ICAST 2025

KUMASI TECHNICAL UNIVERSITY (KsTU)

8TH International Conference for Applied Science and Technology (ICAST)

2025

Book of Abstracts

Theme:

Promoting Research, Innovation and Industrial Partnerships for Sustainable Development.

Date

16th – 17 July, 2025

Venue

Sunset Hotel, Danyame, Kumasi, Ghana

Program Outline

Day #1

Time	Activity
0700 am	Registration of Participants Finance Directorate, KsTU
8.45 am	Opening Prayer University Chaplain, KsTU
8.50 am	Introduction of Chairperson and special guests Registrar, KsTU
8.55 am	Chairperson's opening and welcome address Vice-Chancellor, KsTU
9:00 am	Conference Overview LOC Chair, KsTU
9.05 am	Speech Prof. Ellis Owusu-Dabo, KNUST
9.30 am	Speech Prof. Imhotep Paul Alagidede, University of Wits, South Africa
10.00 am	Speech Mr. Zakaria Sulemana, Director-General, CTVET
10.20 am	Keynote Address by The Special Guest of Honour Hon. Haruna Iddrisu, Minister for Education
10.45 am	Chairperson's closing remark Vice-Chancellor, KsTU
10.55 am	Vote of thanks Mrs. Edna Bediako, KsTU
10.58 am	Closing prayer University Chaplain, KsTU
11.00 am	Photographs
11.15 am	Snack break
11.30 am	First parallel session
12.45 pm	Lunch break
1.45 pm	Second parallel session
5.00 pm	Plenary session /Wrap up for the day Rapporteur General – Dr. Bismark Q. Parker, KsTU
5.15 pm	Announcements/Closing LOC Secretary

Day #2

Time	Activity
8.30 am	Registration Finance Directorate, KsTU
8.45 am	Opening Prayer University Chaplain, KsTU

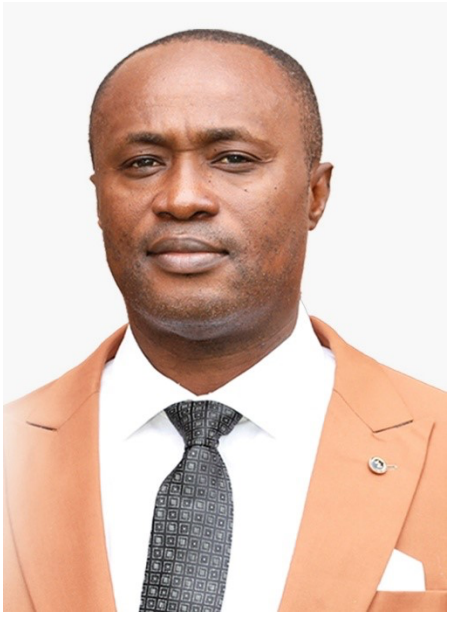
8.50 am	Speech Prof. Clinton Aigbavboa, UJ, South Africa
9.20 am	First Parallel Session
11.20 am	Snack break
11.35 am	Second Parallel Session
12.35 pm	Lunch break
1.45 pm	"Bridging Digital Divides: A Global Perspective on Integrating Generative AI in Research and Pedagogy" Florida Gulf Coast University, USA
3:45 pm	Plenary session /Wrap up for the day Rapporteur General – Dr. Bismark Q. Parker, KsTU
4:00 pm	Closing

MC: Linda Okyere **Guest**

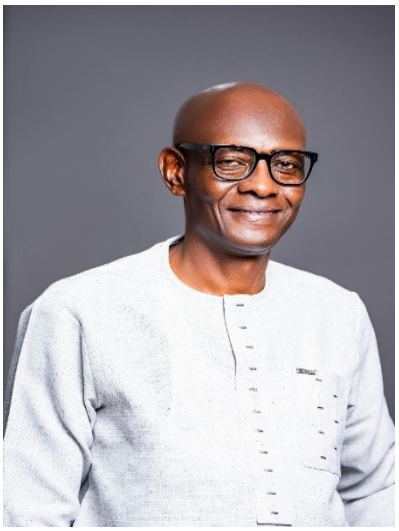
Speakers

1. Hon. Haruna Iddrisu (Minister for Education, Ghana)
2. Mr. Zakaria Sulemana, Director-General, CTVET
3. Prof. Clinton Aigbavboa (University of Johannesburg, South Africa)
4. Prof. Ellis Owusu-Dabo (Kwame Nkrumah University of Science and Technology, Ghana)
5. Prof. Imhotep Paul Alagidede (University of Wits, South Africa)

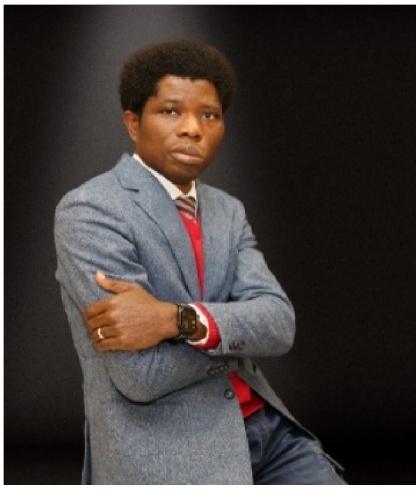
SPEAKERS PROFILES



Professor Gabriel Dwomoh is the Vice-Chancellor of Kumasi Technical University (KsTU), a seasoned academic and administrator with a distinguished record of leadership in higher education. Under his tenure, KsTU has achieved significant milestones, including decentralization of academic programmes, infrastructural expansion, international collaborations, and enhanced grants acquisition. He has overseen the operationalization of a new campus, integration of digital learning infrastructure, and the establishment of research and innovation hubs. His academic vision aligns with global best practices, driving KsTU towards its goal of becoming a World-Class Technical University. Prof. Dwomoh is committed to academic excellence, institutional growth, and stakeholder-driven development.



Mr. Zakaria Sulemana, Director-General of the Commission for Technical and Vocational Education and Training (CTVET), is an accomplished professional in Accounting and Finance with a strong commitment to enhancing organizational performance through effective management control systems such as budgeting and internal controls. He is a collaborative team player with proven analytical, problem-solving, and leadership skills, particularly in project execution and internal control improvement. Mr. Sulemana has led capacity-building initiatives across public and private sectors, including engagements with ICA Ghana. His extensive experience across local and international corporate environments has enriched his expertise in finance, IT, change management, and organizational development.



Prof. Clinton Aigbavboa, a leading scholar at the University of Johannesburg, specializes in Construction Management, Engineering Management, and Sustainable Infrastructure. He is Interim Chair of the DSI/NRF Research Chair in Sustainable Construction Management and Director of the CIDB Centre of Excellence. His impactful research focuses on digital transformation and sustainability in construction, especially in the Global South. With over 1,300 publications and 27 books, his work has advanced understanding of the Fourth Industrial Revolution. He has mentored over 250 postgraduates, secured over R46 million in research funding, and earned a C1 NRF rating, reflecting his global influence in academia and industry.

Professor Ellis Owusu-Dabo is a renowned Epidemiologist, Public Health Physician, and former Pro Vice-Chancellor of KNUST. With vast experience in research management, clinical trials, and global health, he has led major projects funded by the EU, NIH, World Bank, and the Gates Foundation. As former Dean of the School of Public Health, he expanded MPH programs from three to seven. He has over 300 publications, 26,000+ citations, and is among Ghana's top five scientists. He champions inclusive education, capacity building, and mentorship, especially for women and persons with disabilities. Currently leading the Mastercard Foundation-funded Africa Higher Education Health Collaborative, Prof. Owusu-Dabo continues to influence policy, research, and health systems across Africa and beyond.

Imhotep Alagidede is a renowned Metaeconomist and Professor of Finance at the University of the Witwatersrand. He was the inaugural holder of the Bank of Ghana Chair in Finance and Economics at the University of Ghana and is currently Executive Director of AREF Consult and CEO of the Nile Valley Group. With over 20 years of experience in teaching, research, and policy evaluation, he has held academic roles across Africa and the UK. He has published extensively, mentored numerous scholars, and consulted for governments, multilateral agencies, and top corporations. He also edits the Journal of Indigenous and Shamanic Studies.

SCIENTIFIC COMMITTEE

1. Prof. Clinton C. Aigbavoa, UJ, South Africa
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4. Mr. Joshua Appiah - Member
5. Ms. Linda Okyere - Member
6. Ms. Lydia Amponsah - Member/ Secretary

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1	11:00 am	**Antibiotic Resistance in Relation to Bacteria Burden on Common Touch Points.** *Prince Torli, Mina Ofosu, Linda Opponbea Amoani, Herbert Ekoe Dankluvi, Abena Kyeraa Sarpong, Solomon Wireko and Opoku Bempah*	**Energy Management System Using A Cocoa Processing Factory at Tema, Ghana as A Case Study.** *Ing. Marian Omani*	**On fiscal deficit, corruption and gross capital accumulation in Ghana: a structural VAR approach.** *Edmund Ayesu, Bismark Q. Parker, John Agyei, George Asumadu and Raymond Akantege*
2	11:15 am	**Assessment of food safety knowledge, attitudes, and practices of commercial salad vegetable farmers in the Eastern Region of Ghana.** *Regina Ofori Asante, Gloria Mathanda Ankar-Brewoo, Mina Ofosu, Agyemang Boak*	**Effect of Indiscriminate Dumping and Management of Solid Waste on Residential Property Value in Maiduguri Metropolis** *Esv. Muktar Usman Alhaji, Esv. Babagana Bukar, Esv. Hussaini Alhassan Funtua, Ibrahim Babangida and Salisu Abdu.*	**Data To Decisions: The Role of Technology to End Poverty in Ghana** *Ismail Saani[1], Mohammed Abdul Halim[2], Rockson Kwasi Afriyie[3]*
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4	11:45 am	**Additive Manufacturing: A Tool for Sustainable Technological Development Innovation.** *M.A. Hayatu, K.A. Bello and M. Abdulwahab*	**Durability Performance of Mortar Incorporating Cement Kiln Dust and Ilmenite Tailings** *Shettima U. Ali, Mohammed Yau, Baba Gana Makinta, Abdulaziz A. Mulima*	**Utilizing Remote Sensing and GIS for Assessment of Potiskum Urban Growth In Potiskum Local Government Area, Yobe State Nigeria** *Surv. Umar Barde, Ishaku Iliyasu*

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6	12:15 pm	**Optimal Intervention Strategies and Cost-Effectiveness Analysis Regarding Students' Lateness to Classes in Educational Institutions.** *Isaac K. Adu Fredrick A. Wireko, Joshua Kiddy K. Asomoah, Karikari A. Foriwaa*	**Building Conditions and Energy User Behaviour: Systematic Literature Review** *Abbas, Jannat. , Ahadzie, Divine Kwaku, Owusu-Ansah, Anthony, Adjei-Twum, Anthony*	**Assessing the moderating roles of Digitalisation, and Security Spending on Economic Growth in Africa.** *Osman Babamu Halidu, Abdul Aziz Iddrisu, Benjamin Yeboah, George Ohene Gyan*
7	12:30 pm	**Assessment of Viral Suppression Rates Among Art Patients: A Cross-Sectional Study in A Ghanaian Tertiary Hospital.** *Solomon Wireko, Sandy Peters, Anthony Boakye, Seth Adjei Domfeh, John Gameli Deku*	**Infrastructure Delivery in Higher Education Institutions: Importance and Challenges Encountered** *Siyabulela Dywili, Clinton Aighavboa, and Didibhuku Thwala*	

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2	9:15 am		**Reinforcement Learning-Based Real-Time Route Optimization for Electric Vehicles: A Scalable and Adaptive Framework for Energy Efficiency and Urban Mobility** *Kwabena Addo, Abena Agyeiwaa Obiri-Yeboah*	**Exploring Citizen-Centric Marketing Approaches for Enhancing Public Engagement in Policy-Making in the Context of Ghana.** *Collins Kankam-Kwarteng, Francis Osei, Appiah Sarpong*
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4	9:45 am		**Modelling The Effect of Construction Project Supervisors' Attributes on Project Success in Project Delivery.** *Tiban-Ye, L., Bondinuba, F. K., Adjei, K. O., Sam, A.*	
5	11:20 am			

		Day 2: Parallel Session 2B - Room Alpha: Health and Applied Sciences. *Session Chair: Prof. Samuel Djarbeng*	**Day 2: Parallel Session 2B - Room Ceeko Concept: Engineering, Built and Natural Environment.** *Session Chair: Prof. Julius Ahiekpor*	**Day 2: Parallel Session 2C - Room Beta: Creative Arts, Business and Social Sciences.** *Session Chair: Prof. Mrs. Mina Ofosu*
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			Collins Ameyaw., Sarfo Mensah, Ibrahim Mohammed Kusi	*David A. Oluyori[1] and Muhammad J. Ibrahim[2]*
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On fiscal deficit, corruption and gross capital accumulation in Ghana: a structural VAR approach.

Edmund Ayesu, Bismark Q. Parker, John Agyei, George Asumadu and Raymond Akantege

Abstract: Persistent fiscal deficits and corruption are two major problems confronting Ghana's economic growth. Over a long period of time, the country has not been able to develop a strong revenue system to meet increasing expenditure and this has resulted in a sustained negative gap in its primary balance. Also, the country has been plagued with risen levels of corruption perpertuated by weak accountability in public sector transactions. Underlying these twining effects is private capital accumulation, which is suspected as a silent beneficiary of the weakened public sector architecure. Although each of these economic variables has received some attention in the empirical literature, their combined effects and interplay on the economy of Ghana has not been adequately studied. This study thus sought to bridge this gap in the literature and examine the interelationships between these three variables on the economy within the framework of Structural Vector Autoregressive modeling. The study established that increasing corruption was consistent with short-term fiscal deficits as well as a rise in private capital accumulation. Also, a rise in fiscal deficit induced corruption and increased private capital accumulation, thus presenting looped effect on the economy. It is therefore recommended for the consideration of Ghana's fiscal authorities to speed up reforms in government procurement and payment systems to break the looping relationship among the variables for accelerated economic growth.

Key words: Fiscal defict, corruption, capital accumulation, structural VAR, private capital formation.

Modelling The Effect of Construction Project Supervisors' Attributes on Project Success in Project Delivery

Tiban-Ye, L.[1], Bondinuba, F. K.[2], Adjei, K. O.[3], Sam, A.[4]
[2,2,3,4] Department of Building Technology, Faculty of Built and Natural Environment, Kumasi Technical University, Ghana
[2]The Urban Institute School of Energy, Geoscience Infrastructure and Society, Herriot-Watt University, United Kingdom.
[3]Department of Construction Management and Quantity Surveying, Faculty of Engineering and the Built Environment, University of Johannesburg, South Africa.

Abstract: This study examines the impact of construction supervisors' attributes on project success in the Ghanaian construction industry, using Wa Metropolis as a case study. It addresses issues like high turnover rates, absenteeism, subpar work quality, and low performance. This study adopted a quantitative strategy, administering questionnaires to site supervisors in the Wa Metropolis of Ghana. Partial Least Square Structural Equation Modeling (PLS-SEM) addressed the relationship between construction project supervisors' attributes and project success. Empowering supervisors with clear authority, decision-making capabilities, and autonomy can enhance project management. Cognitive-behavioral interventions that foster positive thinking patterns, stress management techniques, and resilience-building interventions can promote better project outcomes. The construction sector is an indispensable pillar of socio-economic progress, with profound implications for housing, infrastructure development, job creation, and GDP augmentation. This is particularly evident in Ghana, where the industry's contributions are both tangible and substantial. Organizations should delineate the project supervisor's scope of authority and delegate appropriate responsibilities. Employers must support supervisors' well-being and cultivate a positive work culture to enhance project outcomes. This study stands out in endeavoring to shed light on a relatively unexplored dimension, specifically the correlation between construction project supervisor attributes and project delivery outcomes. Such a focus departs from conventional research paradigms, offering fresh insights and perspectives.

Keywords: Construction, Ghana, Project Delivery, Project Success, Supervisor Attributes.

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[1] *Collins Ameyaw., [2]Sarfo Mensah, [3]Ibrahim Mohammed Kusi
[2 ,2,3]Department of Building Technology, Faculty of Built and Natural Environment,
Kumasi Technical University, Ghana.

Modelling The Factors That Impede Private Sector Investment in Rail Infrastructure in Ghana.

Abstract: Rail transportation is globally considered crucial to the growth and development of any economy. However, most developing countries are struggling to develop the rail infrastructure despite its capacity to propel them to greater development. The purpose of this study is to model the factors that impede private sector investments in rail infrastructure in Ghana. The study adopted a quantitative research approach, utilizing surveys to collect data from stakeholders, asset owners and private investors in infrastructure and rail sector. The data was analysed using structural equation modelling (SEM) with the aid of SmartPLS software. The results show that limited access to funds are the major issues followed by regulatory uncertainty, insufficient government support, corruption and lack of skilled workforce. Moreover, private investors complain of a poor and ambiguous Public-Private Partnership (PPP) policy and lack of clear or transparent approaches for risk-sharing. In conclusion, eliminating investment barriers is necessary to address regulatory bottleneck, enhance access to financing, and to develop clear PPP guidelines. This paper offers suggestions to policy makers and other stakeholders to create an enabling environment for private sector involvement in rail infrastructure development.

Keywords: Rail infrastructure, private sector investment, Ghana, structural equation modelling, barriers.

Energy Management System Using A Cocoa Processing Factory at Tema, Ghana as A Case Study.

Ing. Marian Omani
Works and Physical Development Directorate, Kumasi Technical University, Ghana

Abstract: The study aims to analyse energy consumption patterns and derive a more efficient energy management plan using EnMS and other energy-saving applications. Firstly, a liquor production and energy consumption audit using two-year post-electricity bills and data from the boilers was performed for the cocoa processing factory. Secondly, energy efficiency was calculated from the energy data collected using regression analysis with the energy baseline as its energy performance indicator, cumulative summation deviation method (CUSUM), R^2, Energy Intensity Index (EII), calculating the Carbon Dioxide (CO_2) emission savings to evaluate energy consumption with its corresponding production. This was done for energy consumption, including the grid electricity, steam boiler, solar, Liquified Petroleum Gas (LPG), Residual Fuel Oil (RFO), and biomass. The statistical package for Excel software was used to ensure the accuracy of the data and to help with the data analysis. The factory's energy consumption was calculated as 43,590.25 TOEs (Tons of energy equivalent) over the previous year. These results were used for CUSUM (Cumulative Sum Deviation Method) graphics with the actual as against expected values. This research examines energy consumption, energy cost, and the relationship between energy usage and cocoa liquor production. The unit of energy cost was 688.22 [$/ton] for the 2022 calendar year. This result showed that the factory was able to have a savings of **GH₵491,635.92** for the period, as well as energy savings of **85,600GJ** (2022 – 2023 April) for no cost intervention, with an overall total consumption saved of **24.5%** (348,770 GJ per year) and a GHG emission reduction of **24,789.82 tCO_2e** per period of the energy management. Moreover, there was a total thermal energy savings for the calendar year 2022 to April 2023 that was calculated to be **84,278GJ** and represents **34%** saving on the fuel input costs for the cocoa liquor production plant. This includes fuel input savings from both the biomass and the RFO[1] boilers (calculated using 39.5MJ/kg for RFO and 11GJ/ton for biomass). The savings were based on the baseline energy performance model developed from the regression analysis. The total thermal savings achieved since the inception of the EnMS for the period is **99,319GJ or 27,588,612.08Kwhrs** (=99,319÷0.0036), with plant savings of **5.18%,** and electrical savings of **5.50%.** There was a decrease in the unit of energy by optimization, and these results indicated that the cocoa processing factory should pay attention to energy management issues and comply with the energy efficiency policy in the country to help in efficient energy management.

Keywords: Regression Analysis, energy management system standard (ISO50001), CUSUM (Cumulative Sum Deviation Method), energy efficiency, energy baselines, energy intensity index or energy performance index, Carbon emission (CO_2 emission).

Antibiotic Resistance in Relation to Bacteria Burden on Common Touch Points

Prince Torli*, Mina Ofosu, Linda Opponbea Amoani, Herbert Ekoe Dankluvi, Abena Kyeraa Sarpong, Solomon Wireko and Opoku Bempah.

Department of Laboratory Technology, Faculty of Health Sciences, Kumasi Technical University, Kumasi-Ghana
Abstract:_Research has shown significant concentrations of *Staphylococcus species* on nonliving surface inhealthcare environments. This particular study focused on evaluating the prevalence and distribution of Methicillin .Resistant Staphylococcus aureus (MRSA) on door handles and handrails across three selected tertiary institutions. A total of hundred (100) samples were obtained from door handles and handrails of these strategically selected institutions roped in for this study. Swab samples were aseptically collected and cultured on Mannitol salt agar. Incubation was carried out for 24 hours at 37 ºC after which purification was done for antibiotic susceptibility test using disc embedded antibiotics; Ampicillin, Oxacillin, Ciprofloxacin and Sulfamethoxazole / Trimethoprim. Out of the 100 samples, the percentages that indicated no growth and growth were 73%, 27% respectively. Again 20% and 5% were recorded for *Staphylococcus aureus* and CoNS respectively, in the tertiary institutions whereas 30% and 10% were recorded for *Staphylococcus aureus* and CoNS respectively, in the clinical settings. Out of the 21 cultured plates that indicated positive for *Staphylococcus aureus*, 4.8% were found to be MRSA. Other strains of *Staphylococcus aureus* show sensitivity of 95.2%, 85.7%, 95.2% and 81% to CIP, OX, AM and SXT respectively. All *Staphylococcus aureus* isolates were sensitive to CIP while some were resistant to OX (4.8%), AM (4.8%), and SXT (4.8%). This current study reveals that MRSA strains are not only present in clinical settings but also in educational settings which may also be present in other geographical areas. The high prevalence of *Staphylococcus aureus* in the clinical settings (30%) used as control in this current study and educational settings (20%) indicates a significant bacteria burden, making it crucial to address this pathogen's transmission and potential antibiotic resistance. Cleaning and disinfection should be targeted more on door handles and handrails to reduce the spread of methicillin resistance *Staphylococcus aureus.*

Keywords: Antibiotic resistance, Bacteria burden, Common Touch Points and Kumasi

Additive Manufacturing: A Tool for Sustainable Technological Development Innovation.

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Abstract: Considering the challenges of conventional materials processing and manufacturing technologies in African countries, scientists and engineers are everyday searching for new technologies to improve or replace the existing ones. Though, African continent is blessed with abundant natural resources such as Oil and gas, varieties of metal ores and fertile agricultural land; lack of adequate advanced technology for processing these resources remains challenging. The application of conventional manufacturing processes is no more sustainable as per African continent is concerned. Additive manufacturing is one of the promising technologies that shows the potential in replacing conventional manufacturing processes. This study reviewed the fundamentals and processing techniques of various additive manufacturing technologies such as, directed energy deposition, powder bed fusion, material jetting, etc. Basic working principles, sources of energy, raw and forms of materials as well as process parameters of the various additive manufacturing processes were studied. Recent original works were studied and relevant findings were summarized. It is deduced from the review indicated that additive manufacturing processes produce 3D objects by basic principle of layer-by-layer addition of material from a CAD model. Findings of the case studies proved that the properties of the additive manufactured parts are better compared to those of the traditional wrought ones and WAAM is the most popular metal based additive manufacturing process. Additive manufactured parts have isotropic properties.

Keywords: Additive manufacturing; layer-by-layer deposition;3D object; feed stock

Effect of Indiscriminate Dumping and Management of Solid Waste on Residential Property Value in Maiduguri Metropolis

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Abstract: Effective and efficient solid waste management and disposal system is crucial in safeguarding the health and well-being of the occupants found in an ecosystem. The environment which serves as a centre of human populace is crucial to humankind's ability to coexist peacefully, and as such, it deserves the highest attention. This research paper aimed at examining the effect of indiscriminate dumping and management of solid waste on residential property values in Maiduguri Metropolis, Borno State, Nigeria. A random Sampling technique was employed to administer Two Hundred (200) questionnaire to Estate Surveyors and Valuers, Borno State Environmental Protection Agency as well as the occupants in the selected neighbourhood. Data were analysed using descriptive, rank correlation and Pearson chi-square distribution. The study revealed that indiscriminate dumping of solid waste has a negative effect on the occupants a well as the level of demand for residential properties and their values. The research recommends the provision of dedicated and well-organized dumping site at strategic locations and public education and awareness campaigns should be conducted on a regular basis by the regulatory organizations to educate the public about the risks to their health and the environment posed by inappropriate disposal of solid waste.

Keywords: Solid waste, Indiscriminate Dumping, Management, Residential Property value.

Automated Tuberculosis Screening Based on X-Ray Radiography with Vision Transformer Neural Network

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Abstract: Chest X-ray radiography is an affordable and commonly available diagnostic tool that can help diagnose several ailments, including tuberculosis (TB), pneumonia, COVID-19, and many more. The necessity for competent professionals to assess X-ray radiography is a difficulty in many health institutions worldwide, particularly in developing countries. Machine Learning (ML) techniques have enabled the automatic detection of tuberculosis using X-ray modalities. Aside from deep convolutional neural networks (DCNN) for vision applications, the Vision Transformer (ViT) network has performed well in picture categorization. Motivated by the transformer network's resilience in image processing tasks, the paper presents a vision-transformer-based framework for early TB detection. The suggested model is on the ViT-Base32 (ViT-B32) framework. The suggested method outperformed other existing CCN models proposed for similar diagnosis by achieving accuracy, sensitivity, specificity, precision, F-1 score, and AUC scores of 96.96%, 96.89%, 97.01%, 96.72%, 96.80% and 0.97, respectively. The outcome suggests that the model is fit for clinical implementation for mass screening of TB disease, which is more prevalent in underdeveloped countries where experts and screening aids are scarce.

Application of Ensemble Machine Learning Techniques in Malware Identification.

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Abstract: The creation of effective and precise techniques for malware detection is essential in the quickly changing field of cybersecurity. An inventive machine learning (ML) model intended to improve malware detection performance is presented in this paper. This algorithm analyses executable files and network traffic patterns by utilizing sophisticated feature extraction techniques and a vast dataset of known malware and benign software samples. My methodology is based on a combination of supervised learning algorithms, such as Decision Tree, KNN and Random Forests, to accurately classify possible threats. The architecture of the model involves static analysis of file signatures to provide a powerful detection mechanism. This machine learning model outperforms conventional heuristic-based techniques, with a detection accuracy of 98.6% and a false positive rate of 2.09%, according to performance evaluation on a varied test set. Furthermore, the model shows resistance to popular evasion strategies employed by advanced malware. This work lays the groundwork for future developments in automated malware detection systems and highlights the potential of machine learning to strengthen cybersecurity defences.

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Data To Decisions: The Role of Technology to End Poverty in Ghana

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Abstract: Poverty remains a significant challenge in Ghana, affecting health, education and living standards. To address this issue, we developed the Ghana Poverty Insights Dashboard (GPID), a comprehensive data-driven tool to improve poverty management and effective resource allocation. Using data from the Ghana Statistical Service Stats bank, including the Demographic, Health and Ghana Living Standards Surveys, we analysed key indicators across four dimensions: employment, education, health and living standards. We used advanced data modelling and visualisation techniques in Power BI to develop a solution with interactive features, such as maps, slicers, tooltips and rankings, to make it easy for users to perform a detailed analysis of socioeconomic patterns of poverty at the regional and district levels. Our findings reveal that the Upper East Region, particularly the Nabdam District, exhibits the highest poverty rates. Employment emerges as a critical factor in Ghana. Key population metrics reveal a poverty intensity of 28.6%, with women disproportionately affected (43.7%). Insights into facilities show an average distance of 8.5 KM to maternity centres and 1.6 KM to Junior High Schools. To effectively address poverty, we recommend targeted interventions in the Upper East Region, focusing on employment generation and improving access to essential services. By leveraging the GPID, policymakers can make informed decisions, monitor progress and ensure that resources are allocated to achieve sustainable poverty reduction.

Keywords: Dashboard, Multidimensional Poverty, Stats Bank, Visualisation, Nab dam District, Upper East Region.

Retrospective Trend Analysis of *Schistosoma Species*, A Neglected Tropical Infection in Ghana

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Abstract: Schistosomiasis, a neglected tropical disease caused by parasitic worms of the genus Schistosoma, remains a significant public health challenge in many endemic regions. This study aims to evaluate the epidemiological trends, clinical manifestations, and treatment outcomes of schistosomiasis over the past five years in the Ashanti region, Ghana. A retrospective analysis was conducted using data collected from Manhyia District Hospital between 2018 and 2022. Patient records were reviewed for demographic information, clinical presentation, diagnostic methods employed (e.g., stool and urine examinations, serological tests), treatment regimens (including praziquantel administration), and follow-up outcomes. Statistical analyses were performed to identify trends and correlations. A total of 1,850 patients diagnosed with schistosomiasis were included in the study. The prevalence of schistosomiasis increased/decreased/stayed stable during the study period, with children between the age of 3-5 years interval being most affected. Common clinical manifestations included a high temperature (fever), an itchy, red, blotchy and raised rash, diarrhea, severe cough and many others, with severe cases leading to complications such as fibrosis of the bladder and ureter. Treatment outcomes indicated that 82% of patients achieved complete resolution of symptoms, while 18% experienced persistent or recurrent infections. Factors influencing treatment efficacy included temperature, environment. The findings of this retrospective study highlight the ongoing burden of schistosomiasis in Ashanti region, emphasizing the need for enhanced diagnostic capabilities, effective treatment strategies, and comprehensive public health interventions. Continued surveillance and targeted control measures are crucial for reducing the incidence and improving outcomes for affected populations. Investigate community perceptions and knowledge regarding schistosomiasis to inform educational campaigns

Keywords: Schistosomiasis, neglected tropical diseases, retrospective study, Ghana, epidemiology, treatment outcomes.

Visual Attention-Based Framework for The Automatic Diagnosis of Breast Cancer from Ultrasound

Modalities

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Abstract: Breast cancer according to the World Health Organization is a global health concern among women. The Magnetic Resonance Image (MRI) is an important means of breast cancer diagnosis. Despite the effective nature of this diagnosis procedure, its sensitivity is dependent on the expertise of the radiologist or the physician. The application of Artificial Intelligence (AI) techniques in the diagnosis process is vital for effective prognosis. The process also eliminates late diagnosis due to scarce radiologists and oncologists. Deep neural networks are the go-to techniques for automatic detection of the disease because of its outstanding detection performance. Despite the outstanding performance of Deep Learning (DL) models, the complexity and heaviness of such applications make it difficult to be embedded on edge devices. Motivated by this, the study presents a DL model with the Visual Attention Condenser (VAC) Network as its backbone for breast cancer detection based on ultrasound images. The neural network architecture of the proposed model is generated automatically through a machine-driven design exploration mechanism with generative synthesis algorithm. The architecture makes the model light weight for edge devices. The model performed well by detecting the images as normal, benign and malignant, with accuracy, sensitivity and specificity scores of 96.2%, 96.4%, and 96.1%, respectively. The light weight nature of the model makes its implementation on edge devices feasible for early and easy identification of breast cancer.

Analysis Of Pipe Conveying Fluid Using Finite Element Method

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Abstract: This research utilizes Finite Element Analysis (FEA) to investigate the dynamics response and structural integrity of fluid – conveying pipes. By discretizing the governing equation of motion, the Finite Element Method (FEM) delivers accurate solutions for natural frequencies, critical flow velocities and buckling thresholds. Through a systematic examination of key parameters, this study uncovers novel insights into the intricate interplay between fluid flow and structural response. Our results provide a foundation for the development of advanced design methodologies, predictive tools and demonstrate the versatility of Finite Element Method in addressing Fluid – structure interaction challenges in modern engineering system.

Keywords: Analysis, Pulsating Fluid, Surface Energy, Vibration.

Fiber Products of The Free Commutative Trioids David

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Abstract: This paper addresses significant questions in the realms of groups, semigroups, and universal algebra, specifically concerning the concepts of direct products, subdirect products, and fiber products of trioids, with particular emphasis on Free Commutative Trioids. We draw upon Goursat's lemma in group theory, which states that every subdirect product can be represented as a fiber product, as a foundational pillar for our investigation. Building on recent advances by Zhuchok, who constructed the free commutative trioid of rank 1 and demonstrated that the free commutative trioid of rank $n > 1$ is a subdirect product of the free commutative semigroup of rank n and the free

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Abstract: This study examines the potential of pension funds to address Ghana's infrastructure deficit. Using a qualitative research approach, the study involved in-depth interviews with participants selected through purposive sampling. The findings highlight that pension funds can significantly contribute to infrastructure development, driven by factors such as security, economic viability, profit motives, and government support. However, challenges such as poor maintenance culture, inadequate start-up capital, and political instability hinder pension funds' investment in

commutative trioid of rank 1. In our study, we provide a thorough characterization of Green's relations, subdirect products, and fiber products of trioids, with the necessary and sufficient conditions for the existence of fiber products of free commutative trioids. Also, we present the finite generation and finite presentations of Free Commutative Trioids and prove that two free commutative trioids A and B over a common fiber quotient U are finitely presented if and only if their fiber product is finitely generated.

Keywords: Trioids, Green's relations, Subdirect Product, Fiber Product, Free Commutative Trioids

The Role of Pension Funds in Bridging the Infrastructure Deficit in Ghana

public infrastructure. The study suggests that enhancing regulatory frameworks, improving capital mobilization, and fostering better governance could unlock the full potential of pension funds in infrastructure development. It also recommends that the government provide additional incentives to attract pension funds into infrastructure projects. Pension fund managers are encouraged to explore opportunities in less-developed, underserved regions to bridge the urbanization gap. One limitation of the study is the potential bias in responses, as participants from pension schemes may have personal or professional interests influencing their views, which could skew the findings. Despite this, the research contributes to understanding the role of pension funds in bridging Ghana's infrastructure gap, an area that has not been extensively studied before. Overall, the study emphasizes the importance of pension funds in supporting sustainable infrastructure development in Ghana, while recognizing the need for addressing existing barriers to investment.

Keywords: Pension funds, Infrastructural Deficit, Infrastructure.

Is There a Causal Effect Between the Climate Vulnerability Components and The Government Tax Revenue Resource in Ghana: Ardle Approach

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Abstract: It is an undeniable fact that climate vulnerability could impact various aspects of economic activities in developing countries, particularly in Africa. However, existing literature on government resources and tax revenue mobilization in the African context is limited. The effects of climate vulnerability on government resources and tax revenue can be crucial for achieving the UN Sustainable Development Goals by 2030 in African developing nations. Therefore, this study aims to examine the causal effects of climate vulnerability components on government resource mobilization and tax revenue collection in Ghana. This study will employ the financial time series dataset spanning over 1990 and 2022 fiscal year, using the Autoregressive Distributed Lag estimation technique, strengthening the model with the impulse response function. These estimation methods will facilitate to ascertain both the short and long run equilibrium association among the study variables used, and to ensure explaining the government resource and tax revenue. The data to employ for the study will be obtained from the ND Gain climate vulnerability website and the World Data Indicator database. The expected findings of this study include the following: (a) climate vulnerability components are likely to significantly impair Ghana's government resource and tax revenue mobilization; (b) the results are expected to provide elasticity measures to explain variations in the dependent variables. Additionally, Ghana's government resource and tax revenue mobilization may experience a decline due to climaterelated impacts. This study's contribution lies in its exploration of climate vulnerability components effects on government resource and tax revenues in Ghana. Ultimately, the findings may provide insights relevant to achieving the UN Sustainable Development Goals in the context of climate vulnerability impacts on fiscal resources of Ghana.

Keywords: climate vulnerability components, government resource revenue, tax revenue, SDGs, ARDL, Ghana

Assessment of Distribution of Ticks and Tickborne Haemoparasites Cattle Slaughtered at Selected

Abattoirs in Kumasi

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Abstract: Tickborne haemoparasitic disease poses a threat to the health of livestock (cattle) causing significant losses in the production of meat, milk, hide, and sometimes death. Some domestic animals such as cattle, dogs, horses, buffaloes and mice act as reservoir hosts whiles in humans it is zoonotic. The cross-sectional study conducted in the Kumasi Metropolis sought to determine the prevalence of tickborne haemoparasites in cattle in three different abattoirs. Healthy adult cattle brought for slaughter to the Kumasi, Musah Subtiu abattoir, and Veterinary Services slab were sampled, and screened for ticks, and blood samples collected after interviews were conducted. Blood-stained slides were screened for the presence or absence of tickborne haemoparasites. Hematological indices of cattle were determined and ticks collected from cattle were identified. The overall prevalence of tickborne haemoparasites was 11.9%. The tickborne haemoparasites identified included Babesia bovis, Babesia bigemina, Theileria mutans and Ana plasma species. *Babesia* species was more dominant with a prevalence of 67.6%. Mixed infections recorded was 14.7%. Male cattle screened recorded a higher prevalence of tickborne haemoparasites 64.65% than females ($p = 0.473$). Adult cattle had the highest prevalence of tickborne haemoparasitic infection (44.1%), followed by young cattle (32.5%) and old cattle (23.5%). All the five breeds of cattle screened had tickborne haemoparasites present in their samples with N'dama (38.2%) recording the highest whilst Zebu and White Fulani (11.7%) being the least. Cattle slaughtered at the Kumasi abattoir recorded the highest prevalence of tickborne Haemoparasites followed by Musah Subtiu and with no Haemoparasites in cattle slaughtered at Veterinary Services. Hematological screening revealed no significant difference between infected and non-infected cattle. Tick vectors *Amblyomma variegatum* (46.7%) was the most dominant followed by, *Rhipicephalus micro plus* (23.9%), *Hyalomma* (20.9%) and *Haemaphysali*s (8.4%) and were responsible for the transmission of tick-borne infections. Male tick vectors (54.45%) were found to be more dominant than female (45.55%) with a ratio of (330:276) 1.2:1. The highest frequency of ticks was collected from the scrotum and udder. The findings of this research indicated that bovine babesiosis was the most prevalent haemoparasitic infection of cattle found in Kumasi Abattoir and Sabtiu Musah Abattoir. *Babesia bigemina* and *Babesia bovis* were the major *Babesia* species that cause babesiosis in cattle. Tick vectors such as *Amblyomma variegatum, Rhipicephalus micro plus, Hyalomma* and *Haemaphysalis* were responsible for the transmission of haemoparasitic infections in cattle. Intervention programs should be implemented and intensified to control the infestation of tick vectors.

Keywords: Tickborne, Haemoparasites, Vectors and Prevalence

Factors Influencing Demand for Microfinance by Rural Farmers and The Mediation Role of Fintech Adoption During Covid-19 Pandemic in Ghana

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Abstract: This study examines factors influencing the demand for microfinance credit by rural farmers and the mediation effect of FinTech adoption during COVID-19 Pandemic in Ghana**.** The study uses survey data from 598 rural farmers and 112 MFIs by employing cluster and random sampling techniques to sample rural farmers from selected communities. A probit regression model was employed to investigate the differences in the probability of rural farmers' demand for microfinance and the estimation of constraint factors and examine the mediation role of FinTech adoption during COVID-19 pandemic. The study found that age and education level are significant determinants of microfinance credit, with older individuals and those with higher levels of education being more likely

to access microfinance services. Education level, MFIs lending procedure, operational and financial difficulties during COVID19 also have significant indirect effects on microfinance credit, mediated through their effects on the determinants of microfinance.

Keywords: Microfinance, rural farmer, COVID-19 pandemic, Probit Model, FinTech Adoption

Assessment of Viral Suppression Rates Among Art Patients: A Cross-Sectional Study in A Ghanaian Tertiary Hospital

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Abstract: Monitoring HIV treatment through viral load testing is critical for identifying treatment failure and ensuring optimal outcomes. Despite antiretroviral therapy (ART) being a cornerstone of comprehensive care, Ghana's viral suppression rate remains at 68%, below the 95-95-95 UNAIDS targets. Limited data exist on viral suppression rates within the Ashanti Region, the area with the highest HIV prevalence. This study evaluates viral suppression rates and associated demographic factors among ART patients at a tertiary health facility in the Ashanti Region of Ghana. A retrospective cross-sectional study was conducted among ART patients receiving care at a tertiary hospital. Eligible participants included those with ≥6 months of ART and at least one documented viral load result. Demographic data and viral load results were extracted from patient records and the E-Tracker software. Viral suppression (<50 copies/mL), low viremia and high viremia were analysed, along with associations between demographic variables and viral load outcomes. Of the 12,054 ART patients analysed, 66.1% achieved viral suppression (<50 copies/mL), while 19.8% had low viremia, and 14.1% experienced high viremia. Viral suppression was significantly associated with age and gender ($p<0.0001$). Patients aged <15 years (cOR: 1.21, 95% CI: 0.77-1.89; $p=0.405$), 15–30 years (cOR: 1.33, 95% CI: 0.89-2.00; $p=0.170$), and 31–60 years (cOR: 1.30, 95% CI: 0.98-1.73; $p=0.740$) showed no significant odds of low viremia compared to their counterparts. The viral suppression rate of 66.1% among ART patients in the Ashanti Region is below the UNAIDS target but consistent with the national average of 68%. Addressing barriers to ART adherence, increasing awareness, and strengthening viral load monitoring are essential for improving suppression rates and achieving global HIV care targets.

Keywords: HIV/AIDS, Viral Suppression, Ashanti Region, Ghana, Antiretroviral therapy (ART)

Reinforcement Learning-Based Real-Time Route Optimization for Electric Vehicles: A Scalable and Adaptive Framework for Energy Efficiency and Urban Mobility

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Abstract: Rapid urbanization and electric vehicle (EV) emergence have gained prominence in sustainable transport systems creating an urgent need for innovative strategies to tackle challenges of traffic congestion, range anxiety, and energy inefficiencies. This study presents a scalable and adaptive framework for real-time route optimization of EVs, leveraging the power of Reinforcement Learning (RL) to enhance energy efficiency and urban mobility. The proposed framework integrates Deep Reinforcement Learning (DRL) with data from Internet of Things (IoT) devices to dynamically adapt EV routes in response to changing urban conditions through a multidimensional variable set including real-time traffic flow, charging station availability, battery state-of-charge, and energy consumption patterns. By leveraging DRL's capability to process large-scale dynamic data and make optimal sequential decisions, the framework ensures energy- efficient routing and reduced travel times, even in highly congested urban environments.

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Extensive simulations were conducted using real-world traffic datasets and EV operational profiles to evaluate the efficacy of the proposed approach. The results demonstrate significant improvements in energy efficiency, with energy consumption reductions up to 25%, and average travel time reductions exceeding 20% when compared to traditional routing methods underscoring its potential to drive transition toward smarter, more efficient, and user-centric urban mobility systems. The findings have broad implications for policymakers, urban planners, and researchers focused on advancing sustainable transportation and smart city initiatives. Future extension will explore integration of multi-agent systems for cooperative routing and charging management in large-scale EV networks.

Keywords: Reinforcement Learning, Electric Vehicles, Real-Time Optimization, Urban Mobility, Energy Efficiency, Smart Cities.

Fibrinogen and Cytokines as Biomarkers of Ovarian Hyperstimulation Syndrome (OHSS) Among Women Undergoing in-Vitro Fertilization Procedure: A Prospective Cohort Study

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Abstract: Ovarian hyperstimulation syndrome (OHSS) is the most severe iatrogenic complication of controlled ovarian stimulation during assisted reproductive technologies (ART) procedures. However, the pathogenesis has not been fully understood yet. In Ghana, there is paucity of data on OHSS. This study assesses fibrinogen and cytokines including interleukin (IL)-8, TNF-α, and IL-10, before and after controlled ovarian stimulation (COS) among women undergoing in-vitro fertilization (IVF) treatment. This prospective cohort study included 46 women undergoing IVF from April to November 2023 at a fertility hospital in Kumasi, Ghana. All participants received the standard treatment protocol for controlled ovarian stimulation (COS) using the gonadotrophin-releasing-hormone analogues (GnRHa) long protocol. A well-structured questionnaire was used to gather sociodemographic and clinical information. Blood samples were collected for laboratory analyses of fibrinogen and cytokines markers as well as hepatic and renal function tests. Statistical analyses were done in R Language 4.3.2 and SPSS 26.0. p-value of < 0.05 was considered significant. The prevalence of OHSS among the participants was 10.9% and was more prevalent in younger ages within 18-24 years (60.0%) ($p > 0.05$). There were no significant differences between OHSS subjects and non-OHSS subjects in terms of pre- and post- COS levels of fibrinogen, TNF-α, IL-8 and IL-10 ($p > 0.05$). Moreso, there were no significant differences between participants in terms of pre- and post-COS levels of liver and renal function tests ($p > 0.05$). At a cut-off of ≥ 33.5 ng/L, IL-10 was the best marker for predicting OHSS with a sensitivity of 80.0%, specificity of 71.8%, and area under the curve of 63.3%. The prevalence of OHSS among women who undergo controlled ovarian stimulation is 10.9%. IL-10 could serve as a predictive biomarker for detecting OHSS among women undergoing controlled ovarian stimulation with high sensitivity, specificity and accuracy.

Keywords: Ovarian Hyperstimulation, Fibrinogen, Cytokines, Fertility

Numerical Simulation of A Nonlinear Equilibrium Model of Gradient Elution in Liquid Chromatographic Reactor Considering Bi-Langmuir Isotherm

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Abstract: In this work, a nonlinear reactive equilibrium dispersive model (REDM) of liquid chromatography is developed to investigate the conveyance of multi-component mixture in a single column using gradient elution considering nonlinear adsorption thermodynamics. A generalized and standard Bi-Langmuir type's adsorption equilibrium isotherm is considered to analyze the constituted model equations using Danckwert boundary conditions. The developed model consists of a system of convection-dominated partial differential equations for mass concentrations in the liquid phase coupled with differential and algebraic equations in the solid phase. A scheme of high-resolution finite volume method (HR-FVM) using an appropriate flux-limiter was employed to solve the model equations numerically. This suggested method deals with integral form of conservation laws, which avoids spurious oscillations, reduces numerical dissipation, and provides higher-order accuracy on the coarser grids. Further, the impact of modulator concentration is studied for a reversible reaction of type A B + C; the obtained solutions are in good and better agreement with those of isocratic elution. Moreover, the influences of various parameters were examined on the behavior of elution profiles. The configured numerical algorithm gives an effectual mechanism for analyzing retention behavior, peak shapes and the effect of mass transfer kinetics on the elution profiles.

Keywords: Chromatographic reactor, Bi-Langmuir isotherm, gradient elution, one- dimensional equilibrium model, high-resolution scheme.

Pragmatic Competence in Classroom Communication: Analyzing Apology and Request Strategies Among Kumasi Technical University (KsTU) Students

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Abstract: Apologies and requests are politeness strategies employed to enhance effective classroom discourse. To attain successful interaction, it is imperative for speakers to be aware of the social distance between themselves and their interlocutors. Pragmatic competence is therefore central for efficacious communication, since it enables speakers to navigate social interactions appropriately (Deda, 2013). The lack of this competence among language learners can lead to miscommunication, potentially resulting in unintended offense. The study explores the use of apologies and requests as essential components of communicative action, emphasizing the need for contextually appropriate language to prevent miscommunication. It investigates the speech acts employed by students of Kumasi Technical University (KsTU) in various social roles, to highlight the role of pragmatic competence in effective interaction. Grounded in Brown and Levinson's (1989) politeness theory, the study examines how individuals employ politeness strategies to mitigate potential offense in interactions. A qualitative research design is adopted, employing a crosssectional structured questionnaire based on the Discourse Completion Task (DCT) to collect data from 40 first-year students by examining strategies across different social contexts. The responses were analysed using Blum-Kulka et al.'s (1989) framework for directness levels in requests, alongside Searle's speech act theory. The findings indicated that students predominantly employ conventional indirect request strategies among peers of equal status, while variations occur in interactions with individuals of different power dynamics. This study contributes to the understanding of pragmatic competence among language learners, accentuating the need for targeted instructional interventions to enhance students' ability to use appropriate politeness strategies in diverse communicative contexts.

Keywords: politeness strategies, pragmatic competence, speechacts, politeness, request.

Interior Design, Guest Satisfaction and Repeat Visit

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Abstract: Interior design in hotels has become a popular subject of debate in many circles. Many hospitality venues struggle to create interior environments that effectively cater to their guests' diverse preferences and expectations. The main objective of this study was to investigate the effect of interior design in enhancing guest experience in the hotel sector in the Ashanti region. The study utilised a descriptive research design. A multistage sampling technique was used to administer 350 questionnaires to guests in some selected hotels in the region. The findings revealed that flower arrangement (90%), lighting designs (70%) and artwork (60%) were among the major elements of interior design likely to enhance guests' experience in the hotel. A significant relationship was found between interior design and the level of patronage. For security purposes, lighting design was found to be the prevalent interior design likely to influence repeat guests in the hotel. The study therefore recommends sensitization on how interior design can enhance guest experience; hence hotels should create memorable first impressions by focusing on their lighting designs, flower arrangement and innovative artworks.

Keyword: Interior design, Hotel sector, Guest experience, Lighting design, Hospitality, Artwork

Infrastructure Delivery in Higher Education Institutions: Importance and Challenges Encountered

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Abstract: Infrastructure plays a pivotal role in shaping the quality and effectiveness of Higher Education Institutions (HEIs), significantly influencing their academic missions, research capabilities, and overall institutional success. This manuscript critically evaluates the importance and challenges of infrastructure delivery in HEIs. It highlights key infrastructure elements, including classrooms, laboratories, libraries, residential facilities, technology systems, recreational spaces, and administrative support structures, demonstrating their direct impact on student outcomes, faculty productivity, and institutional reputation. Despite their importance, delivering these infrastructural projects is complex and fraught with significant challenges such as budget constraints, funding shortfalls, regulatory compliance issues, technological integration difficulties, environmental sustainability concerns, and disruptions to campus activities during construction. The study underscores the need for strategic approaches in managing these challenges, emphasising transparent stakeholder communication, proactive regulatory engagement, and robust risk management. It recommends establishing dedicated infrastructure management units, employing innovative funding models, and prioritising flexible, adaptable, and sustainable infrastructure designs. Continuous investment and forward-thinking planning are highlighted as critical strategies for maintaining institutional competitiveness and ensuring long-term sustainability. Ultimately, addressing these challenges through comprehensive planning and proactive management can significantly enhance the educational environment, bolster institutional reputation, and foster academic excellence in higher education institutions.

Keywords: Higher Education Infrastructure, Infrastructure Delivery, Sustainability, Project Management, Development.

Patients Satisfaction with the Quality of Healthcare Environment in Ghanaian Teaching Hospitals

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Abstract: Many public hospitals in Ghana are faced with challenges with their healthcare environment, which affects patients' satisfaction of their overall healthcare experience. Thus, the study aims to determine patients' satisfaction with the healthcare environment of public teaching hospitals in Ghana. This is a cross-sectional study involving adult patients at the Physician Out-Patient Departments (OPD) and Polyclinics of Komfo Anokye, Tamale and Cape Coast Teaching hospitals in Ghana. A Staff and Patient Environment Calibration Toolkit (ASPECT) dimensions was used to determine the items that patients deem as most important to the satisfaction of their healthcare experience and the influence it has on their revisit intension. A questionnaire survey using a structured 5-point likert scale based on the ASPECT dimensions was used to collect data from 660 patients. Satisfaction Index ranking was used to analyse the data of 622 valid questionnaires. The result of the study shows that patients are most satisfied with the legibility of the place and interior appearance dimensions. However, the dimensions patients are least satisfied with are the privacy, company and dignity as well as the comfort and control dimensions. Therefore, the managers and stakeholders of the surveyed teaching hospitals should take initiatives to constantly improve the quality of healthcare environment, especially the dimensions that patients are least satisfied with, as the quality of the healthcare environment has an influence on patient satisfaction of the overall healthcare experience.

Keywords: Healing environment, Healthcare, Patients satisfaction, Teaching hospitals, Ghana

Building Conditions and Energy User Behaviour: Systematic Literature Review

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Abstract: Generally, the factors that influence occupant behaviour in the use of energy are noted to include energy awareness, building design, social and psychological factors, economic factors, and thermal comfort. However, the conditions of buildings are also argued to possess a huge potential to influence occupant energy use behaviour. This research systematically reviewed literature on building conditions and energy user behaviour to identify what already exists in the literature and the available gaps for future research, thereby presenting a comprehensive overview of the subject. Using a three-stage methodological approach, the study followed the PRISMA protocols for reporting systematic reviews. Data was sourced from Scopus, Science Direct, and Google Scholar. The findings revealed that current studies largely concentrate on the use of building management systems, how the operational state of various building systems and occupant behaviour separately affect energy efficiency and consumption in residential and office buildings. Existing studies are inconclusive about the relationship between building conditions and energy user behaviour. This study serves as a base point for directing and shaping future studies on the subject to collectively drive the agenda towards the efficient use of energy in buildings.

Assessment of Lean Management Practices for Public Buildings Maintenance in Ghana

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Abstract: Public buildings in the developing world have been characterised by poor maintenance practices. With budgetary limitations amidst high maintenance costs, adopting lean principles is paramount to reduce waste and enhance maintenance efficiency. Despite the plethora of knowledge on lean management, its application within the context of public building maintenance in the developing world remains unknown. This study seeks to explore the application of lean maintenance principles for public building maintenance. Consistent with the procedure of an exploratory sequential mixed methods research, literature reviews and focus group discussions were initially conducted to establish relevant indicators, followed by a general questionnaire survey. The results demonstrate a generally average level of application of lean principles for public building maintenance. The principal components analysis confirmed all indicators under nine-factor components. This paper contributes to knowledge by advancing the growing literature on lean building maintenance with particular emphasis in a resource-constraint setting like Ghana. The indicators established in this study are useful for maintenance teams to optimize their efforts to enhance

maintenance efficiency. Action points from this study have wider implications for public building maintenance in the developing world where lean maintenance practices are burgeoning.

Keywords: lean maintenance, public buildings, value stream mapping, Ghana.

Exploring Citizen-Centric Marketing Approaches for Enhancing Public Engagement in PolicyMaking in the Context of Ghana.

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Abstract: Citizen participation is a cornerstone of democratic governance, yet many governments particularly in developing contexts like Ghana struggle to achieve inclusive, informed, and sustained engagement in policy-making processes. This conceptual paper conducts a critical literature review to examine how citizen-centric marketing, adapted from private sector customer relationship strategies, can serve as a transformative approach to enhancing participatory governance. The theoretical foundation of the study was based on Public Value Theory and ServiceDominant Logic Theory. The data sources consist of peer-reviewed journal articles, academic books, government reports, and policy briefs published primarily between 2000 and 2024. Key databases such as JSTOR, Scopus, Google Scholar, and ScienceDirect. By integrating insights from public administration, communication, and social marketing, the study explores key mechanisms such as segmentation, trust-building, transparency, and multi-platform engagement in aligning policy efforts with citizen expectations. The paper also identifies contextual barriers, including institutional inertia and digital inequalities, which may hinder effective implementation. In response, a conceptual framework is proposed to guide future empirical investigations. The findings offer valuable implications for both theory and policy, emphasizing the need to embed citizen-centric practices within broader governance reforms in Ghana and similar democracies.

Assessment of food safety knowledge, attitudes, and practices of commercial salad vegetable farmers in the Eastern Region of Ghana

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Abstract: The depletion of natural resources and increasing of greenhouse emission led to awareness of the need for sustainable development in terms of safe reuse of waste. The transformation of these waste into valuable materials is emerging as a strong trend in this context. The correct solution to the disposal of wide range of solid waste could be its utilization into cement mortar or concrete. Cement kiln dust (CKD) is a byproduct generated during the production of cement, consisting of fine particles and alkaline compounds. On the other hand, ilmenite tailings are residues left from the extraction of ilmenite, a titanium-bearing mineral. The CKD and ilmenite tailings pose environmental

Abstract: Food safety risks, like poor water quality and handling, threaten public health in Ghana's Eastern Region, where farmers' food safety knowledge and practices are unclear. The study aimed to evaluate the food safety knowledge, attitudes, and practices (KAP) of salad vegetable farmers in the Eastern Region. The study was conducted using a descriptive, cross-sectional survey of 22 districts by conducting face-to-face interviews and administration of questionnaires to four hundred (400) salad vegetable farmers. The questionnaire was peer-reviewed and pilot-tested in three districts in the Eastern Region of Ghana before the final version was distributed to salad vegetable farmers. The questionnaire was structured into four distinctive parts to collect information on (i) demographic characteristics, (ii) knowledge, (ii) attitudes towards food safety, and (v) food hygiene practices. The survey data analyzed was based on *N*=390 useable responses. The study highlights positive practices among farmers, such as farm access restrictions (70%) and removing dirt from harvested salad vegetables (77%), but also identifies gaps in essential practices like treating irrigation water and manure sterilization. The lack of toilet facilities (12%) on most farms poses a significant risk of contamination. There is good awareness of proper handling and hygiene practices, but chemical contamination (76%) receives the most attention, while physical (37%) and microbial contamination (18%) awareness needs improvement. The study revealed that inadequate resources (51%), time constraints (53%), and poor record-keeping (64%) are major barriers to implementing effective safety practices. The study finds significant ($p<0.0$) positive correlations between knowledge, attitudes, and practices. This suggests that enhancing knowledge and fostering positive attitudes through regular training can improve food safety practices among salad vegetable farmers.

Keywords: Food safety, vegetables, farmers' attitude, knowledge, practices

Durability Performance of Mortar Incorporating Cement Kiln Dust And Ilmenite Tailings

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challenges and this research focused on durability performance of mortar with Cement Kiln Dust (CKD) and ilmenite tailings. Mortar specimens of 10% and 20% of CKD and 25%, 50%, 75% and 100% of Ilmenite tailings were prepared. These mortar mixes were then casted and then determined their compressive strength, water absorption by immersion and acid attack resistance test were performed. The bulk density and water absorption for the materials were evaluated. The results indicate that the compressive strength of mortar specimens decreases with increasing percentage of CKD, however, there are partial increased of strength at each percentage replacement of ilmenite tailings with curing age. The mortar specimens with 20% CKD replacement absorbed more water compared to 0% and 10% CKD replacement. The residual compressive strength of mortar specimens due to sulphuric acid showed a decreased in strength with 20% CKD at various replacements of ilmenite tailings. The visual appearance of a test specimens showed slight colour changes with weight loss compared to those specimens before exposure to sulphuric acid. Cement kiln dust and ilmenite tailings showed potentiality as suitable materials for mortar due to their excellent strength enhancement and resistance to acid attack and water absorption

Keywords: Ilmenite tailings, Cement Kiln Dust, Mortar, Bulk density, Compressive Strength, Water Absorption, Acid attack resistance.

Garment Fit: Anthropometric Data Collection Challenges of Male Fashion Designers in Ghana.

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Abstract: Anthropometric data is important in determining the overall appeal and functionality of the garment, which affects the comfort, aesthetics, and body image in fashion and clothing design. There is a growing trend of new fashionable designs and styles that fashion consumers exhibit. The garment styles exhibited by the consumers are produced by designers who have challenges in documenting the anthropometric data of customers. This paper aims to analyze the knowledge (skills and techniques) used in taking body measurements and identify garment fit problems of male fashion consumers. A transformational research approach of mixed method design was employed, and data were gathered from fashion designers of 4 regions (Accra, Kumasi, Takoradi, and Sunyani) of Ghana. A convenient sampling technique was used to select respondents for the study. The data collection methods were a questionnaire and an interview, while the data were thematically analysed. Findings revealed that male fashion designers utilized their accumulated skills and techniques to take body measurements and apply direct cuts on the fashion fabric; a few also obtained anthropometric data to construct patterns for producing celebrity garments. It is recommended that the

accumulated experience used in taking body measurements should be documented and used as a reference point to improve their sewing activities.

Keywords: Anthropometry data, fashion designers, male designers, Garment fit and style.

Assessing the moderating roles of Digitalisation, and Security Spending on Economic Growth in Africa

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Abstract: The African continent has experienced rapid technological advancements, particularly in digitalization. Alongside these developments, security expenditure has grown significantly in national budgets across several African countries. As countries modernize and secure their borders, it is crucial to explore how digitalization and security spending interact to influence economic growth. This study investigates the nexus between digitalization, security spending, and economic growth in Africa, a relationship largely unexplored in existing literature. Most studies have examined this relationship in isolation or through mean-based models, without accounting for its non-linear, heterogeneous, and asymmetric nature. The present study addresses this gap by employing the method of moments quantile technique, which is robust to outliers and captures diverse effects across different levels of economic growth. Results suggest their combined effect is consistently positive across all levels of economic growth, with the strongest impact in higher-growth economies. This underscores the importance of coordinated policies integrating digitalization into national security strategies, ensuring both investments reinforce each other to promote sustained economic development. The findings contribute valuable insights to the discourse on economic development, security, and digital transformation in Africa.

Keywords: Security spending, digitalisation, economic growth, method of moments quantile

Regression, Africa

Sustainable hybrid nanofiller-reinforced bio thermosets: A bibliometric and comprehensive review

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Increasing environmental concerns have prompted researchers to investigate hybrid nanofiller-reinforced biothermosets as sustainable substitutes for conventional thermosetting polymers, providing benefits in both cost and performance. This review thoroughly examines research on hybrid nanofillers, including graphene, carbon nanotubes, and nanocellulose, and their impact on improving bio-based thermosets' mechanical, thermal, and electrical characteristics. These advanced materials address critical shortcomings of bio-thermosets, like insufficient mechanical strength and flammability, by employing renewable and biodegradable resources. A bibliometric analysis clarifies trends, notable research, and prospective industrial applications in sectors like automotive, aerospace, and construction. Hybrid nanofillers improve material properties, hence fostering resource efficiency and waste reduction, by circular economy principles. Despite their potentials, challenges like dispersion, interfacial bonding, and scalability remain significant issues. The review emphasises innovative approaches and potential research directions for improving hybrid nanofiller-reinforced bio-thermosets in materials science and environmental sustainability.

Keywords: Hybrid nanofillers, bio-thermosets, sustainability, circular economy, industrial applications.

Is there a causal effect between the climate vulnerability components and the government tax revenue in Ghana? Autoregressive Distributed Lag Approach

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Abstract: According to the Country Climate and Development Report (CCDR), Ghana, being highly vulnerable to climate change, needs approximately $2 billion every year until 2050 to sustain its climate resilience initiatives, making tax revenue mobilization indispensable. The purpose of this study is to examine the causal relationship between Ghana's tax revenue mobilization and the climate vulnerability subcomponents (exposure, sensitivity, adaptive capacity, ecosystems), and other control variables. Using the Autoregressive Distributed Lag (ARDL), Granger-causality methods and a time series dataset covering 1990–2020, the ARDL shows that 1% increase in exposure, adaptive capacity and sensitivity climate vulnerabilities will decrease in tax revenue mobilization by 7.9%, 5.8% and 1.4% respectively. However, increase in adaptive capacity will increase tax revenue mobilization by 5% in the short-run giving future fluctuation in tax revenue mobilization due to shocks. In the long-run, adaptive capacity climate vulnerability of lag and of first difference, showing 1% increase will cause increase in tax revenue mobilization by 6.5% and 5% respectively, while lag and first difference in sensitivity vulnerability leads to decrease tax revenue mobilization by 5% and 1.4% respectively. The serial number (i.e. S/N) 2, 6, and 8 of Granger-causality test results show unidirectional whereas S/N 7 exhibits a bidirectional relationship.

Optimal intervention strategies and cost-effectiveness analysis regarding students' lateness to classes in educational institutions

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Abstract: Students' lateness is a universal issue that negatively affects both academic performance and the general learning environment. It is an ongoing problem that bothers teachers, school administrators and parents. Effective control of lateness helps to improve classroom activities and ensure time management skills for teachers and students. This paper presents an optimal control and cost-effectiveness analysis of student lateness in educational institutions incorporating awareness campaigns $(u1)$, attendance monitoring $(u2)$ and counseling $(u3)$ as control strategies. We utilized the Fleming and Rishel's criteria to explicitly show the existence of the lateness control model. The optimal controls is then characterized in terms of the optimality system. Further, a MATLAB software was utilized to execute an iterative model scheme, providing numerical scenarios using the Runge-Kutta order 4 approach, updating controls within the specified range. We further investigated into how the model parameters influenced the Lateness basic fundamental number in the population by using the PRCC plot which is the best technique for global uncertainty analysis. It was observed that $v1$ and $v2$ were inversely related to the threshold number whereas parameters like α, ω, and Ω exhibited a direct relationship with the threshold number. These observations are essential as they contribute in determining the parameters that are very sensitive to the threshold number and therefore necessary to be put under control. From the optimal control graphs and cost-effective analysis, it was observed that strategy two, that is, the attendance monitoring control strategy $u2$ is the most effective control measure to combat the students lateness behavior in educational institutions. This observation is valid as we observed from the average ACER and ICER analysis that the attendance monitoring control strategy recorded the least or cheapest cost in the utilization of the control interventions suggested in this study.

Keywords: Optimality System, Pontryagin's Maximum Principle, Regular lateness, Habitual lateness, Incremental Cost-Effectiveness Ratio, Average Cost-Effectiveness Ratio.

Utilizing Remote Sensing and GIS for Assessment of Potiskum Urban Growth in Potiskum Local Government Area, Yobe State Nigeria

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Abstract: The most dynamic region on earth is the urban areas. Their sizes have been constantly increased during the past and this process will continue in future. In less developed countries a strong trend toward concentration of people in urban areas can be observed. To effectively understand urban growth, remote sensing imagery is a reliable source. Potiskum local government with its headquarters in Potiskum is one of the local government areas which has the highest population in Yobe State. The need to determine the rate of which the area grow necessities the application of remote sensing and GIS techniques in accessing the urban growth between 1999 to 2018. Landsat 7 ETM satellite image of 1999, 2008, and Landsat 8 OLI of 2018 were processed using Arc GIS 10.6 and ERDAS imagine 2014 and analyzed the urban growth. The entire area was classified into four classes; water body, settlement, bare soil and farmland. The results revealed that within the period of study there were increased in settlement and farmland class by 3.42% and 0.44% respectively, and also decreased in water body and Bare soil by 0.35% and 3.51% respectively. The accuracy assessment was carried out for the four-classified map. Therefore, the study provides insight into understanding urban growth and aids in subsequent infrastructure planning, management, and decision-making. The study recommended the need to assess and monitor urban growth in the study area and similar towns using GIS and remote sensing techniques so as to meet up with basic human need.

Keywords: Utility, Remote sensing, GIS, Urban Growth, Assessment.

Castor and Yellow oleander Biodiesels: Comparative study of their Properties as sustainable alternatives to Diesel fuel.

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Abstract: The continuous and rapid depletion of world petroleum reserve, the high energy demand of the industrialized world as well as the domestic sector and pollution problem caused due to widespread use of fossil fuels make it necessary to develop renewable energy sources of limitless duration and smaller negative environmental impact than fossil fuel. In this study, oils extracted from Castor and Yellow oleander seeds oils using Soxhlet apparatus by direct extraction method were used to produce biodiesel through the two step Trans - esterification process. Properties of the biodiesels were characterized and compared to international biodiesel standard to find a better alternative to Automotive Gas Oil (AGO). Results from the study show that both biodiesels can conveniently replace fossil diesel as automotive fuels without engine modification. However, Castor oil biodiesel has better cold working properties while Yellow oleander oil gave more biodiesel yield with higher heating value and lower viscosity.

Key Words: Fossil fuel, Biodiesel, Automotive Gas Oil, Transesterification

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