4%, and then decreased between 4% and 6%. The maximum CBR values for both soaked and unsoaked were obtained at 8% cement and 4% microsilica content which gave 88% and 52% respectively. Unconfined compressive strength (UCS) test carried out on a few samples with relatively higher CBR values, shows that there was an increase in UCS with cement and microsilica content in addition to curing period.

Keywords: *lateritic soil, Compaction tests, microsilica*

Financing the Packaging and Contents Re-engineering of Locally Produced Rice for Global Markets: Determinants and Challenges

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To successfully help the locally produced agricultural goods for export, appropriate financing of the contents and packaging of local products are required to enhance active participation of farmers in the global market. This makes research in financing the contents and packaging of locally produced agricultural produce—rice especially—for global market, a veritable pathway to economic transformation. Nigeria is the continent's leading consumer of rice, one of the largest producers of rice in Africa, and simultaneously, one of the largest rice importers in the world with lowest export of rice. Though government's interest in rice production has spurred increase in rice produce, much of these produce is wasted due to poor preservatives and contents re-engineering through technologies. Recently, Nigerian rice producers are facing the pressure of competing against import to meet the challenging tastes and preferences of the global consumers. This competition can only be effective if there is adequate financing for the content quality and packaging of rice that are locally produced. This paper therefore investigated the determinants of financing packaging and content re-engineering of locally produced rice for global market. The study was able to identify that non-price factors are major determinants of financing these commodities for export. In addition, the study also identified relatively high standards of export market hurdle and high cost of technologies requirement as major problem facing the farmers.

Keywords: *Printed Circuit Board, Low cost, Mass production*

Advancement and Cost Reduction of Inverter Technology and Solar Electricity for Commercial Use in Nsukka, Enugu State, Nigeria

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Inadequate electricity supply has been a very serious problem facing both industries and private areas in Nsukka. Development is being hindered. Energy supply has to be constant, affordable, and enough to carry all or most of the machine or equipment needed for it. In all these, we need alternative electric power supply, which we can run at almost zero cost. Photovoltaic cell (solar panel) and inverter should have been the most suitable alternative electricity power supply if not for the cost of installation. An inverter is a device that converts a direct current to an alternating current to produce Electricity. This paper centers on how to reduce cost of installation of photovoltaic cell and inverter in Nsukka. Installation of solar panel and inverter is very expensive as a result of various factors such as poor load management, purchase of inferior photovoltaic cells and battery, lack of trained personnel for the installation and types of inverters and batteries. In as much as people of Nsukka are not guided on load management, they use high energy consuming properties in their houses instead of energy saving household equipment. To install photovoltaic cell and inverter that will meet up with this high energy demands makes it costly. Our paper discovers most things that make installation of photovoltaic cell and inverters costly in Nsukka and therefore showcases all that need to be done to reduce the cost of the installation.

Keywords: *Printed Circuit |Board, Low cost, Mass production*

Design and Implementation of a Mini Radio Transmitter on a Locally Made PCB

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This project aims at designing and constructing a low cost and low power FM transmitter with simple locally sourced components to cover a range of five hundred metres (500m) with an embedded 3 channel audio console which accepts audio input signals for transmission to any receiver tuned to the transmitter within the 500m range. This project was divided into three parts namely: transmitter, audio console, and the power supply unit for ease of design and implementation. The design phases of the project include: bread board phase, Vero board phase, and lastly, the PCB phase. In testing the project, an audio signal is generated using an MP3 player. This audio signal from MP3 player is sent to the transmitter through one of the inputs of the audio console. After transmission, the signal is picked up using a radio set.

Keywords: *Printed Circuit Board, Low cost, FM transmitter*

Traditional Cloth Weaving in Nigeria and the Challenges of the Global Market

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Traditional cloth weaving is practiced in many parts of Nigeria by different tribes and groups as a cottage industry. Probably, it is expected that due to the long age of the practice, the industry ought to be sufficiently advanced and able to produce products that meet elementary global standards that are able to compete favorably with comparable products in the global market. However, it seems this is far from the reality. The purpose of this study is to bring to light the factors that could reposition Nigerian traditional cloth weaving in the global market as regards production techniques, standard, acceptability, and usage. To this end, qualitative research technique was adopted for this study. Observation and unstructured interviews were used for collecting data in selected cloth weaving centers across Nigeria. Primary and secondary data was collected and analyzed using technical, historical, and stylistic approaches. The study found that there is lack of innovation and professional efficiency in the cloth weaving practice among the weaving cultures and groups in Nigeria. Consequently, the cloth weaving production practices and systems are very stressful, boring, time and energy sapping. Therefore, there is need to introduce certain innovations in the production aspects of the practice. This will ease the production system, encourage participation in the practice, and widen the scope in the usage of the end product.

Keywords: *Traditional cloth weaving, Global standard, Innovation, Professional efficiency*

Design of an Electronic Thermometer for Simultaneous Temperature and Time Measurement

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The conventional mercury-in-glass thermometer exhibits many deficiencies. These deficiencies include fragility, susceptibility to measurement errors and exposure to hazardous material content. The presented design for the electronic thermometer is smart, cost-effective, user friendly and has better functions (e.g. time, date as well temperature reading). The thermometer was simulated in Proteus lite and programmed using Mikro C pro. The PIC16f877A microcontroller was interfaced with DS1307 real time clock chip to keep the time and date. The thermometer can be used for applications that require a simultaneous temperature and time measurement. In addition, the reprogrammable microcontroller presented in the design makes the thermometer adaptive to most temperature measurement cases.

Keywords: *Microcontroller, Temperature, Thermometer, Programming*

Design of an Automated Garage Door

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The focus of this paper is to design an automated garage door and to demonstrate how this contraption works. A stepper motor is attached to the mechanical system. The system is automated by the use of ESP32 microcontroller containing a Wi-Fi module. It also serves as the interface between the software and the hardware parts of the system. The software part of the system is embedded within the ESP32 microcontroller and is accessed with a smartphone. The smartphone screen serves as the Graphical User Interface (GUI) between the Arduino codes and the hardware. Commands are sent through the smartphone whose hotspot system is connected to the ESP32's Wi-Fi; the ESP32 then controls the switches through a series of relays and the door opens or closes at the user's convenience. The design is tested and demonstrated with a prototype of a garage door built from easily obtained materials: plywood and plastic. A rack and pinion arrangement was used in the design. On testing the Wi-Fi range, about 600m was obtained for outdoor testing without barriers while 45m was obtained for indoor testing in the presence of barriers.

Keywords: *ESP32 microcontroller, Wi-Fi module, Graphical User Interface (GUI)*

Generic Commuter Bus Stop Proximity Alert System for the Nigerian Nation

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A commuter bus service is a fixed-route bus characterized by service predominantly in one direction with limited stops and routes of extended length usually between the central business district and outlying suburbs. This system has been following technological trend and becoming better in developed countries, but the case is truly different in developing countries like Nigeria where people can easily miss their bus-stop location due to language barrier, physical challenge and lack of proper sign posts, high illiteracy level, and other travelling factors. In this work, Bus Stop Proximity Alert System is developed to address these challenges through the use of GPS module to track bus location, compute the distance between the bus and the nearest bus stop based on the haversine formula, and alert the commuters about next bus stop via English language and WAZOBIA languages (Yoruba, Hausa, and Igbo). This system displays the next bus-stop on a screen placed inside the bus and would serve as a form of entertainment and an advertisement system when there is no impending bus-stop. The system provides reduction in drivers' work intensity while enhancing the experience of commuters and generating income for bus operators through audio system advertisement.

Keywords: *Commuter bus, Alert System, GPS, WAZOBIA language*

5G Technology Adoption in Nigeria: Challenges and Prospects

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5G technology stands for fifth-generation cellular wireless technology. Looking at the development in the information and communication technology industry in Nigeria, it is obvious that the space of change in operations and advancement in technology presents fresh challenges on a daily basis to players in the industry. One of the major predictable challenges is the deployment and coverage of the 5G service in rural communities. This study looks at the 5G technology adoption in Nigeria with focus on the challenges and prospects. The study is literature based and as such, it examines the extent of literature on the subject matter. Quite a number of information and communication technology firms are investing billions of dollars and/or naira to develop and prepare for the commencement of 5G technology standard which is earmarked for 2020. But this is an upgrade that will require a big infrastructure deployment plus new technological gadgets and new applications installed inside our phones, so it's expected to commence few more days before 5G becomes widely available to consumers. The fifth generation of mobile wireless communications promises to lower latency, offer greater stability, the ability to connect many more devices at once, improve speed, and move more data. Download speeds of 5G is expected to reach 500 to 1500 Mbps – pretty thanks to faster speeds. The 5G technology could help businesses and public services to increase efficiency, production, and save time; innovative breakthroughs as well as reduce costs.

Keywords: *5G Technology, Adoption, Deployment Challenges and Prospect*

Optimal Fuzzy PID Controller Design for Stability of Flexray Bus in NCS

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The FlexRay communication network was developed to meet the requirement of determinism and fault tolerant communication systems. However, the control stability and performance of the FlexRay bus is reduced when transmission of data is at a high speed. This paper evaluates the use of an optimal Fuzzy PID design for performance enhancement in FlexRay bus by compensating for the delay at the controller

Keywords: *Networked Control System, FlexRay, Fuzzy, PID*

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Design, Construction, and Testing of Multipoint Humidity, Temperature Datalogger

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A low cost multipoint temperature, humidity datalogger was built. It was designed using LM 35 for temperature sensor and DHT 11 Capacitive Humidity Sensor (CHS) and a thermistor. This CHS measures humidity in the air. Thus, the changes in the dielectric constant of a CHS are nearly directly proportional to the relative humidity of the surrounding environment. Arduino Mega was the data processing element. The response time of both sensors were one minute interval. The trend of the temperature and the humidity flow pattern showed that they approached standard showing that the system actually senses changes in the surroundings effectively. The accuracy of these sensors were ± 0.5 .

Keywords: *multipoint, temperature, humidity, datalogger, adiuno mega, sensor*

Factors Affecting Rooftop PV Module Systems

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The world energy crisis and campaign for adoption of renewable energy (RE) as a curb to global climate change that is instigated by the use of traditional energy sources (fossil fuels) has ushered Photovoltaic energy as the major frontier of cheap, environmental friendly, and readily available renewable energy. As residential solar PV installation gains more attention especially rooftop PV system, there is need to comprehend the factors that limit its performance and reliability over time. This work discussed environmental and other derating factors that pose challenge to rooftop PV systems and proffer possible solutions to them.

Keywords: *PV Modules, Soiling, Derating factors, Temperature, Shadow*

Maximum Power Point Tracking of Photovoltaic Cells Based on Improved Optimized Adaptive Differential Conductance Technique

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Maximum power point (MPP) tracking technique based on improved optimized adaptive differential conductance technique was developed in this paper. The performance of the algorithm developed in this paper was evaluated at solar irradiance of 1500, 1000, and 600 W/m² and at temperature of 298, 348, and 398 K. From the simulation results, it was observed that the impedance of the solar photovoltaic(PV) module decreases as the irradiance increases while the impedance of the load is not affected by the irradiance. This technique was validated with optimized adaptive differential conductance. From the validation result, the resultant conductance of the Improved Optimized Adaptive Differential Conductance (IOADC) technique and Optimized Adaptive Differential Conductance (OADC) technique at MPP were 0.0106 mho and 0.0030 mho respectively. The IOADC is 0.0106 higher than resultant conductance at ideal condition while OADC has the resultant conductance of 0.0030 mho higher than the resultant conductance at ideal condition. The subsequent values of IOADC are closer to MPP than the OADC and that leads to higher power conversion efficiency than the OADC. From the analysis, the technique has a relative improvement of 5.8162% compared to the Optimized Adaptive Differential conductance technique. The simulation was done using Matrix Laboratory (MATLAB).

Keywords: *MPPT; Differential Conductance ; power conversion efficiency*

The Effect of Temperature on Corrosion Inhibition of a Blend of African Star Apple Seed Extract on Mild Steel Immersed in HCl Solution

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This research focused on the effect of temperature on the corrosion inhibition capabilities of African Star Apple (*Chrysophyllum albidum*) seed extract on mild steel immersed in 0.1 M and 1.0 M hydrochloric acid. The corrosion rates of the metal substrates were studied using weight loss and electrochemical methods at 30°C, 50°C, and 70°C with and without inhibitor at 180 mins. The chosen extract showed excellent inhibition efficiency from the weight loss and the electrochemical results. It was discovered that the corrosion inhibition efficiencies of the extract were dependent on the concentration of the inhibitor and temperature of the prevailing service condition. Generally, the corrosion rate and current density of the mild steel substrates decreased with increase in inhibitor concentration at 30°C, 50°C, and 70°C. The results obtained at 50°C revealed that the mild steel resulted in minimum corrosion rate value of 0.0038 mg/mm²/yr with inhibitor efficiency of 95.00% for 0.1 M HCl at 50°C and 0.0038 mg/mm²/yr with inhibitor efficiency of 93.75% for 1.0 M HCl at 50°C. The electrochemical result depicted increase in corrosion potential from -3.4 V to -3.01 V upon increase in inhibitor concentration at 70°C. Therefore, the use of African Star Apple seed extract reduced the corrosion rate of mild steel in hydrochloric acid at temperatures above ambient value.

Keywords: *Mild steel, Corrosion rate, African Star Apple seed, Temperature, green inhibitor*

Be-ing in the Era of Fourth Industrial Revolution (4IR): A Review of Essentialism

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We argue in this paper that the framework for the philosophical idea of essentialism of beings has never been more weakened than in the era of the fourth industrial revolution. We adopted Klaus Schwab's idea of 4IR as an unfolding era in which all possible worlds (biological, physical, and digital) are being fused. We show in this paper that the transformative consequences of this fusion which has resulted, among other things, in the modification of several aspects of reality previously considered as unalterable, also warrants that we take a revised look at the idea that each component of reality is essentially one thing alone. We question the idea of a pre-existence essence, or a nature that precludes possibilities of hybrid and warrants that the intelligence of a machine be qualified as 'artificial'.

Keywords: *Essentialism, Fourth Industrial Revolution, Artificial Intelligence*

Disinformation in a Post-Truth Age

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We aim in this paper to highlight the philosophical relevance of skepticism in the 21st Century. We consider the 21st Century as one that is defined, among other things, by a massively eased process of sharing information across locations, in real-time, and by mere clicking of a button. We also consider on the one hand that 'Knowledge is Power', and on the other hand that the spread of false information (misinformation) has resulted in various forms of cyber-attacks, interferences in national elections and affairs, and cyber-bullying. Whereas these impacts have led to an idea of a 'post-truth' age, we argue that rather than looking at our age as a post-truth one, it will be more useful to accept that claims of epistemological certainty have failed and therefore explore the utility of skepticism as a mental disposition and knowledge practice. We also show how skepticism can help forestall future possible destructive impacts of wide spread misinformation around the world.

Keywords: *Skepticism, Misinformation, Post-truth*

A Comparative Analysis of Optimized PID Controller Tuning Using conventional and Soft Computing Techniques

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PID controllers have been used for industrial processes for long owing to its simple structure, strong robustness, and easy realization.

This paper presents a review of the Soft computing methods as well as the conventional techniques used for PID controller tuning.

The work analysed how these various tuning methods affect the rise time, peak overshoot, settling time, and overall Stability of the system.

A comparison between some of the techniques was done and it was observed that the soft computing methods optimize the performance of the PID controller more than the conventional techniques. This work therefore provides a comprehensive reference source for works in PID controllers and its tuning in general.

Keywords: *PID Controllers, Tuning, Convention Techniques, soft computing Techniques*

Finite Element Analysis of Thin Rectangular Plates under Patched Load

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This project work developed a computer application for the finite element analysis (FEA) of thin rectangular plates under patched loads which can be used in the analysis of different types of conditions of plate-holding such as fixed support, free support, and simply supported conditions, and can also provide the user with desired mesh size. This work explicitly explains the procedure in the formulation of finite element properties and its computerization. It is also intended to be a form of tutorial guide to readers who have little or no knowledge in the finite element method. In this research work, the finite element analysis of a thin rectangular plate under patched load with dimensions 4m by 4m was carried out using the software in VISUAL C-SHARP developed by the author. Results obtained were compared with values from a general finite element program, LISA, and was found to show a high degree of accuracy between 97.5-99.9%. Finally, recommendations are made on the selection of finite element meshes for future analysis based on findings.

Distribution Transformer Parameters Monitoring System Using Internet of Things

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Online system monitoring has been the trending technology which gives technical users the privilege to access system from remote locations and proffer quick solution in case of emergency. Quick response to faults, overloading, theft, and load forecasting have been the major challenges facing distribution transformers, thus there is need to develop a system to monitor the distribution transformer's parameters such as voltage, current, oil temperature, and location from a remote location. This system is developed by sensing the transformer's voltage, current, and oil temperature with voltage sensor, current sensor, and PT100 temperature sensor respectively. We are using sensors to monitor the transformer's health so that it will be protected and service to the users will be quick. The output of the sensors are fed to ATMEGA328 microcontroller and processed; the microcontroller computes the connected load power from the sensed voltage and current. Also, the GPS coordinate of the transformer was retrieved from the GPS module. The retrieved data was processed which was further logged and displayed on the thing speak online platform through ESP-01 Wi-Fi module which makes the system state and data accessible from any part of the world. The sensors were simulated, their model equations were formulated, and their graphs were also plotted which describe the dynamics of the sensors. The developed system was tested and implemented which makes the distribution transformer parameters accessible from any part of the world.

Keywords: *Wi-fi Module, Microcontroller, Distribution transformers, Voltage, Current, Oil temperature, Sensors, Thingspeak, GPS module*

**Science, Technology, and Innovation (STI) Policy and the Technological Development of Nigeria:
Prospects and Challenges**

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Across the globe, the link between science and technology in bringing about innovation and indeed development, cannot be over emphasized. In pursuance of science and technology for innovation and development, different countries therefore formulate policies geared towards domesticating and harnessing the benefits of science and technology. In Nigeria, we are yet to see meaningful innovations and development anchored on science, technology. Despite the huge investment in the area of science and technology in Nigeria, we have not felt appreciable impact of such investment. Against this backdrop therefore, this paper examined science, technology, and innovation (STI) policy and the technological development of Nigeria: prospects and challenges. In other to address the above subject matter, this paper raised three research questions: What are the objectives of STI policy towards technological development of Nigeria? What are the challenges militating against STI policy towards technological development of Nigeria? How can STI policy be enhanced towards technological development of Nigeria? The paper relied on qualitative sources of data. Data presentation and analysis were done hypothesis by hypothesis. The paper found that the foundation of science, technology, and innovation policy in Nigeria was faulty in the sense that it aimed at complying with international system while the country remained a dependent economy. The paper recommended increased linkages between applied and academic research in the productive sector and increased national effort for scientific and technological development of Nigeria.

Keywords: *Science, Technology, Innovation, Development, Policy*

Design and Development of Self Service Delivery System For kerosene Retailers .

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Small scale marketers of kerosene especially in rural areas are likely to have problems paying pump attendants on account of the low profit per month. On the other hand, buyers of the product may have emergencies requiring the need to purchase such products at times when offices and markets have closed. In view of the above, a self service delivery system for kerosene outlets would be of economic and social benefit to both sellers and buyers. This work, reports the design and development of self service delivery system for kerosene retailers. Essential subsystems are as follows: the subsystem that controls the quantity of kerosene to be dispensed. This was implemented using a flow meter, keypad and solenoid valve. The security subsystem was implemented using One Time Password(OTP) method. The manager issues OTP subject to reception of credit alert. To prevent issuing OTP that cannot be delivered, the subsystem includes a feedback system that monitors the available supply. This was implemented using ultrasonic sensors. Using a similar technology, illegal supply is detected and alarm is triggered.

Keywords: *Kerosene, Self service, development.*