



**KIRINYAGA UNIVERSITY
7TH ANNUAL INTERNATIONAL CONFERENCE
WEDNESDAY - THURSDAY, MARCH 27-28, 2024**

PROGRAMME AND BOOK OF ABSTRACTS

THEME

ADAPTIVE LEADERSHIP FOR SOCIETAL DEVELOPMENT

SUB THEMES

- ENGINEERING AND BUILT ENVIRONMENT
- ICT AND DIGITAL TRANSFORMATION
- HEALTH AND WELLNESS
- NATURAL AND PHYSICAL SCIENCES
- MATHEMATICS
- BUSINESS AND SUSTAINABLE DEVELOPMENT
- EDUCATION FOR SOCIETAL EMPOWERMENT

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KIRINYAGA UNIVERSITY

7TH ANNUAL INTERNATIONAL CONFERENCE, 2024

MARCH 27th – 28th, 2024

PROGRAMME AND BOOK OF ABSTRACTS

Editors

Prof. Charles, O. A. Omwandho, PhD

Dr. Jotham M. Wasike, PhD

Dr. Grace Kiiru, PhD

Dr. Paul Njenga, PhD

Dr. Wanjiku Njoroge, PhD

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PREFACE

As we embark on the 7th Annual International Virtual Conference of Kirinyaga University, it is with great pleasure and anticipation that we introduce the overarching theme of our gathering: "*Adaptive Leadership for Societal Development.*" In an ever-evolving world fraught with challenges and opportunities, the need for adaptive leadership has never been more critical. This theme serves as a guiding beacon, illuminating pathways towards a future where innovation, resilience, and inclusivity reign supreme.

Within the framework of this theme, our conference explores a rich tapestry of sub-themes, each representing a vital facet of societal advancement. From Engineering and Built Environment to ICT and Digital Transformation, Health and Wellness, Natural and Physical Sciences, Mathematics, Business and Sustainable Development, and Education for Societal Empowerment, our discourse spans diverse disciplines, encapsulating the multidimensional nature of adaptive leadership.

I extend my heartfelt gratitude to the University Management and the dedicated members of the organizing committee whose unwavering commitment and tireless efforts have made this conference possible. Their vision and diligence have transformed a mere concept into a vibrant platform for intellectual exchange and collaboration.

As we convene virtually from March 27th to 28th, 2024, let us seize this opportunity to engage in meaningful dialogue, foster connections, and inspire action. Together, let us chart a course towards a future where adaptive leadership serves as the catalyst for societal development and progress.

Dr. Jotham M. Wasike

Chairperson

DAY ONE: WEDNESDAY, MARCH 27TH, 2024**Dr. Jotham M. Wasike (Coordinator)****Dr. Paul W. Njenga (Co-Coordinator)****PROGRAMME****TIME: 8.30AM - 4.30PM**

TIME	ACTIVITY
8:30 am - 8: 40 am	Welcoming Remarks- Deputy Vice Chancellor (ASA), Kirinyaga University Prof. Charles, O. A. Omwandho, Ph.D
8: 40 am - 9.00 am	Opening Remarks -Vice Chancellor, Kirinyaga University Prof. Mary Ndung'u, Ph.D
9.00 am-10.45 am	Conference Registration Familiarization with the Conference Programme Parallel Sessions and Plenary
9.45 am-11a.m	Tea/Health Break
11.am-1.00 pm	Parallel Sessions and Plenary
1.00pm - 2.00 pm	Lunch/Health Break
2.00pm-4.30 pm	Parallel Sessions and Plenary
4.30pm	Closing/Tea

MORNING SESSION**9AM - 11AM****PARALLEL SESSIONS/ PLENARY**

SUB-THEME	ENGINEERING AND BUILT ENVIRONMENT
Chairperson	Dr. Emmanuel Mbusi
Rapporteur	Mr. Job Kabia

1. Rop, Bernard, Koipaton, Purity and Keter, Micah (Geofountain Synergy Consultancy, Kenya). Impact of Climate Change/Global Warming on Kenya's Recreational Coastal Structures and Hotels.
2. Otwola, William (Kirinyaga University, Kenya). Smart Mud Scrubber.
3. Odhiambo¹, Samson, Adhola², David O. (¹University of Eldoret, ²Siaya Institute of Technology, Kenya). Extension of Horizontal Controls Using Static Global Navigation Satellite System Technique in Kwale and Mombasa Counties, Kenya.
4. Ikumu, Wangui Lucy (University of Nairobi, Kenya). Factors Enhancing Vulnerability to Climate Shocks Using Sendai Framework for Disaster Risk Reduction for Community Resilience: Case of Bura North, Tana River County.

SUB-THEME	ICT AND DIGITAL TRANSFORMATION
Chairperson	Dr. Ephantus Mwangi
Rapporteur	Ms. Grace Kimani

1. Kariuki, Pauline (Nyandarua National Polytechnic, Kenya). Enhancing Cybersecurity Resilience in Kenya: A Comprehensive Analysis of Threats, Vulnerabilities, and Mitigation Strategies.
2. Kimote¹, Zipporah, Mutunga², Daniel (¹Kirinyaga University, ²Daystar University, Kenya). Digital Technology and Community Empowerment: Bridging the Rural-Knowledge Centre Gap.
3. Njuguna, Andrew and Kimote, Zipporah (Kirinyaga University, Kenya). Preserving The Past, Ensuring the Future: Challenges and Innovations in Digital Preservation of Information.
4. Kithinji, Joseph, Mugo, David, and Jepkoech, Jennifer (University of Embu, Kenya). A Comprehensive Study on the Utilization of Information and Knowledge Management for Societal Empowerment.

5. Rangili, Erick (Jomo Kenyatta University of Agriculture and Technology, Kenya). Improving Fault Diagnosis On Rolling Bearing Using a Hybrid of Convolutional Neural Network and Extremely Random Forest Models.

SUB-THEME	HEALTH AND WELLNESS
Chairperson	Dr. Immaculate Marwa
Rapporteur	Mr. Kenny Kamau

- Kawira¹, D.M., Mwari², S.P. (¹Kirinyaga University, ²Kenya Medical Training College, Chuka, Kenya). Impact of Family Planning Stockouts on Users in Tharaka-Nithi County, Kenya.
- Magambo, Margaret Ndiah, Wachira, Rebecca, and Gichohi, Paul Maku (Kenya Methodist University, Kenya). How Individual Counseling Impacts the Psychological Well-Being of Cancer Patients Receiving Care at Oncology Clinics in Meru County.
- Magambo, Margaret Ndiah, Wachira, Rebecca, and Gichohi, Paul Maku (Kenya Methodist University, Kenya). Impact of Family Counselling on the Psychological Well-Being of Cancer Patients Attending Oncology Clinics in Meru County.
- Kosgei, A.J. (Machakos University, Kenya). Quantitative Trait Loci(QTLS) for Yield and Yield-Related Traits in Chickpea (*Cicer Arietinum L.*) Under Drought Stress in Kenya.

SUB-THEME	MATHEMATICS
Chairperson	Dr. Peter Wanjohi
Rapporteur	Ms. Caroline Kimotho

- Kawira¹, Esther, King'ang'i², Denis, Musundi³, Sammy (^{1,3}Chuka University, ²University of Eldoret, Kenya). Hypercyclicity of Basic Elementary Operator
- Gathongo, Beatrice (University of Nairobi, Kenya). Discrete Erlang Mixed Distributions and their Properties.
- Owuor¹, Joseph, Okelo², Benard, Owino³, Julia, Kinyanjui⁴, Jeremiah (^{1,2,3}Jaramogi OgingaOdinga University of Science and Technology, ⁴Kirinyaga University, Kenya). On Interrelationship Between Density and Dentability in Norm-Attainable Classes.
- Muiruri, Peter Guchu, King'ang'i, Denis Njue, and Wabomba, Sammy Musundi (Chuka University, Kenya). On the Norm of Finite Length Elementary Operator in Tensor Product of C*-Algebras.
- Kawira¹, Esther, King'ang'i², Denis, Musundi³, Sammy (^{1,3}Chuka University, ²University of Eldoret, Kenya). Hypercyclicity of Basic Elementary Operator

SUB- THEME	NATURAL & PHYSICAL SCIENCES
Chairperson	Dr. Paul Njenga
Rapporteur	Ms. Lucy Kamau

1. Waweru¹, Gakuru Simon, Kiprotich², Sharon, Waithaka³, Peter. (Murang'a University of Technology, Kenya). Effects of Zn AND Fe Concentrations on the Optical and Structural Properties of Titanium Dioxide Nanoparticles.
2. Waithira¹, Samuel Ndungu, Kiprotich², Sharon, Wako³, Ali Halake, Simba⁴, Nyamato^(1,3) University of Embu, ²Murang'a University of Technology Kenya). Effects of Ph. on the Structural and Optical Properties of CaAl₂O₄: Eu²⁺, Dy³⁺Nanoparticles.
3. Isiaka¹, Amarachukwu, B., Anakwenze², Vivian N., Ezemba³, Chinyere, C., Ilodinso⁴, Chiamaka R., Anaukwu⁵, Chikodili G., Ezeokoli⁶, Chukwuebuka, M. Uzoka⁷, Ugonna, Uzoka, H. (¹Qatar Airways Medical Division, DOHA,^{2,4,5,6}NnamdiAzikiwe University, Awka, Anambra State, Nigeria,³Chchy Gilgal Laboratory and Consultancy Services, Nigeria). ⁷Universidade Federal de Viçosa Minas Gerais, Brazil.). Exploring the Role of Gut Microbiota in Human Health.
4. Waithira S. N.¹ Kiprotich S.² Wako A. H.¹ Simba N.². (University of Embu, Kenya, Murang'a University of Technology, Kenya). Effects of ph on Structural and Optical Properties of caal2o4: eu2+, dy3+nanoparticles.

SUB - THEME	BUSINESS AND SUSTAINABLE DEVELOPMENT
Chairperson	Dr. David Njoroge
Rapporteur	Ms. Grace Chomba

1. Gideon, Enock Musau (Kisii University, Kenya). Streets for People, Climate for Tomorrow: A Systematic Review of Active Transport Solutions and Adaptive Leadership in Societal Development.
2. Mwenja, Joyce and Mug, Kinuthia (Meru University of Science and Technology, Kenya). Risk Assessment of ERP Systems Implementation.
3. Rutto, David, K. L. and Omami Elizabeth, N. (University of Eldoret, Kenya). Traditional and Modern Marketing Channels for Horticultural Produce in Kenya: A Map Out of Channels Currently in Use by Farmers.
4. Koech, Alex and Korir, Loice (Umma University, Kenya). The Moderating Effect of Technological Innovation on the Relationship Between Mobile Banking Accessibility and Financial Performance of SMEs in Kajiado County, Kenya.

5. Mabururu, Michael Ntabo and Knowen, Cosmas Beri (Rongo University, Kenya). Harnessing Capacity Building and Co-Creation of Indigenous Knowledge for Climate Change Resiliency in Kenya.
6. Kiiru, Grace (Kirinyaga University, Kenya). Leveraging Innovation, Technology and Diversification as Strategic Business Responses to Economic Challenges in Kenya: A Review.

SUB - THEME	EDUCATION FOR SOCIETAL EMPOWERMENT
Chairperson	Dr. Anne Muiru
Rapporteur	Ms. Cynthia Ogali

1. Wapukha¹, Precious Joan, Chore², Allan, Muiru³ , Anne (^{1,3}Kirinyaga University, ²Garissa University, Kenya). Historicism of Pandemics: A Conduit for Societal Preparedness from Future Outbreaks in East Africa.
2. Naibei, Samoo Michael and Nyakundi, Enock Bosire (Kirinyaga University, Kenya). Impact of Family Roles and Dysfunction on Children's Mental Health: A Comprehensive Analysis.
3. Nyakundi, Enock Bosire and Naibei, Samoo Michael (Kirinyaga University, Kenya). How Social Media Has Negatively Affected the Mental Health of the Youth in Kenya.
4. Chemwei, Bernard¹, Changwony Rose² (¹Kirinyaga University, ²Kapropita Girls' High school, Kenya). Influence of Motivation on Girls' Performance in Mathematics in Kenya Certificate of Secondary Education (KCSE) In Baringo Central Sub-County.
5. Wafubwa¹, Ruth Nanjekho, Muluve², Eva, Lalinde³, Lina López, Kozak⁴, Meredith, Haberland³, Nicole (^{1,2}Population Council, Nairobi, Kenya,³Independent Education Specialist,⁴Population Council Inc). What Works to Improve Girls' Education in Low and Middle Income Countries: A Review of Literature.

MID MORNING PARALLEL SESSIONS/PRENARY

11.00PM – 1.00PM

SUB-THEME	ENGINEERING AND BUILT ENVIRONMENT
Chairperson	Eng. Rodgers Bosire
Rapporteur	Mr. Job Kabia

1. Wanjeru, Patrick (Muranga University of Science and Technology). Design of a Cost Effective Neutral Fuzzy Based Separately Excited DC Motor Speed Control.
2. Shee, Ali (Technical University of Mombasa, Kenya). Copper-Modified-Resin as Recyclable Catalysts for the Treatment of Chlorinated Organic Compounds in Water.
3. Mutunga, Daniel, Kositany-Cheruiyot, Jane, and Mogute, Mary (Daystar University, Kenya). An Analysis of Challenges of Climate Change Mitigation and Adaptation Strategies in the ASAL in Kenya.
4. Mbusi, E.T. (Kirinyaga University, Kenya). Growth and Trend of Construction Industry Output in Kenya: 1977-2023.
5. Sasaki Minoru, Kitamura Takahide and Iwata Kimihiko (Gifu University Tokai National Higher Education and Research System, Japan). Enhancing Practical Education Through Project-Based Learning: The Case of Gifu University Graduate School of Engineering's Experimental Rocket Project.

SUB-THEME	ICT AND DIGITAL TRANSFORMATION
Chairperson	Dr. Josphat Karani
Rapporteur	Ms. Grace Kimani

1. Guto¹, Richard, Obunde², Joan (¹Chuka University, ²Kirinyaga University, Kenya). The Nexus Between Information Audit in Collection Development and User Satisfaction for Societal Development: A Meta-Analytical Review.
2. Guto¹, Richard, Birgen², Stellah Jepkorir (¹Chuka University, ²Information Consultant). Record Management as a Basis for Enhancing Organizational Integrity and Development in County Government Systems in Kenya.
3. Wasike¹, Jotham, ²Wanjiku, Jackline (¹Kirinyaga University, ²Karatina University, Kenya). Exploring the Impact of Collaborative Knowledge Sharing on Integration with Business Processes in the Context of Nairobi County, Kenya.
4. Wasike¹, Jotham, Waswa², Evelyn, Sitati³, Samuel (¹Kirinyaga University, ^{2,3}Kibabii University, Kenya). Unravelling Knowledge Management Through Community of

Practice (COPs) Paradigms in Kenyan Universities for Sustainable Innovation and Collaboration.

5. Nthoki Muthoka, Jane and Njuguna, Andrew Kimanga (Kirinyaga University, Kenya). Navigating Digital Transformation: Harnessing Online Institutional Repositories for Advancing Research.

SUB-THEME	HEALTH AND WELLNESS
Chairperson	Dr. David Nderu
Rapporteur	Mr. Kenny Kamau

1. Ratanya, Scholastica (Technical University of Mombasa). Sustainable Governance Model in Health Care on Work Force Outcomes: An Analysis of Level Five (5) Hospitals in Mombasa and Kilifi Counties.
2. Mburu, Samuel (Kirinyaga University, Kenya). Tumour Microenvironment (TME) Targeting as a Promising Therapeutic Strategy in High Risk TNBC Patients.
3. Omari¹, Phanice Kerubo, Karanja², Simon Muturi, Mambo³, Susan (¹ University of Kabianga,^{2,3}Jomo Kenyatta University of Agriculture and Technology, Kenya). Unveiling the Path to Healthy Habits: Effect of School-Led Total Sanitation Intervention on Sanitation and Hygiene Knowledge and Practices among School-Going Children (Grade 4-7) in Baringo County, Kenya.

SUB-THEME	MATHEMATICS
Chairperson	Dr. Jeremiah Kinyanjui
Rapporteur	Ms. Caroline Kamotho

1. Njori, Peter (Kirinyaga University, Kenya). Exploring The Nature of Time as a Form of Energy and a Dimension of Space.
2. Ongili, Pancras, Lao, Hussein, and Kinyanjui, Jeremiah(Kirinyaga University, Kenya).On the Cyclotomic Cosets Over GF (37).
3. Kamotho¹, Caroline*, Ngure², Josephine, Kinyua³, Margaret (^{1,2} Kirinyaga University, KENYA,³KaratinaUniversity, Kenya). Modelling and Forecasting Daily Covid-19 Cases in Kenya Using SARIMA Model.
4. Mburu¹, Francis Nganga, Njori², Peter Wanjohi, Gitonga³, Cyrus Ngari, Moindi⁴, Stephen Kibet (^{1,2,3}Kirinyaga University, ⁴University of Nairobi, Kenya). Study of W₉ - Curvature Tensor on Lorentzian Para-Kenmotsu Manifolds.
5. Karunditu, Julia Wanjiku, Gitonga, Cyrus, and Wanjohi, Peter Njori (Kirinyaga University, Kenya). Modelling Density Dependent Escherichia Coli in Wastewater Treatment.

SUB-THEME	NATURAL AND PHYSICAL SCIENCES
Chairperson	Dr. Dickson Kinyua
Rapporteur	Ms. Lucy Kamau

1. Waithira¹, Samuel Ndungu, Kiprotich², Sharon Wako¹ Ali Halake, Simba¹, Nyamato (¹University of Embu, ²Murang'a University of Technology, Kenya). Effects of pH on the Structural and Optical Properties of CaAl₂O₄: Eu²⁺, Dy³⁺Nanoparticles.
2. Waithaka¹, Paul Njenga, Githaiga² Benson Muriuki (¹Kirinyaga University, ²Egerton University, Kenya). Seasonal Variation of Antibiotic Producing Actinomycetes from Menengai Crater, Kenya.

SUB- THEME	BUSINESS AND SUSTAINABLE DEVELOPMENT
Chairperson	Dr. Agnes Mutiso
Rapporteur	Ms. Grace Chomba

1. Gachanja, Isaac Muiruri (University of Embu, Kenya). Influence of Leadership on Innovation Efficiency in Manufacturing Firms in Kenya.
2. Elingit, Romano Okwi (Kisii University, Kenya). Effects of Transformational Leadership on Employee Motivation among Hospitality Enterprises in Kenya.
3. Mungai, Daniel (Kirinyaga University, Kenya). Financing Options and the Sustainable Development of Real Estate in Nairobi Metropolitan Area.
4. Maina¹, John Kamau, Mberia², Hellen, Muchunku³, Idaho Gatwiri, Maina⁴, Mary Wanjiru (^{1,2,3}Jomo Kenyatta University of Agriculture and Technology, KENYA,⁴Kirinyaga University, Kenya). Opinion Leaders in Interpersonal Communication and Their Influence on Alcohol Consumption Among Students in Government Tertiary Colleges in Kenya.
5. Ngumbi¹, Elizabeth, and Wasike², Jotham (¹Freelance Consultant and Researcher, ²Kirinyaga University, Kenya). Gender Norms: Barriers to Women's Economic Empowerment.
6. Muriithi, Carol, Maina, Mary and Mutiso, Agnes (Kirinyaga University, Kenya). Effect of Economic Activities on the Financial Performance of Listed Commercial Banks in Kenya.

SUB - THEME	EDUCATION FOR SOCIETAL EMPOWERMENT
Chairperson	Prof. Jane Kerubo

Rapporteur	Ms. Cynthia Ogali
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1. Muthara, Frashier W., Kithinji, Wendyjoy K., John, Charles M., Lagat, Daniel K. (Affiliation). Education Financing, Morality and Student Academic Performance in Selected Institutions of Higher Education in Kenya.
2. Nderitu, Nene (Kirinyaga University, Kenya). Influence of Corporate Governance Practices On Achievement of Educational Goals in Public Secondary Schools in Kirinyaga County, Kenya.
3. Ntalala, Safari (Kirinyaga University, Kenya). A Probe into the Challenges Faced by Children in Learning English as a Second Language: The Case of a Six-Year-Old.
4. Ng'enda, Mary, Wangeri, Tabitha and Kinai, Theresa (Murang'a University of Technology, Kenya). An Investigation of Parental Career Support Factors as Correlates of Career Decision Making among Secondary Students in Murang'a County, Kenya.
5. Enock, Musau Gideon (Kisii University, Kenya). Streets for People, Climate for Tomorrow: A Systematic Review of Active Transport Solutions and Adaptive Leadership in Societal Development.

AFTERNOON PARALLEL/PLENARY**2PM -4.30PM**

SUB-THEME	ENGINEERING AND BUILT ENVIRONMENT
Chairperson	Eng. Moses Mwai
Rapporteur	Mr. Simon Cheptum

1. Mburia, Lydia Nyawira (Daystar University, Kenya). Structures, Size and Trends of the Forest Sector & Global, Regional and National Comparative Studies.
2. Bosire¹, R.N., Gombe², Daniel (¹Kirinyaga University, ²Kenya Power Institute, Kenya). Biodegradable Composite Material for Construction Application.
3. Olowo, Sunday, Idris, Ismaila, Olawale, Surajudeen Adebayo, Olawale, Surajudeen, Joseph Adebayo, Ojeniyi, Joseph Adebayo, Isah, A. O., Subairu, S.O (Federal University of Technology Minna, Nigeria). Diffie Hell-Man Key Exchange Encryption Mechanism for Securing Data from Man-In-The-Middle Attack.
4. Wambugu, Patrick Gatonye (Nyandarua National Polytechnic, Kenya). Motorbike to Electric Bike Conversion and the Design of a Unique Electric Scooter to Reduce Emissions, Reduce Fuel Expenditure and Manage Electronic Waste.
5. Sitoya¹, Moses, Maina², Paul, Muliwa³, Anthony (Moi University, Kenya). Evaluation of Combustion Performance of Briquettes-Firewood Co-Fired Tea Factory Boiler.
6. Owino, Jane, and Kemboi, Benjamin Opicho (Technical University of Kenya). Administrative Framework Governing Development and Management of Renewable Energy in Kenya: A Case of Wind Turbines in Ngong Hills Forest Ecosystem.

SUB-THEME	ICT AND DIGITAL TRANSFORMATION
Chairperson	Dr. Kennedy Malanga
Rapporteur	Mr. Harrison Karani

1. Ngumbi¹, Elizabeth, Wasike², Jotham (¹Education Consultant , ² Kirinyaga University, Kenya). Rise of Fake News in Kenya: Impact and Mitigation Measures in 21st Century.
2. Kimuna¹, Caroline, Kitui², Festus and Sisa³, Richard. (¹Jomo Kenyatta University of Agriculture and Technology,²National Industrial Training Authority, Kenya,³International Consultant, Records and Archives (UNFPA). Strategic Knowledge Management: Unveiling the Nexus of Organizational Success.
3. Kimani, Grace, Karani, Josphat, and Mwangi, Ephantus (Kirinyaga University, Kenya). A Systematic Review of Credit Rating Variables

4. Kipkorir, Peacemark, Mwangi, Ephantus, and Wasike, Jotham (Kirinyaga University, Kenya). A Machine Learning-Based Packet Sniffer for Secure Traffic Monitoring and Analysis in Computer Networks.
5. Karimi, Phyllis (Kirinyaga University, Kenya). The Role of Blockchain Technology in Strengthening Cybersecurity for Societal Empowerment.

SUB-THEME	HEALTH AND WELLNESS
Chairperson	Prof. Laura Wangai
Rapporteur	Ms. Mercy Njuguna

1. Kirui¹, Meshack Kemei, Obondi², Geoffrey, Nderu³, David and Mundu⁴, Elly (Kirinyaga University, Kenya). Discrimination of Blue and Black Ballpoint Pens' Ink and Its Effectiveness in Forensic Investigations.
2. Alwora Angela, Butto, Amarch Marwa, Immaculate. (Kirinyaga University, Kenya). Outcome of Sexual Assault Offenses' Forensic Investigation in Butere Sub-County, Kakamega County, Kenya: The Influence of Coordination Between Medical and Legal Sectors.
3. Lunani¹, Mike W, Webale², Mark K, Munyekeny³, Godwil, O., Chimbevo⁴, Lenny M. (^{1,2,3}Kirinyaga University,²Pwani University, Kenya). Distribution of Fingerprints Patterns among Non-Siblings, Gender and Sub-Ethnic Populations in Western Kenya.
4. Kariuki, Margaret W. (Kirinyaga University, Kenya). Assessing the Impact of Nano-Encapsulated Repellent Application to Cattle Ears on *Rhipicephalus Appendiculatus* Infestation.

SUB-THEME	MATHEMATICS
Chairperson	Dr. Joseph Esekon
Rapporteur	Mr. Joseph Karomo

1. Karanu, Kennedy Kibe, Kayiita, Zachary and Kinyanjui, Jeremiah (Kirinyaga University, Kenya). The Property of Unitary Quasi-Equivalence on Θ -Operators.
2. Wanjala¹, Victor, Adhiambo², Beatrice Obiero, Mburu³, F.N (^{1,2}Rongo University, ³Kirinyaga University, Kenya). On K+1*D-Operator.
3. Warue¹, Edith, Musundi², Sammy, Ndung'u³, Jeremiah (^{1,2}Chuka University, Kenya, ³Kirinyaga University, Kenya). Characterization of Square Normal Operators.

4. Kamau, J. N. and Njori, P.W. (Kirinyaga University, Kenya). Optimizing Fine Needle Design to Minimize Needle Tract Seeding in Cancer Diagnosis: A Computational Fluid Dynamics Study.
5. Gicheru, James Gathungu, Gitonga, Cyrus Ngari, Njori, Peter Wanjohi (Kirinyaga University, Kenya). Modelling Emissions of Carbon (IV)Oxide from Fossil Fuels and Human Activities.

SUB-THEME	NATURAL AND PHYSICAL SCIENCES
Chairperson	Dr Agatha Wagutu
Rapporteur	Mr. Peter Muiru

1. Onsate¹, Wislay Nyangau, Keheze², Fanuel Mugwang'a, Muna³, Joseph Karanja (^{1,2}Pwani University, Kirinyaga University, Kenya). Opto-Electrical characterization of Bio-Dye extract from Baobab and Neem Tree Leaves for Dye Sensitized Solar Cell Application.
2. Gitari^{1,2}, W.M, Mudzielwana², R, Ayinde³, W.B, Izuagie,A.A, Denga⁴, E (¹Technical University of Kenya,^{1,2,3}University of Venda, South Africa, ⁴Adeyemi College of Education, Nigeria). Sustainable Water Defluoridation Technology: Development and Testing of Adsorbents at EnviReN Research Group, South Africa.

SUB-THEME	BUSINESS AND SUSTAINABLE DEVELOPMENT
Chairperson	Dr Grace Kiiru
Rapporteur	Mr Francis Kamau

1. Musyoka, Collins, and Wanjohi, Peter (Kirinyaga University, KENYA). Determinants of Effective Logistics Coordination Among Humanitarian Organizations in Kenya Organization in the North Eastern Region in Kenya.
2. Gichuru, Eutychus Ngotho (Makerere University, Uganda). Building Resilient and Sustainable Organizations: A Strategic Human Resource Approach in Disruptive Times.
3. Mwangi, Peter (University of Embu, Kenya). Inventory Management Practices, Retailer-Supplier Collaboration and Supply Chain Performance of Retail Stores in Nakuru County, Kenya.
4. Nkanata, Susan (Kirinyaga University, Kenya). Harnessing Artificial Intelligence for Enhanced Performance Management in Organizations: A Case Study of Safaricom, Kenya.
5. Wasike, Philip Wanjala, Namusonge, Gregory, S. and Makokha, Elizabeth Nambuswa (Jomo Kenyatta University of Agriculture and Technology, Kenya). Project Monitoring and Evaluation on Road Construction Projects Performance in Kenya.

6. Odunga, Pius (Kirinyaga University, Kenya). Impact of Tourism on the Economy of Kenya: Tourism Gross Fixed Capital Formation Multiplier Effects.
7. Wasike, Judith (Technical University of Kenya). Assessing Procurement Planning Practices in Motor Vehicle Assembly: Implications for Organizational Performance.

SUB-THEME	EDUCATION FOR SOCIETAL EMPOWERMENT
Chairperson	Dr. Bernard Chemwei
Rapporteur	Mr. James Kamau

1. Wafubwa¹, Ruth Nanjekho, Muluve², Eva, Austrian³, Karen (^{1,2}Population Council, Nairobi, Kenya,³GIRL Centre-Population Council). Learning Beyond Lockdown: Understanding Adolescent School Retention in Kenya Post COVID-19.
2. Samoo, Michael Naibei (Kirinyaga University, Kenya). Embracing Mental Wellness: A Call for the Incorporation of Mental Health Curriculum in Educational Institutions in Kenya.
3. Chege, Samuel Nganga and Githaiga, Nancy Muthoni (Murang'a University of Technology, Kenya). Indigenous Languages: Key to Climate Change Mitigation and Adaptation.
4. Okello, Lazarus Millan and Ogada, Jecinter (Rongo University, Kenya). Relationship Between Institutional Culture and Arson in Public Boarding Secondary Schools in Kisumu County.
5. Mwaura, Ruga, S. N (Technical University of Kenya). Influence of Strategic Human Resource Management Practices on Performance of Public Universities in Kenya.
6. Ngunyi¹, H., Irungu², C., Muiga³, M. (¹Daystar University, ^{2,3}Kirinyaga University, Kenya). Babies and Books: Influence of Student-Motherhood on the Challenges Experienced by Undergraduate Student Mothers in Kirinyaga University, Kenya.

DAY TWO: THURSDAY, MARCH 28TH, 2024**Dr. Grace Kiiru (Coordinator)****Dr. Wanjiku Njoroge (Co-Coordinator)****PROGRAMME**

TIME	ACTIVITY
9.00 am - 10.45 am	Conference Registration Conference Programme Familiarization Parallel Sessions/Plenary
10.45am-11.00 am	Tea/Health Break
11.00 am-1.00pm	Parallel Sessions/Plenary
1.00pm- 2.00pm	Health Break
2.00pm-3.30 pm	Parallel Sessions/Plenary
3.30 pm - 3.40pm	Closing Remarks from Deputy Vice Chancellor (ARSA), Kirinyaga University Prof. Charles O. Omwandho, Ph.D
3.40pm - 4.00pm	Closing Remarks Vice Chancellor, Kirinyaga University, Prof. Mary W. Ndung'u, PhD
4.00pm - 4.10pm	Announcements /Issuance of Certificates
4.10pm - 4.20pm	Vote of thanks by Representative of Participants
4.20pm - 4.30pm	Vote of thanks from Coordinator Dr. Grace Kiiru
4.30 pm	End of the Conference

MORNING PARALLEL/PLENARY**9AM- 11AM**

SUB-THEME	ICT AND DIGITAL TRANSFORMATION
Chairperson	Dr. James Mwikya
Rapporteur	Mr. Harrison Karani

1. Cheruiyot, Eudiah and Toroitich, Rael (Kabarak University, Kenya). Enhancing Societal Empowerment through Effective Information and Knowledge Management Initiatives.
2. Ubaga¹, Ephrine Kiarie², Grace, Rotich³, Kenneth (^{1,2}Daystar University, ³Egerton University, Kenya). Re-Engineering University Library Services with Emerging Technologies in Kenya: Prospects and Challenges.
3. Ubaga, Ephrine, Kisia, Oliver, and Kiarie, Grace. (Daystar University, Kenya). Shaping the Adoption and Use of Artificial Intelligence in Academic Libraries in Kenya
4. Ndiema¹, William and Magati², Clinton (¹Kabarak University, ²Maasai Mara University). AI Integration in Land Management.
5. Masinza¹, Faith Lugulu, Lusala², Henry Lucheli, Kimoriot³, Maureen Jeruto (^{1,2}Garissa University, ³Kenya Methodist University, Kenya). Assessment of Staff Training Needs for Supporting Off-Campus Teaching at Selected University Libraries in Kenya.

SUB-THEME	HEALTH AND WELLNESS
Chairperson	Dr. Wanjiku Njoroge
Rapporteur	Ms. Mercy Njuguna

1. Maore¹, Sharon, Mecha², Ezekiel, Wabwile³, James, Maoga⁴, Jane, Omwandho⁵ Charles O.A., Oreng⁶, Purity, Konrad⁷, Lutz (^{1,2,3,5} University of Nairobi, Kenya,^{2,4,7}Justus-Liebig University, Giessen, Germany, ^{2,3,5} Department of Biochemistry, Kenya, ⁵Kirinyaga University, Kenya, ⁶ Institute of Primate Research, Karen, Kenya). Nutritional Value of Zinc Ions in Endometriosis Pain Management.
2. Oreng^{1,6}, Purity Apiyo, Wabwile², James Jacob Mecha³, Ezekiel Onyonka Maore⁴, Sharon Mwendwa, Omwandho⁵, Charles, Mwethera^{1,6} Peter (¹ Kenyatta University, Kenya ^{2,3,4,5}University of Nairobi, Kenya,⁵Kirinyaga University, Kenya,⁶Kenya Institute of Primate Research, Kenya). Morphological Diversity of Pilobolus Fungi on Herbivore Dung at the Pwani University Farm.

3. Jane Maoga^{1,2}, Muhammad A. Riaz¹, Ezekiel Mecha^{1,4}, James Jacob Wabwile⁴, Agnes Mwaura¹, Purity Oreng⁶, Charles O.A. Omwandho^{4,5}, Scheiner-Bobis G²and Konrad¹, Lutz (^{1,2}Justus-Liebig University, Giessen, Germany, ²Children's Hospital Boston, Boston, USA, ³ Justus-Liebig University, Giessen,Germany,⁴University of Nairobi, Nairobi, Kenya,⁵Kirinyaga University, Kenya, ⁶ Institute of Primate Research, Kenya).Membrane-Type 1 Matrix Metalloproteinase (Mt1-Mmp, Mmp14) in Serum Samples of Patients with Endometriosis.
4. Mecha^{1,3}, Ezekiel, Wabwile¹, James Jacob Maore², Sharon, Oreng⁷, Purity. Omwandho^{1,6}, Charles O.A Maoga^{3,4}, Jane Riaz³, Muhammad, A. Scheiner-Bobis, G⁵ and Konrad³, Lutz (^{1,2} University of Nairobi, Nairobi, Kenya,^{3,5}Justus-Liebig University, Giessen, Germany,⁴Children's Hospital Boston, Boston, MA, USA,⁶Kirinyaga University, Kenya,⁷Institute of Primate Research, Kenya). Cyclooxygenase 2 (Cox2) and Pain Management in Human Endometriosis.

SUB-THEME	BUSINESS AND SUSTAINABLE DEVELOPMENT
Chairperson	Prof. Pius Odunga
Rapporteur	Ms Nancy Gaceri

1. Muigai¹, R. Gitau, Wamweya², Edward (¹Kirinyaga University,²Jomo Kenyatta University of Agriculture and Technology, Kenya). Effect of Financial Innovation Strategies on Growth of Microfinance Institutions in Kirinyaga County.
2. Muigai², R. Gitau¹, Muriithi Jane Gathigia² (¹Kirinyaga University,² Africa International University, Kenya). Influence of Microfinance Services on Financial Performance of Micro, Small and Medium Enterprises in Kirinyaga County.
3. Kisirkoi, Samson (Maasai Mara University, Kenya). Strategies of Retirement Preparedness for Happy and Healthy Aging.
4. Ngatia, Regina Njeri, Osoro, Anthony, and Nyang'au, Samson Paul (Jomo Kenyatta University of Agriculture and Technology, Kenya). Green Supply Chain Management and Performance of Food and Beverages Manufacturing Firms in Kenya.
5. Njoroge, D.I, Kamau, S. and Ndirangu, Z.W. (Kirinyaga University, Kenya). Effect of Conflict and Grievance Management On Employee Retention Among Medical Practitioners in County Governments in Kenya: A Case Study of Kirinyaga County
6. Mbugua, Annevelyn Njoki (Jomo Kenyatta University of Agriculture and Technology). Value Chain Management Practices and Performance of Food and Beverage Manufacturing Firms in Kenya.
7. Alani, Jimmy (Gulu, Uganda). Technology, National Output, and Innovation in Uganda, 1970-2020: A Case of Adaptive Leadership.

SUB-THEME	EDUCATION FOR SOCIETAL EMPOWERMENT
Chairperson	Dr. Justus Muuasya
Rapporteur	Mr Francis Kamau

1. Muthoni, Murage Lucy (Karatina University, Kenya). Influence of Shared Leadership on Student Leaders' Effectiveness in Public Universities in Kenya.
2. Ombati, Robert Mosomi, Karuti, Jephitha Kirimi and Kamiru, Purity Kanja(South Eastern Kenya University, Kenya).Microcredit and Poverty Levels in Arid Lands of Kenya: A Case of Kitui County.
3. Mulianga¹ S. S., Namusonge², G.S, Nambuswa³, E. M. (¹Kibabii University, ^{2,3}Jomo Kenyatta University of Agriculture and Technology, Kenya). Earnings Ability and Financial Performance of Deposit Taking Micro Finance Banks in Kenya.
4. Muusya, Justus (Kirinyaga University, Kenya). Mchangowa Kiswahili Katika Kuzuia Maeneziya Mara dhiya Ukimwi.
5. Musasia, Clinton (Masinde Muliro University of Science and Technology, Kenya). Governance Structures and Completion Rate of Graduate Students in Public Universities Kenya.

MID MORNING PARALLEL SESSIONS/PRENARY**11.00PM - 1.00PM**

SUB-THEME	ICT AND DIGITAL TRANSFORMATION
Chairperson	Dr. Catherine Mukunga
Rapporteur	Mr. Stephen Kahungura

1. Wambui, Wilson Kabucho (Nyandarua National Polytechnic, Kenya). Integration of Expert Systems in TVET Libraries Amidst 4IR Era in Kenya.
2. Kitui¹, Festus, Kimuna², Caroline, Sisa³, Richard, Ngugi⁴, Jamleck (¹Natiomal Industrial Training Authority, ²Jomo Kenyatta University of Agriculture and Technology, Kenya, ³UNFPA). Emerging Technologies: Navigating Opportunities and Challenges.
3. Reuben¹, James Mwikya, Okeyo², Washington (¹Kirinyaga University, Kenya,²The Management University of Africa, Kenya). Training and Skills Alignment for the AI Generation.
4. Kimote, Zipporah and Njuguna² Andrew (Kirinyaga University, Kenya). Navigating the 21st Century: Unraveling New Frontiers in Knowledge Management.
5. Karimi, Phyllis (Kirinyaga University, Kenya). Integration of Internet of Things (IoT) in Smart Infrastructure for Sustainable Urban Development.
6. Abdullahi¹, Abdulazeez Adebayo², Olawale Surajudeen, Sikiru³, Subairu Olanrewaju, Ismaila⁴, Idris , Ojeniyi⁵, Joseph Adebayo , Olalere⁶, Morufu (^{1, 2, 3, 4, 5, 6}Federal University of Technology Minna, Nigeria, ²Islamic University in Uganda, Uganda). Comparative Analysis of Machine Learning Approach for Online Credit Card Fraud Detection.

SUB-THEME	HEALTH AND WELLNESS
Chairperson	Dr. Samuel Mburu
Rapporteur	Ms. Angela Alwora

1. Kimoloi¹, Sammy, Baris², Olivier, Wiesner³, Rudolf (¹MasindeMuliro of science and Technology, KENYA,² Institutional affiliation: InstitutMitoVasc, Universitéd'Angers, France, ³University of Cologne, Germany). Myofiber-Specific Accumulation of Mitochondrial DNA Deletions Causes Body Weight Loss and Bone Abnormalities in Mice.
2. Mbisi¹, Annastacia, Ngari², Dennis Mugambi, Kinoti³, Timothy, Njogu⁴, Teresia (¹Kirinyaga University, ^{2,3}Chuka University, Kenya,⁴University of New South Wales Australia). The Level of Knowledge and Practice of Secondary Prevention Among

Type 2 Diabetes Mellitus Patients at Selected Healthcare Facilities in Meru County, Kenya

3. Ngari, Charles Wanjohi (Kirinyaga University, Kenya). Modeling Dynamics of Cholera a Perspective of Blood Groups, Treatment and Optimal Control.

SUB-THEME	BUSINESS AND SUSTAINABLE DEVELOPMENT
Chairperson	Dr. Robert Gitau
Rapporteur	Ms. Nancy Gaceri

1. Wanyonyi¹, Nobert, W, Mutsotso², Beneah M, Anangwe³, Kathleen, A, Kariuki⁴, James, G. (Kibabii University, University of Nairobi, Kenya). The Farm Input Support Program and Food Security: Challenges and Possibilities as is in the Case of Bungoma County, Kenya.
2. Ikumu, Wangui Lucy (University of Nairobi, Kenya). Coping Strategies of Social Protection Programs to Climate Shocks in Tana North, Tana River, Kenya.
3. Sylvia, Sirai Chebet (Kibabii University, Kenya). Determinants of Online Shopping and Customer Satisfaction among Employees of the County Government of Bungoma, Kenya.
4. Muriithi¹, Jane Gathigia and Muigai², Robert Gitau (Africa International University, Kenya, Kirinyaga University, Kenya). Internal Control Systems and Financial Performance of Companies Listed in Nairobi Securities Exchange.
5. Wasike, Philip Wanjala, Namusonge, Gregory, S. and Makokha, Elizabeth Nambuswa (Jomo Kenyatta University of Agriculture and Technology, Kenya). Project Communication and Road Construction.
6. Maosa, Robert Okari (Moi University Eldoret, Kenya). Strengthening Ethical Political Leadership for Sustainable Development in Africa: Kenyan Perspective.
7. Gichuru, Eutychus Ngotho (Makerere University, Uganda). Leveraging Hybrid Governance: How Collaborative Leadership Can Drive Social Empowerment and Educational Development.

SUB-THEME	EDUCATIONFOR SOCIETAL EMPOWERMENT
Chairperson	Dr. Safari Ntalala
Rapporteur	Ms Millicent Machweni

1. Kahiga, Edward Mutahi, Kibaara, Tarsilla and Gichohi, Paul Maku (Kenya Methodist University, Kenya). Influence of Institutional Capacity on the Competitiveness of TVET Institutions in Nyeri County.

2. Kahiga, Edward Mutahi, Kibaara, Tarsilla and Gichohi, Paul Maku (Kenya Methodist University, Kenya). Financial Management Practices and the Competitiveness of TVET Institutions in Nyeri County.
3. Magaju¹, Jacinta*, Kithinji², Winfred, Kanyi³, Charles (1³ Kenya Methodist University, 2 Aga Khan University, Kenya). Teacher Preparedness and the Implementation of the MTE Policy in Public Lower Primary School Education in Meru County, Kenya.
4. Muhanga, Cyrus Mboleya, Wamocha Lydia and Kageha, Zilpah (Masinde Muliro University of Science and Technology, Kenya). Effect of Respondents' Characteristics On Schooling Among Street and Non-Street Children in Nakuru, Kenya.
5. Ngumbi¹, Elizabeth, Thuo², Simon, Wasike³, Jotham (1Skyrokers Training Institute, 2Resilience Center, Kirinyaga University, Kenya). Effects of Prolonged Climate Change (20-30 Years): Employing GESI and Other Resilience Measures.

AFTERNOON PARALLEL/PLENARY**2PM -3.30PM**

SUB-THEME	ICT AND DIGITAL TRANSFORMATION
Chairperson	Dr. Victor Mageto
Rapporteur	Mr. Stephen Kahungura

1. Kiplagat, Sally (Egerton University, Kenya). Effect of Technological Changes on Library Operations and Services at Egerton University.
2. Oginga, Hillary Odongo (Kirinyaga University, Kenya). A Transformer Model for Detecting Septoria Leaf-Spot Disease.
3. Njeru, Janice, Malanga, Kennedy, and Mwangi, Ephantus (Kirinyaga University, Kenya). A Systematic Literature Review on Hate Speech Detection Models: Advances, Challenges, And Future Directions.
4. Masinza, Faith Lugulu, Gichohi, Paul Maku, Nzioka, Catherine Mueni (Kenya Methodist University, Kenya). Assessment of Digital Literacy Skills for Supporting Off-Campus Teaching at Selected University Libraries in Kenya.
5. Kimotho, Alfred Njoka and Mwenja, Joyce Mugure (Meru University of Science and Technology). Leveraging Block Chain for Tamper-Resistant System Logs: Mitigating Manipulation of Change Log in Microsoft Dynamics Navision ERP.

SUB-THEME	HEALTH AND WELLNESS
Chairperson	Dr. Dennis Butto
Rapporteur	Ms. Angela Alwora

1. Bolo^{1,2}, Peter, Mucheru-Muna², Monicah, Kihara¹, Job ¹Alliance of Bioversity International and International Centre for Tropical Agriculture (CIAT), ²Kenyatta University, Department of Environmental Sciences and Education, Nairobi, Kenya). Nitrogen and Phosphorus Mineralization and Monetary Value Under Select Integrated Soil Fertility Management Practices in a Ferralsols of Western Kenya.
2. Wabwile¹, James Jacob, Mecha², Ezekiel Onyonka, Oreng⁴, Purity Achieng, Maore³, Sharon Mwendwa, Chandrakant⁷, Chirag Sheth Bärnighause⁶, Till, Omwandho⁵ Charles, Twieku⁸, Gideon, Nyaboga² Evans Nyaga (^{1,2,3} University of Nairobi, Kenya, ⁴, Kenyatta University, Kenya,⁵Kirinyaga University, Kenya, ⁶ Heidelberg University, Germany, CEU Cardenal Herrera University, Spain, ⁷Kwame Nkrumah University of Science and Technology, Ghana).Exploring Phytochemical Composition and Therapeutic Potential of *Rosmarinus Officinalis* Using Gc-Ms Analysis.

3. Maloba, Peter Mukhunya, Kimoloi, Sammy, Onyancha, Jared (Masinde Muliro University of Science and Technology, Kenya). Evaluation of Anti-Nociceptive, Antioxidant Activities and Phytochemical Composition of Fagaropsis Angolensis and Fagaropsis Hildebrandtii.
4. Kiplimo, Jacob, Mburu, Samuel, and Nyamu, Janerose (Kirinyaga University, Kenya). A Metric Scale-Based Assessment Framework for Risks Categorization and Associated Harm for Lms in Public.
5. Ngari, Charles Wanjohi (Kirinyaga University, Kenya). Modeling the Dynamics of Cholera: A Perspective On Blood Groups, Treatment, and Optimal Control.

SUB-THEME	BUSINESS AND SUSTAINABLE DEVELOPMENT
Chairperson	Dr. Dennis Muchangi
Rapporteur	Mr Stephen Kahungura

1. Barasa, Samuel, Lemeria, Isaac, and Ekesa, Nelson (Kirinyaga University, Kenya). Block Chain Technology and Performance of Supply Logistic Firms in Kenya.
2. Mogaka, Joshua Kengere (Kisii University, Kenya). Value Discipline Dimensions on Organizational Performance of Mobile Service Providers, Case Study of Kisii County, Kenya.
3. Andrew, Yano Kibet (University of Eldoret). Determinants of Farm Gate Dry Maize Grain Output on Household Income among Small-Scale Maize Farmers in Keiyo North sub-County, Elgeyo Marakwet County, Kenya.
4. Kambaga¹, Dunstan, Mongare², Omare (¹Technical University of Kenya, ²Kisii University, Kenya). Building Tourism Brands on Tourism Attraction at Manga Ridge in Kisii County, Kenya.
5. Muriithi¹, Ruth and Kariuki², Florence (Murang'a University of Technology, Kenya). Influence of Innovativeness On Growth of Microfinance Institutions in Murang'a County, Kenya.
6. Maosa, Robert Okari (Moi University Eldoret, Kenya). Navigating Local Democratic Governance, Poverty Reduction and Inequality: The Hybrid Public Governance.
7. Cheruiyot, Eudiah., Toroitich, Rael (Kabarak University, Kenya). Leadership and Hybrid Governance for Social Empowerment and Development.

SUB-THEME	EDUCATION FOR SOCIETAL EMPOWERMENT
Chairperson	Dr. Daniel Langat
Rapporteur	Ms Millicent Machweni

1. Kerubo, Jane (Kirinyaga University, Kenya). The Role of Universities in Digital Skills Training for the 21st Century.
2. Barasa, Violet Nasambu (Kirinyaga University, Kenya). African Literature and the Question of Leadership for Societal Development.
3. Chemwei, Bernard (Kirinyaga University, Kenya). Implementation of Child Friendly Schools Initiative (CFSI) in Public Primary Schools in Northern, Kenya: Impediments and Solutions.
4. Muiru, Anne (Kirinyaga University, Kenya). University Students Stress Patterns in a Kenyan Socio-Cultural and Economic Context.
5. Magaju¹, Jacinta*, Kithinji², Winfred, Kanyi³, Charles (^{1,3}Kenya Methodist University, ² Aga Khan University, Kenya). Influence of Instructional Materials on the Implementation of The MTE Policy in Public Lower Primary School Education in Meru County, Kenya.

ABSTRACTS

SUB-THEME: ENGINEERING AND BUILT ENVIRONMENT

IMPACT OF CLIMATE CHANGE/GLOBAL WARMING ON KENYA'S RECREATIONAL COASTAL STRUCTURES AND HOTELS

*Rop B., Koipaton P., Keter M.
Geofountain Synergy Consultancy, KENYA
Correspondence: geofaountainsynergy2020@gmail.com*

Abstract

Emission of Greenhouse gases and aerosols to the atmosphere due to human activities thickens the layer of gases and prevent the sun's radiations from going back to the atmosphere hence global increase in temperature (Global warming) in effect causing climate change. This is a looming disaster on coastal structures that must be addressed in time to avoid future climatic disasters. The Kenya coastal structures, once a beauty of natural attraction, risks destruction due to global warming gradually increasing the sea level and likely to submerge the coastal structures in the near future. There is always a conflict between infrastructural developers and environmentalists hence the need to advocate for sustainable development strategies where both parties agree, so that we can develop, conserve and sustainably preserve nature as much as possible. As the controversy over the pros and cons of the worldwide coastal zones, due to global warming (climate change), continues, there is need particularly in Kenya, to have the Coastal Development Authority (CDA) initiate plans of managing the current coastal development areas and setting the Coastal Regulation Zone (CRZ) rules to protect future potential disastrous damages to recreational structures along the coastal region.

Keywords: *Impact, Climate Change, Global Warming, Kenya, Recreational Coastal Structures and Hotels.*

SMART MUD SCRUBBER

Otwola W.

Kirinyaga University, KENYA

Correspondence: otwola.william@students.kyu.ac.ke

Abstract

For many years the muddy shoes and feet problem has not been resolved in learning institutions, hospitals, research laboratories, and livestock farms. It is usually assumed that the use of mud scuppers at gates, doors of institutions is sufficient. For instance, in Kenya, decentralization and increased rate of setting up important projects like advancement of healthcare system moving from one level to upgrading to another level say level 5,6 being located in rural settings rather than urban centers predisposes patients and works to excess mud in those areas. Noteworthy as we improve our systems, our clients reside in undeveloped areas hence coming in with muddy shoes to modern facilities such as lifts, x ray units, ICU casualty, emergency departments and maternity which requires uttermost cleanliness, the race to digital future with smart infrastructure a critical factor to community development. In the considering mud problem in rural settings, innovation of a smart mud crabber will employ use of sensors to detect a person's presence, motor to run brush at a high speed, water jets from pipes and user interface to provide convenience to the user. The design is intended to use high quality materials to maximize durability. Service providers are forced to do repeated cleaning tasks during rainy seasons due to mud from public footprints. Smart mud crabber will offer high level service, cutting up the cost of renovating walls, economize use of water in cleaning floor and cabbros with overall intention of reducing cost of repairing and lowering risk of hospital acquired infections.

Keywords: *Smart, Mud, Scrubber.*

ENHANCING PRACTICAL EDUCATION THROUGH PROJECT-BASED LEARNING: THE CASE OF GIFU UNIVERSITY GRADUATE SCHOOL OF ENGINEERING'S EXPERIMENTAL ROCKET PROJECT

Sasaki M., Kitamura T., Iwata K.

Gifu University Tokai National Higher Education and Research System, JAPAN
Correspondence: *sasaki.minoru.n3@f.gifu-u.ac.jp*

Abstract

This paper presents the 2019 Experimental Rocket Project of the French Competition as a program within the Gifu University Graduate School of Engineering. Since 2005, participation in the experimental rocket launch campaign held in France has proven effective in fostering practical education and project-based learning within the Department of Mechanical Engineering. Sponsored by Planète Sciences, a member of the French National Space Research Center (CNES), this campaign aims to promote aerospace education and science among youth. Through hands-on experience encompassing planning, designing, manufacturing, launching, result analysis, and reporting of experimental rockets, students gain not only specialized knowledge and skills but also a broader perspective, comprehensive judgment, and enhanced communication abilities. The ultimate goal is to cultivate highly specialized individuals with autonomy and internationalism, essential qualities in today's globalized world.

The Gifu University team's participation in 13 experimental rocket launch campaigns in France from 2005 to 2019 has yielded significant success. Despite the challenges posed by the COVID-19 pandemic from 2020 to 2023, efforts to develop highly specialized human resources for the aerospace industry continued with the launch of the "Aerospace Production Technology Human Resource Development" project, in collaboration with Tokai National University Organization, Gifu Prefecture, and Kawasaki Heavy Industries Aerospace Company, Ltd. Furthermore, collaborative initiatives with high schools, such as the Can sat practical education program and space engineering course, facilitated by the Gifu Prefectural Board of Education, aim to further enhance practical education and promote interest in aerospace engineering among students.

In conclusion, the Gifu University Graduate School of Engineering's commitment to project-based learning and practical education not only benefits its students but also contributes to the development of human resources vital to the aerospace industry and regional innovation.

Keywords: *Project-Based Learning, Practical Education, Aerospace Engineering, Experimental Rocket Project, Collaboration, Student Engagement, Skill Development, Innovation.*

EXTENSION OF HORIZONTAL CONTROLS USING STATIC GLOBAL NAVIGATION SATELLITE SYSTEM TECHNIQUE IN KWALE AND MOMBASA COUNTIES, KENYA

Odhiambo¹, S., Adhola², D.O.²

¹University of Eldoret, KENYA.

²Siaya Institute of Technology, KENYA.

Correspondence: sodhiambo53@yahoo.com

Abstract

Static global navigation satellite system (GNSS) surveys deliver the highest accuracy positions available in a system, which occupies a point for longer periods of time than kinematic systems. Static systems include a range of survey styles from rapid static surveys to continuously operating stations, such as continuous operating reference systems (CORS). This study sought to undertake survey data search for all the existing Survey of Kenya (SoK) old control pillars within the project area, to identify appropriate sites for setting up new ground control (GCPs) pillars, monument the new GCPs as per SoK manual requirement and observe the new GCPs, process and reduce observations to get their adjusted coordinates. Three topographical maps i.e. 200/2 (Kwale), 201/1 (Mombasa) and 201/3 (Ukunda) were used to locate existing old control pillars within the project area. Eight appropriate sites were selected for new control pillars and monumented as per section I on survey marks of the SoK manual. Two of the five dual frequency GNSS receivers were set up on two base stations and three were used to rove over the new controls for a minimum of one hour before moving them to other new points. The GNSS data was later downloaded, converted into receiver independent exchange (RINEX) format and processed using Leica Geo-Office 8.2 (LGO) GNSS software. The GNSS survey file was compiled as per section VII on presentation of computations of the survey manual and the coordinates of new points plotted in Form 3 as per section VIII on plotting of cadastral survey plan of survey manual. The survey computation file and the plan were forwarded to the director of survey for quality checks and authentication. The Static differential GNSS technique provides the best accuracy with reasonably low cost and time. The study recommends use of static differential GNSS technique in extension of horizontal controls since it gives high accuracy results.

Keywords: *Static GNSS Survey, GCPs.*

FACTORS ENHANCING VULNERABILITY TO CLIMATE SHOCKS USING SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION FOR COMMUNITY RESILIENCE, CASE OF BURA NORTH, TANA RIVER COUNTY

Ikumu W.L.

University of Nairobi, KENYA
Correspondence: ikumulucy@gmail.com

Abstract

Integrating disaster risk reduction approaches with climate governance will foster capacity for recovery and response for sustainable livelihoods. Gaps in adoption of policy alternatives on reduction of vulnerability to shocks will have serious implications on community adaptation in arid and semi-arid areas. This paper focuses on factors enhancing vulnerability to climate shocks using SENDAI Framework for Disaster Risk Reduction in Bura North, Tana River County, Kenya. The case of Tana North illustrates gaps in inclusion of SENDAI Framework of Disaster Risk Reduction for community resilience to climate shocks. The study used the 'Kobo' questionnaire tool kit to collect primary data from 362 households. Indicators of vulnerability to shocks were demonstrated by a decline in food availability resulting in high food prices, low purchasing power, reduced food portions, diseases and malnutrition. ANOVA test showed that the regression model is statistically significant ($F = 13.063$, $p < 0.05$), where the predictor variable (vulnerability) significantly explains variance in resilience, $r = 0.036$ depicts a positive correlation between vulnerability and resilience, while adjusted $R^2=0.0033$ explains variations of vulnerability to shocks. Key indicators of climate shocks enumerated include; erratic rainfall, flash floods, prolonged droughts, reduction in rainfall intensity and high increase in temperatures. Majority of respondents showed lack of awareness on use of SFDRR as a coping strategy but concurred that if included it could result in a higher ability to adapt to shocks, thereby achieving resilience outcomes. Disaster risk reduction strategy is yet to be embraced as a policy alternative for adaptation and resilience planning in ASALs

Keywords: *Adaptation, ASALs, Climate Shocks, DRR, Resilience and Vulnerability.*

DESIGN OF A COST EFFECTIVE NEUTRAL FUZZY BASED SEPARATELY EXCITED DC MOTOR SPEED CONTROL

Patrick M.W.

Murang'a University of Technology, KENYA.

Correspondence: patiew5053@gmail.com

Abstract

In a new age of artificial intelligence, a lot of research is focused on development of artificial systems for systems that can perform tasks autonomously, adapt to new situations and improve their performance over time. ANFIS is an adaptive hybrid system that comprises fuzzy logic and neural networks in controlling complex and nonlinear systems and was introduced by Jang in 1990s. The main aim of the research is to Design a cost effective neutral fuzzy based separately excited DC motor speed control. The drive will consist of a planned approximation of the speed and control mechanism of the motor. The separately field excited DC motor has some merits in comparison to other drives and has unique abilities when regulated using ANFIS. This is because ANFIS can be programmed for variable drives. A Forward propagation algorithm technique will be developed for neuro-fuzzy network system controllers. The expectation is that the regulator will be robust for a wide range of loads and may have an enhanced systems response that will improve the rising, settling and peak time together with peak overshoot. The research will provide amicable solution towards adaptive motor control; energy efficiency cost, this will have significant implication in industrial applications

Keywords: *Design, Cost Effective, Neutral Fuzzy Based, DC Motor Speed Control.*

COPPER-MODIFIED-RESIN AS RECYCLABLE CATALYSTS FOR THE TREATMENT OF CHLORINATED ORGANIC COMPOUNDS IN WATER

Shee, A.

Technical University of Mombasa, KENYA
Correspondence: sheearli@tum.ac.ke

Abstract

Chlorinated organic compounds (COCs) are among the most common water pollutants and pose not only an environmental but also a public health risk. Detoxification of waters contaminated with COCs by reductive dechlorination using nano-sized copper (nCu) catalysts in the presence of suitable reductants such as sodium borohydride (NaBH_4) is most promising. Although a broad range of COCs are reducible in aqueous solutions under ambient conditions by nCu catalysts handling and reusability of nCis a major challenge hence whatfield applications are desired. In this study, amberlite cation-exchange-resin was modified with metallic copper (herein referred to as nCu-resin) and evaluated for reductive dechlorination of COCs in water under laboratory conditions. nCu-resin with NaBH_4 showed excellent catalytic activity for dechlorination of COCs in water. Furthermore, nCu-resin can be recycled without significant loss of its catalytic activity when applied up to ten times. Although nCu-resin was partially deactivated by sulfide/bisulfide, up to 80% of its baseline activity was restored upon rinsing with deionized water. Due to its ease of handling, reusability, and regeneration, nCu-resin catalysts are recommended as alternatives to unmodified nCu for treatment of COCs in water under field conditions.

Keywords: *Amberlite Resin, Catalysts Regeneration, Chlorinated Organic Compounds (COCs), Copper Catalysts, Reductive Dechlorination.*

STRUCTURES, SIZE AND TRENDS OF THE FOREST SECTOR AND GLOBAL, REGIONAL AND NATIONAL COMPARATIVE STUDIES

Mburia, L.N.

Daystar University, KENYA
Correspondence: lydiamburia@gmail.com

Abstract

Globally, the forest sector widely cuts diverse sectors of the economies ranging from forest management to forest product industries and other forest related business enterprises, including recreational, non-wood products and other ecosystem services. In the United States, the forest sector encompassed both public, community and privately owned forestlands, from which wood raw materials are harvested to produce forest products. Most of the primary forest product industries were the pulp, paper, and paperboard, solid-wood industries especially the lumber, particle board, plywood, and other wood products. The Forest Sector in East Africa encapsulates forests and woodlands encompassed by very diverse ecosystems namely the lowlands to montane forests, dry forests, woodlands and bushlands, mangroves and plantation forests. At a country scale, forests covered 55% of total land area in Tanzania, 43% of Mozambique, 12.4% of Uganda, and 6.99% of Kenya. Forestry contributed significantly to the economy and the wellbeing of Eastern Africans yet regional forest conversion rates were high. The East Africa region took steps to design country level forest monitoring and information systems, periodically gathering data critical for forest resource monitoring, like forest biomass, land cover changes, timber harvesting and areas of degradation. Forest area globally was projected under the reference scenario to fall, by 0.1% annually, between 2020 and 2040 which was a rate of change slower than in the past but in accordance with the most recently reported trends of the Global Forest Resources Assessment published by the FAO in 2020. Africa has a high per capita forest cover of 0.8 ha per person compared to 0.6 ha globally where on average, forests accounted for 6 percent of GDP in Africa, which was the highest in the world. Trends in economic and social development, demographics, technology, and the natural environment at the regional and global level would influence the role that forests, and their products, will play. Deforestation was highest in forestlands with weak management and tenure security, especially open access land in Tanzania and communal lands in Kenya. In Uganda deforestation was highest in private land forests with less deforestation occurring in government-managed public forests especially in protected areas.

Keywords: *Forest Management, Ecosystem Services, Forest Biomass, Deforestation.*

BIODEGRADABLE COMPOSITE MATERIAL FOR CONSTRUCTION APPLICATION

Bosire R.N.¹ Gombe D.,²

¹Kirinyaga University, ²Kenya Power Institute, KENYA

Correspondence : info.rodgerbos@gmail.com

Abstract

In recent years, construction sector has been under increasing pressure to adopt sustainable practices to mitigate environmental impacts. One promising avenue is utilization of biodegradable composite materials, which offer a potential solution to address the challenges posed by traditional construction materials. This abstract aims to explore the current state of research and development in biodegradable composite materials for construction applications, with a focus on their properties, fabrication methods, and potential advantages. Biodegradable composite materials are typically composed of natural fibers or fillers embedded within a biodegradable polymer matrix. These materials have several advantages over conventional construction materials, including reduced environmental footprint, lower embodied energy, and ability to biodegrade at the end of their service life, thereby minimizing waste and pollution. Moreover, biodegradable composites can exhibit comparable mechanical properties to traditional materials, making them suitable for a wide range of construction applications. Various natural fibers such as bamboo, hemp, jute, and flax are commonly used as reinforcements in biodegradable composites due to their abundance, renewability, and low cost. These fibers are combined with biodegradable polymers such as polylactic acid (PLA), polyhydroxyalkanoates (PHA), or starch-based polymers to create composite materials with tailored properties. Fabrication methods for biodegradable composites include compression molding, extrusion, and injection molding, among others. These methods allow for production of complex shapes and structures suitable for construction applications. Overall, biodegradable composite materials hold significant promise for sustainable construction, offering a renewable, eco-friendly alternative to traditional construction materials.

Keywords: Biodegradable, Construction, Composites, Fibers, Application.

MOTORBIKE TO ELECTRIC BIKE CONVERSION AND THE DESIGN OF A UNIQUE ELECTRIC SCOOTER TO REDUCE EMISSIONS, REDUCE FUEL EXPENDITURE AND MANAGE ELECTRONIC WASTE

Wambugu P.G.

Nyandarua National Polytechnic, KENYA
Correspondence : gatonyewambuguz@gmail.com

Abstract

The escalating dependence on fossil fuels for transportation has precipitated global warming, producing emissions that exacerbate the greenhouse effect, consequently leading to adverse climatic shifts. The resultant rise in sea levels, climatic anomalies, and unpredictable weather patterns has compelled migration of wildlife to higher altitudes, fostering new interactions with human populations and contributing the spread of diseases such as the COVID-19 pandemic. Furthermore, the detrimental fine particles emitted by internal combustion engines are laden with heavy metals. This paper embarks on a transformative journey, focusing on the conversion of traditional internal combustion motorbikes into efficient electric scooters. The primary objectives include design of an electric scooter capable of direct mains electricity plug-in and solar rechargeability creation of a battery park employing recycled laptop LiPO batteries for effective electronic waste management, and development of an affordable, locally sourced electric scooter that not only curtails expenses but also produces zero emissions. The study conducted an observational analysis to determine the electric scooter's travel distance per charge for an average individual weighing 70 kg, investigating the time required for a full battery recharge. Additionally, the study assessed the economic benefits and emission reduction potential of the efficient scooter. Impressively, the electric scooter achieved a remarkable travel distance of 100 km on a single charge, reaching speeds of up to 80 km/h, and necessitated only 2 hours and 20 Ksh for a full recharge. Notably, the scooter proved to be a sustainable solution, producing zero emissions and mitigating health concerns linked to fine particles containing heavy metals, common in internal combustion engines. Furthermore, its adoption translates to a reduction in greenhouse gas emissions and a noteworthy decrease in expenditure, eliminating the need for traditional fuel charges.

Keywords: LiPO, Sustainability, Battery Park, Electric Scooter, Emissions Reduction.

EVALUATION OF COMBUSTION PERFORMANCE OF BRIQUETTES-FIREWOOD CO-FIRED TEA FACTORY BOILER

Sitoya M., Maina P., Muliwa A.

Moi University, KENYA

Correspondence: sitoyam@gmail.com

Abstract

Use of firewood as a fuel for tea factory boilers is very prominent in Tea industry in Kenya, owing to its relatively high efficiency and low cost. However, in the long run, firewood usage is unsustainable and is marred by numerous challenges such as forest cover depletion, desertification and outlawed logging of forests which brings about negative climate change. With these effects, an alternative renewable energy in the form of waste-derived biomass briquettes can possibly alleviate boiler fuel problems in factories at reduced cost. This study evaluates the combustion performance of the tea factory boiler at Tebesonik Tea factory in Kericho County, Kenya. The boiler is fired using both firewood-sawdust briquettes (F-SDB) combination and firewood-sugarcane briquettes (F-SCB) combination. First, the various formulations of SD and SC briquettes were procured from known vendors in Kisumu County Kenya and characterized to determine the physical and energy properties of the different briquettes. Thereafter, the briquettes were tested in the Wood Pac fire-tube boiler at Tebesonik Tea factory in the ratios of 100% firewood: 0% SDB, 90% firewood: 10% SDB, 80% firewood: 20% SDB and 70% firewood: 30% SDB, the same percentages were repeated but with SCB formulation. In each case boiler performance parameter of pressure attained which is an indication of efficient steam production is monitored and noted. Results showed that the SDB consisted of a higher VM of 86.25% and MC -6.6% and lower ash content of 3.3% compared to the SCB with 81.6% volatile matter, 6.5% moisture content and 7% ash content. In the second set of the experiment, it was noted that both briquettes' formulations gave high boiler pressure of 8 bar and above when co-fired with firewood as boiler fuels. These findings therefore point to the fact that both SDB and SCB briquettes formulations can produce high pressure to be used as boiler fuels in factories sustainably.

Keywords: *Alternative Fuel, Boiler Performance Sugarcane Briquettes, Sawdust Briquettes, Efficiency.*

AN ANALYSIS OF CHALLENGES OF CLIMATE CHANGE MITIGATION AND ADAPTATION STRATEGIES IN THE ASAL IN KENYA

Mutunga D., Kositany C.J., Mogute M.

Daystar University, KENYA.
Correspondence: dmutunga@daystar.ac.ke

Abstract

Climate change is a major threat to the environment and human life today. This situation has continued and has been experienced for a long time with little attention, if any, being paid to it. This reality has become a global concern especially in regions that are vulnerable to its impacts, such as the Arid and semi-arid lands (ASAL) in Kenya. Many international conventions held to mitigate the effects of this situation on the environment have made different declarations and agreements, most of which have not yielded any tangible results. Instead, its effects like food insecurity, droughts, high temperatures and rising sea levels have continued to increase because of the different socio-economic activities carried out by communities in these regions for their subsistence. Uncontrolled and persistent extraction of natural resources like wanton felling of trees, mining, stone quarrying, and removal of vegetation cover have contributed immensely to environmental degradation which in turn has led to climate change. This paper is of the view that barriers to the different agreements and resolutions by global conventions, local agencies and communities on climate change mitigation and adaptation have prevented them from redeeming the ASAL in Kenya of the vagaries of climate change. It therefore endeavours, through a critical analysis of existing literature to offer insights into the challenges of the climate change mitigation and adaptation strategies in these lands. The findings of the study will help in drawing conclusions and recommendations.

Keywords: *Climate Change, Arid and Semi-Arid Lands, Environmental Degradation, Mitigation, Adaptation.*

GROWTH AND TREND OF CONSTRUCTION INDUSTRY OUTPUT IN KENYA: 1977-2023

Mbusi E.T

Kirinyaga University, KENYA
Correspondence: embusi@kyu.ac.ke

Abstract

In recent times, an increasing number of scholars have been drawn into studying the construction industry and its role in various economies of the world due to the importance attached to its economic functions. It has been observed that, in the absence of the role played by this industry around the world, no economy can stand. In this respect therefore, the researcher herein undertook to take a closer look into the growth and trends of construction industry output in Kenya from 1977 up to 2023; a span of forty-seven (47) years. The study was examining whether construction output in the country was on an upward trend, stunted or on a downward trend. This is quite a pertinent question to answer since the demand for constructed facilities is continuously going up. For purposes of answering these questions, data were collected from Kenya National Bureau of Statistics (KNBS) and analyzed both graphically and by application of exponential trend analysis which serves as a report of the findings. The results from the study indicate that the industry took a downward trend for the whole forty-seven (47) years. This study therefore recommends formulation of a policy which can reroute the industry to the envisaged growth trajectory and hence meet the country's ever-increasing constructed facilities' demand.

Keywords: *Construction Industry Output, Constructed Facilities, Demand, Exponential Trend.*

ADMINISTRATIVE FRAMEWORK GOVERNING DEVELOPMENT AND MANAGEMENT OF RENEWABLE ENERGY IN KENYA: A CASE OF WIND TURBINES IN NGONG HILLS FOREST ECOSYSTEM

Owino J., Kemboi B.O

Technical University of Kenya

Correspondence: jane.bukachi@tukenyta.ac.ke

Abstract

This study explores the intricate administrative framework guiding the development and management of renewable energy in Kenya, centering on wind turbines within the Ngong Hills Forest ecosystem. The aim is to comprehensively evaluate the existing policies, assess ecological impacts, and gauge community engagement dynamics within this distinctive context. The research seeks to achieve three primary objectives: evaluate the effectiveness of the current administrative framework, investigate the ecological impact of wind turbines in Ngong Hills Forest, and assess community engagement and stakeholder participation. In the global pursuit of sustainable energy, Kenya's commitment to renewable sources is pivotal. This study's findings hold significance in shaping policy, environmental conservation practices, and community empowerment, contributing to the broader discourse on renewable energy governance. Employing environmental justice and policy implementation theories, the study provides a theoretical lens to understand the equitable distribution of benefits, burdens, and the effective implementation of policies related to wind energy development. Using content analysis, key documents, including policies and environmental impact assessments, were systematically analyzed. The approach integrates quantitative and qualitative analyses to derive comprehensive insights. The study reveals complexities in the existing framework, emphasizing the need for adaptive management in mitigating ecological risks. Community engagement processes require enhancement for more inclusive decision-making. The research concludes that a nuanced approach is imperative to balance renewable energy goals with environmental conservation, necessitating policy adjustments and improved community involvement. The study recommends refining administrative structures for better ecological safeguards, proactive community engagement, and adaptive management. These recommendations offer actionable insights for policymakers, industry stakeholders, and communities, fostering a more sustainable approach to wind energy development in forested ecosystems.

Keywords: *Renewable Energy, Administrative Framework, Wind Turbines, Environmental Impact and Community Engagement.*

SUB-THEME: ICT AND DIGITAL TRANSFORMATION

ENHANCING CYBER SECURITY RESILIENCE IN KENYA: A COMPREHENSIVE ANALYSIS OF THREATS, VULNERABILITIES, AND MITIGATION STRATEGIES

Kariuki P.

Nyandarua National Polytechnic, KENYA
Correspondence: kariukip19@gmail.com

Abstract

The study aimed to investigate the current state of cybersecurity in Kenya, focusing on identifying prevalent cyber threats and vulnerabilities that pose risks to individuals, businesses, and critical infrastructures. The study explored the evolving nature of cyber threats and the impact of technological advancements on the country's digital landscape and assessed the effectiveness of existing cybersecurity measures and policies in mitigating these threats. Cybersecurity experts, policymakers, and regulatory bodies were used to gather perspectives on the existing cybersecurity framework and identify potential areas for improvement which added up to 1,200 respondents. The research employed a mixed-methods approach, combining both quantitative and qualitative methods to gather in-depth insights into the current state of cybersecurity. The methodology involved a survey to assess awareness, attitudes, and practices related to cybersecurity among individuals and organizations. Qualitative interviews and case studies were conducted to gain a deeper understanding of specific challenges and successful mitigation strategies employed by key stakeholders. Quantitative data was analyzed using statistical techniques and qualitative data thematically analyzed. This study aimed to provide valuable insights for policymakers, cybersecurity professionals, and stakeholders to strengthen Kenya's cyber defenses and safeguard its digital future. The rapid pace of technological advancements was observed to both benefit and challenge cybersecurity efforts in Kenya. Emerging technologies, such as IoT and cloud computing, were identified as potential sources of increased vulnerability, requiring specific attention in cybersecurity strategies. There is need for organizations to invest in robust cybersecurity infrastructure, including regular software updates, secure network configurations, and employee training.

Keywords: *Cybersecurity, Threats, Vulnerabilities, Mitigation Strategies.*

DIGITAL TECHNOLOGY AND COMMUNITY EMPOWERMENT: BRIDGING THE RURAL-KNOWLEDGE CENTRE GAP

Kimote Z.,¹ Mutunga D.²

¹Kirinyaga University, KENYA ²Daystar University, KENYA.

Correspondence: zkimote@gmail.com

Abstract

Rural communities in developing countries continue to experience marginalization due to centralization of services in urban areas and institutions. Thus, rural communities lack access to innovations and knowledge necessary for transformation of their lives due to lack of good and effective channels for relaying information to enable them tap into the knowledge they need to broaden their world view, interpret their situations, and address the barriers that prevent them from taking control of their lives. Government and non-government agencies have information on factors that have limited community access to valuable information which if disseminated would enhance problem-solving ability and enable the communities to improve their wellbeing. This paper argues that rural communities can be empowered through enhanced knowledge management strategies to develop problem-solving skills. This study seeks to explore different strategies for disseminating knowledge to communities using digital technology.

Keywords: *Rural Communities, Knowledge, Digital Technology, Knowledge Centres.*

PRESERVING THE PAST, ENSURING THE FUTURE: CHALLENGES AND INNOVATIONS IN DIGITAL PRESERVATION OF INFORMATION

Njuguna¹, A., Kimote², Z.

¹*Kirinyaga University, KENYA*

²*Egerton University, KENYA*

Correspondence : andykim7119@gmail.com

Abstract

Digital preservation is a critical challenge for modern societies, as it involves preserving vast repositories of knowledge for future generations. This paper explores the intricate field of digital preservation, focusing on the need for radical changes in preservation techniques due to the variety of formats and sources. Conventional methods are no longer sufficient in the rapidly changing technological environment, necessitating proactive and dynamic approaches. The main goals of this study are to address data integrity, obsolescence, and the constant threat of technological change in digital preservation. The research seeks to clarify new approaches and technologies developed to address these issues, providing a comprehensive guide for long-term digital data preservation. The methodology includes in-depth interviews with subject matter experts, analysis of relevant case studies, and a comprehensive review of existing literature. Major themes include format migration, emulation, metadata standards, and cooperative efforts within the preservation community. The expected results include a comprehensive understanding of the difficulties faced by digital preservation projects and an investigation of efficient methods and tools used to overcome these obstacles. This research contributes to the current scholarly conversation on digital preservation by identifying obstacles and offering practical preservation solutions. It promotes a dynamic, forward-thinking strategy to safeguard the enduring legacy of our digital heritage, highlighting the necessity of adjusting preservation techniques to changing technological capabilities.

Keywords: *Digital Preservation, Proactive Approaches, Data Integrity, Obsolescence, Technological Change.*

A COMPREHENSIVE STUDY ON THE UTILIZATION OF INFORMATION AND KNOWLEDGE MANAGEMENT FOR SOCIETAL EMPOWERMENT.

Kithinji J., Mugo D., Jepkoech J.

University of Embu, KENYA

Correspondence: kithinji.joseph@embuni.ac.ke

Abstract

Information and knowledge management have become essential tools for societal empowerment in today's environment, with the capacity to address difficult issues and promote inclusive progress. This study examines the various ways in which these disciplines might be applied to empower societies, emphasizing the democratization of information access and promotion of cooperative knowledge-sharing platforms. The primary objectives of this research are to analyze the role of information and knowledge management in societal empowerment, understand the methods employed for effective implementation, assess the outcomes in terms of enhanced decision-making and problem-solving, and draw conclusions on the overall impact of these practices on community development. A comprehensive research methodology was adopted, involving a combination of literature reviews, case studies, and empirical data analysis. The study examined successful information and knowledge management initiatives across various sectors, assessing the methodologies employed in terms of technology integration, collaboration frameworks, and knowledge-sharing mechanisms. The findings indicate that strategic information and knowledge management significantly contribute to societal empowerment. Democratized access to information empowers individuals, enabling them to engage actively in societal processes. Collaborative knowledge-sharing platforms facilitate interdisciplinary approaches, leading to innovative solutions for societal challenges. Advanced technologies, including artificial intelligence and big data analytics, play a crucial role in enhancing the efficiency of data processing and decision-making, contributing to development of smart and resilient communities. Integration of information and knowledge management practices is vital for societal empowerment. The study underscores the importance of fostering an environment that promotes transparency, collaboration, and technology adoption.

Keywords: Utilization, Information, Knowledge Management, Societal Empowerment.

IMPROVING FAULT DIAGNOSIS ON ROLLING BEARING USING A HYBRID OF CONVOLUTIONAL NEURAL NETWORK AND EXTREMELY RANDOM FOREST MODELS

Rangili, E.

Jomo Kenyatta University of Agriculture and Technology, KENYA
Correspondence : erickrangili@gmail.com

Abstract

Fault detection and diagnosis are critical for ensuring the reliable operation of rolling bearings, as failures can lead to accidents, production losses, and costly damages. In recent years, deep learning models have gained prominence for their effectiveness in fault prediction, detection, and diagnosis, albeit with challenges such as the need for large training datasets, complex model architectures, and high computational power. This study aims to address these challenges by proposing a hybrid approach that combines Deep Learning (DL) and Shallow Machine Learning (SML) models. Specifically, a Convolutional Neural Network (CNN) is employed for data processing, feature selection, and training, while an Extremely Random Forest (ERF) model is utilized for classification.

The hybrid model offers several advantages, including reduced complexity in classification, decreased computational requirements, and lower implementation costs, all while maintaining high accuracy and performance. Through experimental evaluation, improvements in training and classification time, as well as enhanced computational efficiency, are observed.

Keywords: *Fault Detection and Diagnosis (FDD), Deep Learning (DL), Convolutional Neural Network (CNN), Extremely Random Forest (ERF).*

THE NEXUS BETWEEN INFORMATION AUDIT IN COLLECTION DEVELOPMENT AND USER SATISFACTION FOR SOCIETAL DEVELOPMENT: A META-ANALYTICAL REVIEW

Guto¹, R., Obunde², J.

¹*Chuka University, KENYA*

²*Kirinyaga University, KENYA*

Correspondence: rguto@chuka.ac.ke

Abstract

Libraries and information providing centers are the nerve center of academic and research activities and must help the organization realize its objectives, through provision of adequate and relevant information. The library's pivotal place is in the basic mandate of having information materials that satisfy the needs of the users. The increase in published literature in several fields in both academic and co-curriculum activities has enhanced the role and importance of libraries in selecting, acquiring, organizing and communicating the relevant, accurate and precise information to the clientele including researchers, academicians to achieve the institutional objectives and for self-societal empowerment. Information audit is the systematic process through which an organization will effectively determine the current information environment by identifying what information is required to meet the needs of the institution, society and its users. Libraries and information centers need to adopt new methods to manage the large quantity of available information materials. Libraries thus play a crucial role in informing, educating and empowering nations and states through developing adequate library collection for information provision. However, the ever changing and growing demands for information and poorly equipped libraries; have led to library user dissatisfaction. To solve this problem, the information audit process is significant as it establishes the contact within the user's needs and information available. To establish the nexus between the two variables, the paper will be based on three specific objectives namely to analyze the effect of information audit process on collection development, assess the effect of collection development policy to user satisfaction and to explore challenges affecting collection development to user satisfaction. A meta-analytical approach will be adopted to review scientific publications and papers published in journals to develop a clear insightful argument on the stated concept. The paper will identify several themes to show the relevance of information audit in collection development as a determinant for library user satisfaction for societal development.

Keywords: *Nexus, Information Audit, Collection Development, User Satisfaction, Societal Development, Meta-Analytical.*

RECORD MANAGEMENT AS A BASIS FOR ENHANCING ORGANIZATIONAL INTEGRITY AND DEVELOPMENT IN COUNTY GOVERNMENT SYSTEMS IN KENYA

Guto R.,¹ Birgen S.J.²

¹*Chuka University, KENYA*

²*Information Consult, KENYA*

Correspondence: rguto@chuka.ac.ke

Abstract

Proper and sound records management provide a critical element of ensuring transparency, accountability and credibility in governance and effective administration hence enhancing societal development. Government agencies, ministries and even County governments in Kenya are commissioned by law to adopt a systematic and well organized approach in managing public records. The process is guided by legislative instruments such as: The public Archives and Documentation Service Act (ap.19), Government Finance Regulation and Procedure (Cap .23). The Record Disposal Act (Cap.14) among others. Records management programme is an integral part of any society standard business operation for smooth flow of information within and without an organization leading to effective sharing and dissemination of information which is a key element of societal development. The purpose of this paper is to examine the role of records management as a basis for enhancing organization integrity and development in County government systems in Kenya. The objectives of the study will be: to examine the relationship between records management and organizational integrity; to analyze the challenges of records management in attainment of operational integrity; to propose solutions to effective records management in County governments in Kenya in order to facilitate the achievement of their operational integrity. This study will embrace a qualitative research approach with specific reference to content analysis. Data will be collected from secondary sources such as journal articles, theses and conference papers. Literature searches will be conducted online using Scopus database and Google scholars; search terms will include; record management and organizational integrity; records management and corruption; record management and societal development; records management and County governments in Kenya. This paper will identify several themes to show the relationship between records management and organizational integrity for societal development and analyze each concept conclusively to provide a clear understanding of the main argument.

Keywords: *Record Management, Organizational Integrity, Development, County Government Systems, Kenya.*

EXPLORING THE IMPACT OF COLLABORATIVE KNOWLEDGE SHARING ON INTEGRATION WITH BUSINESS PROCESSES IN THE CONTEXT OF NAIROBI COUNTY, KENYA.

Wasike J.¹ Wambugu, J.²

¹Kirinyaga University, ²Karatina University, KENYA

Correspondence: jwasike@kyu.ac.ke

Abstract

This study investigated the transformative influence of collaborative knowledge sharing on the integration of business processes within the unique context of Nairobi County, Kenya. The problem statement underscored the increasing complexity of organizational operations and the imperative for seamless integration of knowledge sharing practices with core business processes. The purpose of the study was to comprehend how collaborative knowledge sharing acts as a catalyst for enhanced integration in the specific urban setting of Nairobi County. The study objectives were to assess the current state of collaborative knowledge sharing practices among organizations in Nairobi County; analyze the existing level of integration between knowledge sharing and business processes; and to identify and evaluate the factors that hinder or facilitate effective integration. A mixed-methods approach was employed, and interviews were conducted to gather both quantitative and qualitative data from selected 4 large organizations, namely; Safaricom, Nation Media Group, Equity Bank and Kenya Airways. Four Senior managers from each organization were interviewed. The findings revealed a moderate level of collaborative knowledge sharing practices, with notable variances among different industries. Integration between knowledge sharing and business processes was found to be suboptimal, primarily hindered by lack of technological infrastructure and organizational culture. The study recommends implementation of advanced collaborative tools, training programs to enhance digital literacy, and fostering of a knowledge-sharing culture within organizations. Implications of the study extend to policy recommendations for governmental bodies, suggesting support for technological infrastructure development and initiatives to promote a knowledge-driven economy in Nairobi County. This research further sheds light on the critical role of collaborative knowledge sharing in shaping integration landscape of businesses in Nairobi County, offering actionable insights for organizations and policy makers to navigate the challenges and leverage opportunities for sustainable growth.

Keywords: Collaborative Knowledge Sharing, Integration, Business Processes, Nairobi County, Kenya.

UNRAVELLING KNOWLEDGE MANAGEMENT PARADIGMS IN KENYAN UNIVERSITIES FOR SUSTAINABLE INNOVATION AND COLLABORATION

Wasike J.,¹ Waswa E.,² Sitati S.²

¹Kirinyaga University, ²Kibabii University, KENYA

Correspondence: jwasike@kyu.ac.ke

Abstract

This research addresses the evolving landscape of knowledge management in Kenyan universities through an exploration of Community of Practice (CoP) dynamics. The study seeks to unravel the intricate paradigms shaping knowledge management practices in these institutions, with a focus on fostering sustainable innovation and collaboration. Despite the recognition of the pivotal role played by knowledge management in academic institutions, there is a dearth of comprehensive understanding regarding the dynamics of Community of Practice within Kenyan universities. The lack of clarity hampers effective strategies for sustainable innovation and collaboration. The primary aim of this study was to comprehensively map the dynamics of Community of Practice, elucidating its role in knowledge management within Kenyan universities by providing actionable insights for enhancing sustainable innovation and collaboration in academic settings. The study objectives were to analyze the existing dynamics of Community of Practice in Kenyan universities, to identify and assess knowledge management paradigms within the context of CoP in academic settings, to explore the impact of CoP on fostering sustainable innovation and collaboration among faculty and staff in Kenyan universities. A mixed-methods approach was employed, encompassing interviews, and content analysis of CoP interactions within selected two public and two private universities in Kenya, namely Kirinyaga and Kibabii for public and United States University-Africa and Catholic for private. Four senior managers from each university were interviewed. Findings provided a nuanced understanding of CoP's role in fostering sustainable innovation and collaboration. Based on the study, practical recommendations are offered to university administrators and policymakers for optimizing CoP dynamics to enhance knowledge management, sustainable innovation, and collaboration. This research contributes to the academic discourse by offering insights into the complex interplay of CoP dynamics in Kenyan universities. The implications extend to informing strategic decisions for optimizing knowledge management practices, fostering innovation, and promoting collaboration in the higher education sector.

Keywords: *Community of Practice (CoP), Knowledge Management, Kenya, Universities, Sustainable Innovation, Collaboration.*

NAVIGATING DIGITAL TRANSFORMATION: HARNESSING ONLINE INSTITUTIONAL REPOSITORIES FOR ADVANCING RESEARCH

Muthoka J.N.¹ Njuguna, A.K.²

¹*Kirinyaga University, KENYA*

²*Egerton University, KENYA*

Correspondence: andykim7119@gmail.com

Abstract

Leveraging online institutional repositories for advancing research in the era of digital transformation, institutions and researchers confront the challenge of adapting to a swiftly evolving landscape of information dissemination and scholarly communication. This study underscored the pivotal role of online institutional repositories in propelling research efforts amid this dynamic environment. Amidst the rapid evolution of information dissemination, institutions and researchers encountered challenges in effectively managing, preserving, and disseminating research findings. This study aimed to explore the utilization and impact of online institutional repositories in advancing research efforts within the context of digital transformation. The study objectives were to assess the effectiveness of online institutional repositories in facilitating access to scientific findings, examine the role of online repositories in enhancing the visibility and impact of research, investigate the extent to which online repositories facilitated collaboration among researchers and institutions, and explore the challenges and opportunities associated with the use of online repositories in addressing emerging issues such as data management and research reproducibility. The study was anchored on the theoretical foundation of Information Management and the conceptual framework of Technological Acceptance Model (TAM), which posits that the perceived usefulness and ease of use influence individuals' acceptance and adoption of technology. A mixed-methods approach incorporating quantitative surveys and qualitative interviews was employed to gather comprehensive insights into the utilization and impact of online institutional repositories. The population consisted of researchers, faculty members, and administrators from various academic institutions in Kenya. Stratified random sampling was used to select a representative sample of 300 participants. Surveys and semi-structured interviews were utilized to collect quantitative and qualitative data, respectively. Quantitative data was analyzed using descriptive statistics and inferential analysis techniques, while qualitative data were subjected to thematic analysis. The study revealed that online institutional repositories significantly enhanced access to scientific findings, increased research visibility, and fostered collaboration among researchers and institutions. However, challenges such as data management and copyright issues persisted. The findings underscored the

importance of investing in robust technological infrastructure and promoting awareness and utilization of online repositories. Recommendations included implementing training programs for researchers, enhancing metadata standards, and developing policies to address copyright and licensing issues. By embracing online repositories, institutions could accelerate innovation and knowledge dissemination in the digital age.

Keywords: *Online Institutional Repositories; Copyright and Licensing; Knowledge Dissemination*

RISE OF FAKE NEWS IN KENYA: IMPACT AND MITIGATION MEASURES IN 21ST CENTURY

Ngumbi E¹, Wasike J.²

¹Education Consultant, KENYA

²Kirinyaga University, KENYA

Correspondence: [*elizabeth.ngumbi6@gmail.com*](mailto:elizabeth.ngumbi6@gmail.com)

Abstract

In recent past, the spread of fake news has come up as pettifogging factor across the globe, African states including in Kenya. This paper is an investigation of the multifaceted effects of fake news on various aspects of Kenyan society regarding politics, social cohesion and public health including suggesting possible mitigation measures to stop the spread. A mixed methods approach combining qualitative and quantitative analysis of media reports and social media content to assess the prevalence and impact of fake news in Kenya was used. Data collection involved sampling diverse regions in Kenya to ensure effective representation across different contexts. The study result show that fake news in Kenya has significant, far-reaching and multifaceted repercussions on politics, democracy, social cohesion and public health. For example, the country is facing troubled democratic processes, misinformation, polarization and erosion of trust in social institutions especially in healthcare. In addition, fake news are a cause of aggravated social tensions, fueling political, ethnic and religious tensions. In public health, undermines efforts of health institutions to fight diseases such as COVID - 19 and malaria, leading to public fear, mistrust and unwillingness to seek medical services or get vaccinated. In order to win public trust, there is need for concerted efforts to address fake news and its related challenges in Kenya. This study suggests combating fake news through using holistic approaches to empower Kenyan citizens with critical thinking skills, strengthening regulatory mechanisms and fostering collaboration among stakeholders. Strategies including and not limited to media literacy programs, regulatory frameworks for digital platforms and collaborative initiatives between governments, civil society and the private sector are suggested. In addition, there is need to promote independent journalism and fact-checking initiatives which are essential for combating the spread of misinformation. Failure to combat fake news jeopardizes the progress and stability of Kenyan communities, highlighting the need for proactive interventions.

Keywords: *Fake News, Misinformation, Social Media, Democracy, Public Health, Kenya.*

LEVERAGING BLOCK CHAIN FOR TAMPER-RESISTANT SYSTEM LOGS: MITIGATING MANIPULATION OF CHANGE LOG IN MICROSOFT DYNAMICS NAVISON ERP

Kimotho, A.N , Mwenja, J.M

Men University of Science and Technology, KENYA
Correspondence: akimotho@must.ac.ke

Abstract

In traditional setups, super administrators and power users wield significant influence over system logs, posing security risks due to their ability to manipulate critical information. This study investigates the integration of blockchain technology as a robust solution to mitigate such risks, establishing an immutable and transparent log management system. Ensuring the integrity and authenticity of system logs is paramount in contemporary digital environments to maintain the security and trustworthiness of information systems. Microsoft Dynamics NAV (Navision) employs a change log feature to track data alterations, aiding organizations in maintaining transparency and traceability in business processes. However, this feature is susceptible to manipulation by privileged users. The research explores the foundational principles of blockchain technology, emphasizing its decentralized and distributed nature. A framework is developed to enhance the existing solution, ensuring an indelible record of system activities that immediately flags any manipulation attempts. The transparency and security of blockchain technology offer robust defense against unauthorized alterations, providing a trustworthy audit trail for system administrators and auditors.

Keywords: *Blockchain, Enterprise Resource Planning (ERP), Microsoft Dynamics NAV.*

STRATEGIC KNOWLEDGE MANAGEMENT: UNVEILING THE NEXUS OF ORGANIZATIONAL SUCCESS

Kimuna C.¹ Kitui F.² Sisa R.³

¹Jomo Kenyatta University of Agriculture and Technology, KENYA

²National Industrial Training Authority, KENYA

³International Consultant, Records and Archives, UNFPA

Correspondence: kituif@gmail.com

Abstract

In an era marked by rapid technological advancements and constant shifts in market dynamics, organizations confront unprecedented challenges in effectively harnessing and leveraging their knowledge assets. This paper seeks to provide in-depth insights into the realm of strategic knowledge management (SKM) by addressing the multifaceted challenges and opportunities associated with its implementation. Employing a comprehensive mixed-methods approach, our research combines quantitative surveys and qualitative interviews to conduct a thorough examination of current knowledge management practices. It aims to identify barriers hindering effective implementation of strategic knowledge management, explore methodologies employed by successful organizations, and analyzes the profound impact of SKM on organizational performance and innovation. Our methodology involves engaging organizational stakeholders through in-depth interviews and gathering data on existing knowledge management practices through quantitative surveys. Concurrently, we conducted an extensive literature review to establish a robust theoretical framework for understanding the strategic dimensions of knowledge management. Results underscore prevalent challenges organizations face, including cultural barriers, inadequate technology infrastructure, and resistance to change. Successful organizations, however, strategically navigate these challenges by adopting a combination of advanced technologies, fostering cultural transformations, and actively engaging employees in the knowledge management process. These multifaceted strategies contribute to enhanced SKM effectiveness and, subsequently, organizational success. There is need for organizations to prioritize cultural shifts, invest in advanced technologies, and develop holistic knowledge management strategies aligned with organizational objectives to create an environment conducive to innovation and sustained competitive advantage. This paper contributes empirical insights to the evolving field of knowledge management, shedding light on the strategic dimensions of SKM and providing actionable recommendations, offering practical guidance to improving strategic knowledge management practices. Integration of cultural shifts, technology investments, and holistic strategies aligned with organizational objectives can empower organizations to navigate the complexities of the knowledge landscape, fostering innovation and ensuring long-term competitiveness and effectively position themselves at the forefront of strategic knowledge management to drive success and resilience in an ever-evolving business landscape.

Keywords: *Strategic Knowledge Management, Cultural Transformation, Advanced Technologies, Innovation.*

A SYSTEMATIC REVIEW OF CREDIT RATING VARIABLES

Kimani G. , Karani J, Mwangi E.

Kirinyaga University, KENYA.

Correspondence: kimani.17780@students.kyu.ac.ke

Abstract

Abstract: This study navigates the intricate landscape of credit ratings and their impact on financial markets, particularly during the 2007-2009 financial crisis. It conducts a comprehensive review of research on credit ratings, elucidating the variables shaping them and their repercussions on investor sentiment, business behavior, and economic growth. Employing a systematic literature review methodology, 21 papers from reputable sources such as sciencedirect.com and emerald.com were scrutinized, following established techniques. Stringent selection criteria ensured a thorough examination, with cross-referencing minimizing the risk of omissions. The evaluation process facilitated a nuanced understanding of diverse perspectives on credit ratings and their interrelations. The research aims to unveil insights into the determinants of credit ratings, encompassing corporate cash management decisions, reputational risks, inventory efficiency, and qualitative aspects in debt rating frameworks. Furthermore, it endeavors to elucidate the synergy between market-driven methodologies and credit ratings, as well as their predictive capabilities for bank credit assessments. By amalgamating these findings, the study aspires to furnish valuable insights for economic stakeholders and policymakers grappling with the intricacies of credit rating systems. The results and discussion section underscores the key variables associated with credit ratings, spanning auditing features, microeconomic factors, and macroeconomic indicators. While the literature review offers valuable insights into the intricate nexus between credit rating variables and financial markets, it acknowledges limitations such as a restricted timeframe and the absence of credit ratings as a moderating factor, suggesting avenues for future research endeavors.

Keywords: *Credit Ratings, Behavioral Finance, Credit Rating Agencies (CRAs), Systematic Literature Review, Financial Systems.*

MACHINE LEARNING-BASED PACKET SNIFFER FOR SECURE TRAFFIC MONITORING AND ANALYSIS IN COMPUTER NETWORKS

Kipkorir P., Mwangi E., Wasike J.

Kirinyaga University, KENYA
Correspondence: peacemarkcheruiyot7@gmail.com

Abstract

The proposed research study is a machine learning-based packet sniffer for secure and efficient traffic monitoring and analysis in computer networks. The overall purpose is to capture packets over the network, and then eventually unpack data to make sense out of it. Such aspects of data captured from the Ethernet frame include Ipv4 packet, ICMP packet, TCP Segment and flags. With this data, we will be able to capture and write it on a file. Internet Protocol version 4 (IPv4) is the fourth version of the Internet Protocol (IP). It is one of the core protocols of standards-based internet working methods in the Internet and other packet-switched networks. The Internet Protocol is the protocol that defines and enables internetworking at the internet layer of the Internet Protocol Suite. In essence, it forms the Internet. It uses a logical addressing system and performs routing, which is the forwarding of packets from a source host to the next router that is one hop closer to the intended destination host on another network. The Internet Engineering Task Force (IETF) and IANA have restricted from general use various reserved IP addresses for special purposes. Notably these addresses are used for multicast traffic and to provide addressing space for unrestricted uses on private networks. The Internet Control Message Protocol (ICMP) is a supporting protocol in the Internet protocol suite. It is used by network devices, including routers, to send error messages and operational information indicating success or failure when communicating with another IP address. The ICMP packet is encapsulated in an IPv4 packet. The packet consists of header and data sections. A TCP segment consists of data bytes to be sent and a header that is added to the data by TCP. With this invention of transferring data over and through the internet, there is a major problem of ineffectiveness of traditional network security measures in addressing the ever changing landscape of cyber threats targeting the utilization of networks in data transfer. Conventional security measures such as firewalls, intrusion detection systems, and antivirus software provide essential layers of defense but often fail to detect and prevent sophisticated attacks that bypass these defenses. The study is expected to establish a tool called packet sniffer that will aid in efficient and secure monitoring of the network traffic. The problem at hand is the limited effectiveness of traditional network security measures in addressing the evolving landscape of cyber threats. Traditional network security measures often fall short in effectively detecting and mitigating these threats, highlighting the need for advanced approaches to enhance network security. The objective of this study is to design a machine learning based

Packet sniffing model that can automate the detection and classification of network attacks, then develop an efficient packet sniffer machine learning-based algorithm using the designed model and finally to validate the effectiveness and efficiency of the machine learning-based packet sniffer through extensive experimentation and comparative studies with existing solutions. The study will also seek to inform policy makers and stakeholders in the Information Technology (IT) field on the effectiveness of the solution and will also serve as a guide for putting in place policies to govern utilization of networks as a necessity in the day-to-day operations. The methodology that will be used is a mixed method design that is study survey, design science research and experimental research.

Keywords: *A Machine Learning-Based Packet Sniffer, Secure Traffic Monitoring, Analysis, Computer Networks.*

THE ROLE OF BLOCKCHAIN TECHNOLOGY IN STRENGTHENING CYBERSECURITY FOR SOCIETAL EMPOWERMENT

Karimi P.

Kirinyaga University, KENYA

Correspondence: pkarimi@kyu.ac.ke

Abstract

Cybersecurity threats pose significant challenges to societal empowerment, affecting individuals, organizations, and governments worldwide. Blockchain technology emerges as a promising solution, offering enhanced security through decentralized and immutable data storage. This study investigates how blockchain technology can mitigate cybersecurity risks, empowering individuals and organizations to navigate the digital landscape securely. By analyzing blockchain's efficacy in enhancing data security, privacy, and trust, it aims to provide insights into its potential societal impact. The study seeks to assess the current landscape of cybersecurity threats and challenges faced by individuals and organizations, investigating the principles and mechanisms of blockchain technology in enhancing cybersecurity, exploring real-world applications of blockchain for cybersecurity across various sectors, and evaluating the potential societal empowerment resulting from adoption of blockchain-based cybersecurity solutions. This research employed a mixed-methods approach, combining quantitative analysis of cybersecurity incidents and qualitative examination of blockchain implementations. A comprehensive literature review established foundational knowledge, supplemented by case studies and expert interviews to gain practical insights. The study targeted individuals, businesses, and governmental entities concerned with cybersecurity and interested in leveraging blockchain technology for enhanced protection. Sampling techniques include purposive sampling of cybersecurity professionals, blockchain experts, and representatives from sectors vulnerable to cyber threats. The sample size aimed for diversity and adequacy to ensure comprehensive data collection. Data collection utilized surveys, interviews, and documentary analysis. Statistical analysis was done to identify trends and patterns in cybersecurity incidents, while qualitative data from interviews and case studies were thematically analyzed to extract key themes and narratives regarding blockchain's role in strengthening cybersecurity and societal empowerment. Research findings indicated that blockchain technology enhances cybersecurity by providing immutable data storage, decentralized consensus mechanisms, and transparent transaction tracking. Implications suggest potential societal empowerment through increased data security, privacy, and trust in digital interactions, benefiting individuals, organizations, and governments alike.

Keywords: *Blockchain Technology, Cybersecurity, Societal Empowerment*

AI INTEGRATION IN LAND MANAGEMENT

William N.¹ Magati C.²

¹Kabarak University, KENYA

²Maasai Mara University, KENYA

Correspondence:ndiema1william@gmail.com

Abstract

FAO (2023) report on state of food security shows an estimation of between 690 and 783 million individuals in the globe faced hunger in 2022, and recommends redoubling of their efforts to transform agri-food systems and leverage them towards reaching the Sustainable Development Goal. The overall goal of this report is to give insight into Artificial intelligence (AI) integration as a transformative force for adaptive leadership in land management, promoting (SDG) and societal empowerment. The traditional land management approaches struggle with the challenges arising from climate change, land degradation, and population growth. Such elements are essential in necessitating dynamic and informed decision-making, informed by real-time data and insights. This paper aims to discuss the application of AI in land management, explore the benefits of AI-driven land management for sustainable development and analyze the challenges and opportunities for adaptive leadership in implementing AI solutions. The study employs a literature review model and statistical analysis, drawing data from discussing existing research on AI applications in land management, focusing on precision agriculture, land use planning, resource management, and environmental monitoring. This study shows why AI application is necessary in land management, including optimizing crop yields and resource usage through precision agriculture technique, streamlining land administration processes through automated data processing and intelligent record keeping, identifying optimal land use configurations for sustainable development through spatial analysis, and predicting and mitigating natural disasters through AI-powered environmental monitoring. The paper encourages a collaborative effort among policymakers, technologists, and local communities to leverage AI for sustainable land use emphasizing ethical considerations, digital literacy training and equitable access to technology.

Keywords: *AI, Integration, Land Management.*

ASSESSMENT OF STAFF TRAINING NEEDS FOR SUPPORTING OFF-CAMPUS TEACHING AT SELECTED UNIVERSITY LIBRARIES IN KENYA

Masinza F.L.¹ Lusala H. L.¹ Kimoriot M.J.²

¹Garissa University, KENYA

²Kenya Methodist University, KENYA

Correspondence: famasinza@gmail.com

Abstract

Kenya's university libraries are deficiently prepared to launch and operationalize full-fledged off-campus information products and services; hence, wavering support for off-campus learning and teaching. The purpose of this study was to determine staff training needs to support off-campus teaching at selected university libraries. A descriptive survey research design was employed and target population was 127 university library staff and 491 faculty from business, education, information technology, and graduate studies departments were included in the study. A census of all the library staff was done, while a sample size of 220 faculty were selected using a stratified sampling technique. A semi-structured questionnaire was used to collect the data. Validity and reliability tests were conducted on the data instrument. Data was analyzed using descriptive statistics, correlation, and thematic analysis. Staff training needs had a positive and significant relationship with off-campus teaching at selected university libraries in Kenya. The key aspects of staff training needs noted included digital knowledge, competencies, skills, and regular training. There is need for library management to strengthen staff training needs.

Keywords: *Assessment, Staff Training Needs, Off-Campus Teaching, University Libraries, Kenya*

INTEGRATION OF EXPERT SYSTEMS IN TVET LIBRARIES AMIDST 4IR ERA IN KENYA

Wambui, W.K.

Nyandarua National Polytechnic, KENYA

Correspondence: wilsonkabucho@gmail.com

Abstract

The fourth Industrial Revolution era has without doubt been a driver for change in the digital world providing libraries with opportunity to reprofile their competencies and reinvent themselves to remain relevant in the dissemination of information. The research objective is to investigate the integration of expert systems in Technical and Vocational training institutions in Kenya to promote the shaping of digitalization in the fourth industrial revolution. The research design adopted was descriptive research design. A census of 72 respondents was done using a close ended questionnaire. The questionnaire was tested for validity and reliability. The items were reliable with a Cronbach alpha score of 0.7853 exceeding 0.7. content and face validity were done. Data collected was subjected to quantitative analysis with totals and percentages presented in form of tables and charts. The findings were that 98% of TVET institutions have no standard libraries, 82% have no qualified librarians, and 98% have not integrated ESs. The study concluded that the TVET Institutions have no modern libraries, no qualified techno serving librarians and were yet to integrate ESs. The recommendations were Construction of modern libraries, Employment of adequate Techno serving librarians and integration of Expert System in TVET libraries in Kenya.

Keywords: *Expert System, 4IR, Access to Information, TVET Libraries, Library Service.*

EMERGING TECHNOLOGIES: NAVIGATING OPPORTUNITIES AND CHALLENGES

Kitui F.,¹ Kimuna C.,² Sisa R.,³ Ngugi J.,²

¹*National Industrial Training Authority, KENYA*

²*Jomo Kenyatta University of Agriculture and Technology, KENYA*

³*UNFPA*

Correspondence: kituif@gmail.com

Abstract

This research explores the dynamic landscape of emerging technologies, aiming to delineate both the opportunities they present and the challenges they pose. In an era marked by rapid technological advancements, understanding how to navigate these developments is paramount for individuals, organizations, and societies at large. The purpose of this study is to provide a comprehensive examination of emerging technologies, elucidating their potential benefits and the obstacles they entail. By identifying key trends and analyzing current practices, this research seeks to offer insights into how stakeholders can harness these technologies effectively while mitigating associated risks. The objectives of this study are twofold: firstly, to assess the current state of various emerging technologies across different sectors; and secondly, to evaluate the implications of these technologies on economic, social, and ethical dimensions. This research adopted a mixed-methods approach, combining qualitative and quantitative analyses. The research design involved literature reviews, case studies, and surveys to gather data from a diverse population comprising 20 industry experts, 20 policymakers, and 20 consumers. Sampling techniques included purposive and random sampling methods to ensure a representative sample. Research instruments included structured questionnaires and interview protocols tailored to capture nuanced perspectives on emerging technologies. Data analysis involved both descriptive and inferential statistical methods, supplemented by qualitative thematic analysis to uncover underlying patterns and themes. Findings from this research reveal a multifaceted landscape of emerging technologies, characterized by opportunities for innovation, economic growth, and societal advancement, alongside challenges related to privacy, security, and equitable access. The significance of this study lies in its potential to inform strategic decision-making processes for various stakeholders, including policymakers, industry leaders, and technology developers. By highlighting the complexities inherent in emerging technologies, this research offers recommendations for fostering responsible adoption and maximizing their societal benefits.

Keywords: *Emerging Technologies, Navigating Opportunities, Challenges.*

TRAINING AND SKILLS ALIGNMENT FOR THE AI GENERATION

Reuben J.M.¹ Okeyo W.²

¹*Kirinyaga University, KENYA*

²*The Management University of Africa, KENYA*

Correspondence: jmwikya@kyu.ac.ke

Abstract

As we enter the third decade of the 21st century, new and powerful forces are driving the direction of innovation in the fields such as science, technology and medicine. Digitalization has the potential to spur economic growth, but risks exacerbating inequalities. Artificial Intelligence (AI), automation and other digital general-purpose technologies can spur economic growth when they generate innovation that complements and enhances human productivity but they risk worsening economic inequality when innovation simply replaces people. They will make certain occupations obsolete and give rise to new ones that require different sets of skills. While they may create leapfrogging opportunities for some less-developed economies, others may miss out due to a lack of large capital investments and the high-skilled labor force necessary for these technologies to thrive. Current research indicates that many high education institutions have yet to form meaningful or robust responses to the changes occurring in the era of AI. It is imperative that high educational institutions, regardless of the context, understand the current and future importance of AI and begin to incorporate AI into their development and planning processes. Forward thinking and, where possible, preemptive action will position education institutions and their graduates to thrive in the AI era and make a positive contribution to economic, social and individual goals. Failure to do so, will have the opposite effect; graduates will be poorly prepared for the labour market and high education institutions as a whole will lose their status, when precisely the opposite is needed. To achieve this objective regardless of where their country currently stands on the AI adoption curve, the article proposes that education institutions should; Research the available AI tools, Integrate AI and related principles into core requirements, Leverage Open Educational Resources (OERs) to educate staff and students on AI, Guarantee the ethical use of AI and student data in the institutions, Capitalize on and create diversity initiatives in technology and Invest in academia-to-industry pathways.

Keywords: *Training, Skills, Artificial Intelligence.*

NAVIGATING THE 21ST CENTURY: UNRAVELING NEW FRONTIERS IN KNOWLEDGE MANAGEMENT

Kimote Z., Njuguna A.

Kirinyaga University, KENYA
Correspondence : zkimote@gmail.com

Abstract

Organizations that embark on the complex journey of knowledge management (KM) do so by means of a methodological process that involves producing, storing, retrieving, and sharing knowledge and expertise in order to improve business performance. Businesses are realizing more and more that they must handle information with care in today's environment where it is a valuable resource. Organizations are moving toward a paradigm shift as they realize that utilizing knowledge is not only advantageous but also essential for promoting innovation and maintaining competitiveness. Thus, companies must adopt knowledge management if they are to fully prosper in this information-driven age. This shift calls for a radical alteration of organizational culture as well as unwavering support at all organizational levels. For an organization to succeed, utilizing knowledge has become essential. In order to support its claim, this paper presents a thesis that says knowledge management is essential to an institution's success. The paper explores the difficulties organizations encounter in managing their knowledge and adapting to new trends through an extensive analysis of the literature and research already in existence. The study intends to provide meaningful results that will direct recommendations for establishments that have not yet accepted new trends by emphasizing the significance of knowledge management (KM). A comprehensive methodology that combines in-depth organizational analysis, case studies, and examination of emerging technological trends is applied. By understanding and solving the obstacles associated with knowledge management (KM) adoption, organizations may position themselves to thrive in a world where knowledge is a critical driver of innovation, efficiency, and long-term success. Organizations may thus use the study's suggestions as a roadmap to enhancing their knowledge management strategies in light of evolving trends, therefore enhancing overall performance and competitiveness.

Keywords: *Knowledge Management (KM), Organizational Culture, Paradigm Shift, Innovation and Competitiveness.*

INTEGRATION OF INTERNET OF THINGS (IOT) IN SMART INFRASTRUCTURE FOR SUSTAINABLE URBAN DEVELOPMENT

Karimi P.

Kirinyaga University, KENYA
Correspondence: pkarimi@kyu.ac.ke

Abstract

Urban development faces challenges of sustainability and efficiency. Integrating Internet of Things (IoT) into smart infrastructure offers potential solutions, but requires comprehensive understanding and implementation strategies. This research explores integration of IoT in smart infrastructure to foster sustainable urban development. It aimed at identifying opportunities and challenges and proposed strategies for effective implementation. The study objectives were: to assess the current state of urban development and the role of IoT in enhancing sustainability, investigate IoT technologies and their applications in smart infrastructure for urban settings, identify challenges and barriers to integration of IoT in urban development projects, and propose strategies for effective implementation of IoT in smart infrastructure to achieve sustainable urban development goals. A mixed-methods approach integrates literature review, case studies, and expert interviews. The study targeted urban planners, policymakers, technology experts, and stakeholders involved in urban development projects and IoT implementation. Sampling techniques included purposive sampling of urban planners, policymakers, and technology experts. Data collection utilized surveys, interviews, and document analysis. Surveys gather quantitative data on IoT adoption and perceptions, while interviews and document analysis provide qualitative insights into implementation strategies and challenges. Quantitative data underwent statistical analysis to identify trends and patterns in IoT adoption and perceptions, while qualitative data was thematically analyzed to extract key themes and insights regarding implementation challenges and strategies. Findings suggested that IoT integration in smart infrastructure offers significant potential for sustainable urban development, enabling efficient resource management, improved public services, and enhanced quality of life. Implications include the need for robust cybersecurity measures, stakeholder collaboration, and policy support to realize the full benefits of IoT in urban settings.

Keywords: *Integration, Internet of Things (IoT), Smart Infrastructure, Sustainable Urban Development.*

COMPARATIVE ANALYSIS OF MACHINE LEARNING APPROACH FOR ONLINE CREDIT CARD FRAUD DETECTION.

Abdullahi A.,¹Adebayo O.,² Surajudeen S.,¹ Olanrewaju, I.,¹, Idris o.,¹ OlalereJ.A.¹, Morufu

¹Federal University of Technology Minna, NIGERIA

²Islamic University, UGANDA.

Correspondence: abdullahi.pg209993@st.futminna.edu.ng

Abstract

Detecting online credit card fraud poses a significant challenge in data mining due to the diverse nature of genuine and fraudulent activity profiles. Additionally, issues such as incomplete or inaccurate data further complicate the task, stemming from biases in credit card fraud statistics collection. The effectiveness of fraud detection in credit card transactions greatly depends on the dataset and detection techniques employed. This study investigates the efficacy of three popular techniques—Naive Bayes, K-Nearest Neighbours, and Support Vector Machine—in detecting online credit card fraud. Using a dataset acquired from Kaggle.com consisting of 94,682 transactions, the methods were applied to both raw and pre-processed data. The analysis was conducted using Orange, a data mining software. Performance evaluation metrics including area under the curve, accuracy, the F1 measure, precision, and recall were employed to assess the techniques' effectiveness. The results indicate that Naive Bayes achieved an accuracy of 97.6%, K-Nearest Neighbours attained 97.7%, while Support Vector Machine yielded 72.7% accuracy. Notably, K-Nearest Neighbours outperformed both Naive Bayes and Support Vector Machine methods, showcasing its superior performance in detecting online credit card fraud.

Keywords: Credit Card Fraud; Naïve Bayes; K-Nearest Neighbour; Support Vector Machine.

EFFECT OF TECHNOLOGICAL CHANGES ON LIBRARY OPERATIONS AND SERVICES AT EGERTON UNIVERSITY

Kiplagat S.

Egerton University, KENYA

Correspondence: kiplagatsally@gmail.com

Abstract

Operations and services of libraries have experienced significant changes due to introduction of information and communication technologies (ICTs). This has led to an array of both technical and managerial issues that can have adverse impact on information management if not checked. The aim of this study was to assess the effect of technological changes on library operations and services with a view to proposing a framework to guide management of technological changes as they affect library information management practices at Egerton University. The objectives of the study were to: trace the history and drivers of technology application at Egerton University Library between 1999 and 2013; establish the technological changes and their implications on library operations, services and staff skills and knowledge; assess the adequacy of existing ICT policy; examine the technological benefits and challenges associated with introduction of ICTs affecting library operations and services and propose a framework to guide adoption of new ICTs in the management of library operations and services. The study adopted Information Technology Infrastructure Library (ITIL) as its theoretical framework. A qualitative paradigm using case study as the research method was employed. Purposive sampling technique was used to select fifty (50) respondents comprising both professional and paraprofessional staff from the library, and four (4) informants drawn from ICT and Procurement Departments. Data was collected using face-to-face interviews and analyzed thematically. The study established that the benefits accrued from technology adoption far outweighed the negative effects. Amongst the notable benefits were: greater level of efficiency in operations and productivity; achievement of excellent services; cost reduction in acquisition of information resources through consortia and increased access to wider range of resources and remote access. The negative effects were: cost of IT equipment, installation and maintenance; staff/user training and retraining; problems of data conversion/transfer and security; absence of permanent physical collection and generation of electronic-waste. Technological changes and technology adoption are inevitable and libraries and information centres must find a suitable framework that will enable them to keep up to date and be at par with the rest of the world. The study proposed ITIL framework for managing the challenges by guiding the library in development, adoption and implementation of information technologies. ITIL framework has aspects such as financial management for determining the cost of implementing a change, capacity management, software asset management, lifecycle configuration management and license management.

Keywords: Effect, Technological Changes, Library Operations, Services, Egerton University.

A TRANSFORMER MODEL FOR DETECTING SEPTORIA LEAF-SPOT DISEASE

Oginga H.O.

Kirinyaga University, KENYA

Correspondence : odongo.hillary@students.kyu.ac.ke

Abstract

The rise of global climatic conditions has catalyzed emergence of new crop pests and diseases which have become a great threat to agricultural sector. Highly valuable and heavily demanded vegetables and fruits in the world; such as tomatoes, have the potential to increase the income of small-scale and large-scale farmers in many regions. However, its production has been threatened by diseases such as; early blight, leaf curl, septoria leaf spot, late blight spot, bacteria spot, target spot, mosaic virus, leaf mold, yellow leaf virus, botrytis cinerea, gray leaf spot, fusarium, and spider mites that have led to reduced quality and quantity of tomatoes produced. The tomato farmers in different parts of the world have tried manual identification of the diseases in their farms which has been hindered by the size of the tomato farms being an impediment to early disease detection. This research paper reviews several other works with an aim of ensuring that tomato farmers are capable of investigating the symptoms of septoria-leaf spot disease. A transformer model is developed to enable early detection of the Septoria leaf-spot tomato disease symptoms being among the most common tomato leaf diseases that greatly affect the tomato production. The process has been achieved through a design research science method. Septoria leaf-spot symptoms are identified from the obtained dataset from Plant Village and Salient Features are extracted and tested using the developed model, and accuracy and performance of the model validated.

Keywords: *Transformer, Plant Village, Septoria.*

SYSTEMATIC LITERATURE REVIEW ON HATE SPEECH DETECTION MODELS: ADVANCES, CHALLENGES, AND FUTURE DIRECTIONS

Njeru J., Malanga K., Mwangi E.

Kirinyaga University, KENYA

Correspondence : jannicenjeru@gmail.com

Abstract

With the proliferation of hateful and harmful content on internet platforms, hate speech identification has emerged as a major study issue in natural language processing (NLP) and artificial intelligence. This systematic literature review provides a detailed evaluation of hate speech detection methods, including current advances, limitations, and future research directions. Using a structured review process, we examine a wide range of papers from major academic databases, methodically analyzing different techniques, datasets, evaluation standards, and applications. Our review explains the evolutionary path of hate speech identification, tracing a change from traditional machine learning algorithms to complex deep learning architectures and pre-trained language models. Despite significant advances, we identify ongoing problems that limit efficacy and generalizability of hate speech detection models. These obstacles include cultural disparities, responses to societal crises like pandemics and disasters, data scarcity, and imbalanced dataset issues, emphasizing the importance of ongoing innovation and refinement. In addition, we identify promising research directions that will impact the future of hate speech identification. These include use of explainable AI approaches to improve interpretability and transparency, as well as creation of real-time detection systems capable of processing massive amounts of data quickly and precisely. This study seeks to provide researchers, practitioners, and policymakers with practical insights to drive improvement of hate speech detection technology and encourage a safer online environment by analyzing existing literature and identifying topics for future research.

Keywords: Hate Speech Identification, NLP, AI, Literature Review, Hate Speech Detection Methods, Machine Learning, Deep Learning, Pre-Trained Models, Explainable AI.

DIFFIE HELL-MAN KEY EXCHANGE ENCRYPTION MECHANISM FOR SECURING DATA FROM MAN-IN-THE-MIDDLE ATTACK

Olowo, Sunday, Idris, Ismaila , Olawale , Surajudeen Adebayo, Olawale , Surajudeen, Joseph Adebayo, Ojeniyi, Joseph Adebayo, Isah, A. O., Subairu, S.O

Federal University of Technology Minna, NIGERIA
Correspondence: sundayolowo3@gmail.com

Abstract

In this study, a Diffie-Hellman key exchange encryption mechanism was adopted to enhance the security of transmitted data from Man-in-the-Middle (MITM) attacks. The system aims to improve the confidentiality, integrity, and non-repudiation of data transmitted over an unsecured network. The key exchange protocol used in the system ensures that the keys are securely exchanged without interception by a MITM. The proposed system also includes a user authentication mechanism to verify the identity of the parties involved in the key exchange. The system is designed to be simple to use and efficient in terms of storage space utilization and data consistency. The results of the study show that the proposed system effectively protects against MITM attacks and provides a secure channel for data transmission.

Keywords: *Diffie Hell-Man Key Exchange Encryption Mechanism, Securing Data, Man-In-The-Middle Attack.*

ASSESSMENT OF DIGITAL LITERACY SKILLS FOR SUPPORTING OFF-CAMPUS TEACHING AT SELECTED UNIVERSITY LIBRARIES IN KENYA

Masinza F. L., Gichohi P. M., Nzioka C. M.

Kenya Methodist University, KENYA
Correspondence: famasinza@gmail.com

Abstract

University libraries in Kenya face challenges in effectively launching and operationalizing off-campus information products and services, resulting in fluctuating support for off-campus learning and teaching initiatives. This evaluated the digital literacy skills of chosen university libraries in bolstering off-campus teaching support. Anchored on the technological pedagogical content knowledge model, the data was obtained from Kenyatta University, University of Nairobi, and Kenya College of Accountancy. Using a descriptive survey research design, the study targeted 127 university library staff and 491 faculty from business, education, information technology, and graduate studies departments. A census approach was employed for library staff, while a stratified sampling technique yielded a sample size of 220 faculty members. Data was collected using a semi-structured questionnaire, with validity and reliability tests conducted on the instrument. Analysis incorporated descriptive statistics, correlation, and thematic analysis. There was a positive and significant relationship between digital literacy skills and off-campus teaching support at the selected university libraries in Kenya. Enhancing digital literacy skills among library staff is necessary to bolster off-campus teaching initiatives. Attention should be directed towards strengthening literacy searching, citing and referencing, literature synthesizing, and scholarly writing skills among library personnel. This research contributes significantly to policy, theory, and practice in the field of information science, emphasizing the pivotal role of digital literacy in advancing off-campus teaching support within university libraries in Kenya.

Keywords: *Digital Literacy Skills, Off-Campus Teaching, University Libraries, Kenya.*

SHAPING THE ADOPTION AND USE OF ARTIFICIAL INTELLIGENCE IN ACADEMIC LIBRARIES IN KENYA

Ubaga E., Kisnia O., Kiarie G.,

Daystar University, KENYA

Correspondence: kisiatsango@gmail.com

Abstract

Artificial Intelligence is driven by changes in technology, and will only get better, easier and faster with the rapid technological advances. Academic librarians should therefore consider ways to incorporate intelligent technology into their library services in order to reap maximum benefits for their users. This paper discusses the awareness, capabilities, advantages and disadvantages of artificial intelligence, in order to give insight for its adoption and use within the context of academic libraries. This study investigated the ways in which academic libraries are currently using artificial intelligence to enhance provision of services, improve user experience, enable more effective and efficient library operations. The study was based on a review of current literature on the topic in academic libraries, to assess their awareness, adoption, readiness for, and use of artificial intelligence. Findings of the study were discussed in terms of the potential impact for academic libraries to become artificially intelligent and the implications for how best these libraries can leverage artificial intelligence to improve their operations and services. The study found that the potential for adoption and use of artificial intelligence in academic libraries is high and may not only enhance the operations and provision of current services, but also lead to the introduction of new services and functions to libraries as well as enhancing collaboration and sharing. There is however a need to create awareness of this potential by educating and training academic library staff and users about artificial intelligence, in order to help them thrive in a society which uses artificial intelligence.

Keywords: *Artificial Intelligence, Academic Libraries, Awareness, Adoption, Collaboration, Sharing.*

ENHANCING SOCIETAL EMPOWERMENT THROUGH EFFECTIVE INFORMATION AND KNOWLEDGE MANAGEMENT INITIATIVES

Cheruiyot E., Toroitich R.

Kabarak University, KENYA

Correspondence: echeruiyot@kabarak.ac.ke

Abstract

This paper explores the role of information and knowledge management initiatives in fostering societal empowerment across diverse sectors. Knowledge management initiatives encompass a wide range of strategies, processes, and technologies aimed at effectively capturing, organizing, sharing, and utilizing knowledge within organizations and communities. There is rapid information and knowledge flow in the world today. Globally, knowledge is an asset that needs to be tapped and put into use by various institutions. Organizations' innovation performance is influenced by internal and external factors, such as government policies, regional culture, organizational characteristics and employee behaviour. Access to information emerges as a foundational element, supported by educational programs and skill development initiatives that empower individuals and communities. Capacity building, collaboration, and technological infrastructure play critical roles in shaping successful knowledge management strategies. Despite the increasing availability of information and advancements in knowledge management practices, there exist significant challenges and gaps that hinder the effective utilization of these resources for societal empowerment for example digital divide, information overload, data privacy and security among others. The objectives of the study are to evaluate the effectiveness of existing information and knowledge management initiatives in promoting societal empowerment across various sectors, identify the critical success factors and finally challenges associated with knowledge management initiatives. The study will employ document review methods on the topic being investigated. The relationship between effective information management and the communities' empowerment will be depicted in the study. Conclusion and recommendations based on the findings will be provided to guide policy makers and stakeholders.

Keywords: *Knowledge Management, Empowerment, Capacity Building.*

RE-ENGINEERING UNIVERSITY LIBRARY SERVICES WITH EMERGING TECHNOLOGIES IN KENYA: PROSPECTS AND CHALLENGES

Ubaga E.,¹ Kiarie G.,¹ Rotich K.²

^{1,2}Daystar University, KENYA

²Egerton University, KENYA

Correspondence: ubagae@gmail.com

Abstract

The current wave of advancements in technology has significantly altered the services provided by university libraries, as well as the expectations that society has of them. Consequently, if university libraries don't start utilizing emerging technologies to enhance the delivery of information and services, they risk becoming obsolete in the twenty-first century. It is against this background that this paper examines prospects and challenges associated with the use of emerging technologies by university libraries in Kenya. By studying emerging technologies and their application in university libraries, librarians in Kenya will be able to foster new ways of service delivery which will help them to maintain their competitiveness in drawing and retaining patrons. This article, which is based on a review of previous studies, explores various emerging technologies available in Kenya, how they can be utilized by university libraries, as well as the challenges arising from their implementation. The study found that there are many opportunities for improving service delivery in Kenyan university libraries through emerging technologies such as mobile technologies, Instant Messaging, QR Code, mobile Apps, among others. However, although Kenyan university libraries are making efforts towards adopting emerging technologies for service delivery, the rate of adoption is still slow, and the variety of technologies being adopted is still narrow in comparison to the options available. This has been attributed to challenges such as lack of ICT skills, funds, policies, support from top management, as well as power outage, poor attitude of library staff and poor infrastructure. The study recommends that university libraries in Kenya should adopt emerging technologies in order to deliver exceptional services. Additionally, training of library staff, improving ICT infrastructure and top organization support amongst other factors should be put in place in order to enhance the adoption of emerging technologies.

Keywords: *Emerging Technologies, Library Services, Library Automation, University Libraries.*

SUB-THEME :HEALTH AND WELLNESS

IMPACT OF FAMILY PLANNING STOCKOUTS ON USERS IN THARAKA-NITHI COUNTY, KENYA

Kawira D.M.,¹ Mwari S.P.²

¹Kirinyaga University, KENYA

² Kenya Medical Training College, Chuka, KENYA

Correspondence: dmbarae@kyu.ac.ke

Abstract

Family planning stock out remains a critical issue in enhancing reproductive health and promoting the overall well-being of families in Kenya. Many studies have associated FP stock out with supply, procurement, and management issues. While many studies focus on studying the impact of FP stock out on women users, there are limited studies examining the impact of stock out of preferred FP methods on users both men and women. A proportional random sample of 279 respondents from Chuka County Referral Hospital, Kaanwa Health Centre and Magutuni Hospital in Tharaka Nithi County was obtained to provide information on FP stock out. Data coding, cleaning, and analysis was done using SPSS version 21.0. Results were presented in tables and graphs. Fifty-seven percent of respondents reported having experienced FP stock out. Most respondents (73.1%) preferred seeking FP services from public health facilities while 40% and 33% preferred IUD and implants as their FP methods, respectively. However, stock out of these preferred methods resulted in use of alternative methods or seeking the preferred method from alternative sources. Financial burden, unplanned pregnancy, family conflict, and use of non-preferred methods were the main impacts of FP stock out among the respondents. The County government of Tharaka Nithi through the Ministry of Health should adopt intervention measures that will promote supply of various methods of FP in public health facilities to meet the FP needs of the patients attending these facilities.

Keywords: *Family Planning, Stockouts, Users, Tharaka-Nithi County, Kenya.*

HOW INDIVIDUAL COUNSELING IMPACTS THE PSYCHOLOGICAL WELL-BEING OF CANCER PATIENTS RECEIVING CARE AT ONCOLOGY CLINICS IN MERU COUNTY

Magambo M.N., Wachira R., Gichohi, P.M.

Kenya Methodist University, KENYA

Correspondence: ndiah006@gmail.com

Abstract

Cancer patients undergo immense physical, emotional, and psychological distress that impacts their overall well-being. This happens despite the strategies the Ministry of Health has implemented, such as allocating resources and employing qualified personnel to support cancer patients. Indeed, the psychological well-being of cancer patients is still inadequate hence the mental health of patients continues to deteriorate, complicating treatment, coping, recovery, and healing process. This study evaluated how individual counseling impacts the psychological well-being of cancer patients at oncology clinics in Meru County. The study was guided by person-centered theory. It utilized a convergent survey research design and adopted systematic random sampling and purposive sampling techniques to select participants from a target population of 2580 cancer patients, 2580 caregivers, and 53 clinicians, respectively. Of these, the study sampled 335 cancer patients, 40 caregivers, and six clinicians. Questionnaires, interviews, and focus group discussions were used to collect data. Validity and reliability of research instruments were ascertained accordingly. Percentages, mean, and standard deviation were computed for quantitative data, while thematic analysis was used to analyze qualitative data. The findings of the study indicate that despite the critical role of individual counselling in lessening cancer stigma, improving decision-making, promoting problem-solving skills, promoting comprehensive understanding and fostering preparedness, the optimal performance of individual counselling was curtailed by inadequate infrastructure, weak personalization of psychosocial care and weak flexibility at oncology clinics in Meru County. Individual counselling positively and substantially impacted psychological well-being of cancer patients. There is need for a more tailored and flexible approach of individual counselling of cancer patients. Clinicians and psychologists should prioritize customization of psychosocial interventions for each patient.

Keywords: *Psychological Well-Being, Oncology Clinics, Individual Counseling, Cancer, Psychosocial Intervention*

IMPACT OF FAMILY COUNSELLING ON THE PSYCHOLOGICAL WELL-BEING OF CANCER PATIENTS ATTENDING ONCOLOGY CLINICS IN MERU COUNTY

Magambo M.N., Wachira R., Gichohi P.M.

Kenya Methodist University, KENYA

Correspondence: ndiah006@gmail.com

Abstract

Cancer patients globally face significant physical, emotional, and psychological challenges that impact their overall health. This indicates the unmet need for psychosocial support, which can worsen their psychological well-being, potentially complicating medical treatment and recovery. Many oncology clinics lack sufficient mechanisms for engaging family members in helping patients navigate these difficulties. Unfortunately, this undermines efforts by the Ministry of Health, which allocates resources and deploys qualified personnel for cancer management. In seeking solutions to this situation, the study evaluated the impact of family counselling on the psychological well-being of cancer patients attending oncology clinics in Meru County, Kenya. The study was anchored on social cognitive theory and utilized a convergent survey research design. The target population was 2580 cancer patients, 2580 caregivers and 53 clinicians, out of which 335 cancer patients, 40 caregivers and six clinicians were sampled. Questionnaires, interviews, and focus group discussions were used to collect data. The study adopted systematic, random and purposive sampling techniques in selecting subjects. Data collection tools were questionnaires, interviews and focused group discussions. Reliability and validity were established accordingly. Descriptive and inferential statistics analyses were applied to quantitative data, while thematic analysis was used on qualitative data. Family counselling significantly reduced stigma, increased cancer knowledge and understanding and improved the psychological well-being of patients. Results strongly advocate integrating family counselling into oncology clinics for its value in addressing family dynamics, decision-making, harmony, and stigma, enhancing emotional, social, nutritional, financial, spiritual, and other dimensions linked to cancer patient well-being. Clinicians, psychologists, and caregivers should prioritize a holistic approach including family counselling, with comprehensive family involvement, continuous family members empowerment, coordinated decision-making, and family-tailored counselling sessions. Policies should prioritize adequate resources, cultural competence training, integrated family-centered services, and inter-professional collaborations to address challenges undermining cancer patients' psychological well-being.

Keywords: Family Counselling, Psychological Well-Being, Oncology Clinics, Cancer, Palliative Care, Psychosocial Intervention.

QUANTITATIVE TRAIT LOCI(QTLS)FOR YIELD AND YIELD-RELATED TRAITS IN CHICK PEA (*CICER ARIETINUM L.*) UNDER DROUGHT STRESS IN KENYA

Kosgei A.J

Machakos University, KENYA

Correspondence : songj.aliz@gmail.com

Abstract

Yield and yield-related traits are complex and usually controlled by many genes each contributing small effects to the overall phenotypic expression. Their expression is also highly affected by environment and genotype x environment interactions. Utilization of modern breeding techniques such as molecular markers linked to the quantitative trait loci (QTLs) of interest will make it possible to track these traits using marker-assisted approaches. This research aimed to identify QTL associated with yield and yield-related traits under three treatments. The experiment was conducted using chick pea F5-6 families developed from two crosses, ICCV05107xICCV94954. Genotypic data was obtained using 49 polymorphic simple sequence repeat (SSR) markers conducted in International Crops Research Institute for Semi-Arid Tropics (ICRISAT), India. Phenotypic data was obtained from a field experimental setup in a 19 x 10 alpha lattice design replicated three times in three sites. Analysis for genotypic data was done using Gene Mapper software version 4.0 while phenotypic data analysis was conducted using SAS software version 9.2. QTL detection was achieved using IciMapping. A linkage map spanning a total length of 335.04 cM was generated. Eight QTLs were identified and mapped; three for above-ground biomass, one on Linkage Group (LG) 3 and two on LG 4 responsible for 8.67-32.4% phenotypic variation expressed, PVE, respectively). Two QTLs for yield were mapped on LGs 4 and 6(8.24- 11.08% PVE respectively). One QTL each was mapped for 100-seed weight on LG 1 (12.19% PVE), Harvest Index (HI) on LG 8 (9.9% PVE) and days to maturity on LG 4 (13.31% PVE). Marker traits identified and mapped will be useful for genomic-assisted breeding for yield in chickpea improvement. However, there is a need to map more markers and specific gene identification for effective marker-assisted breeding to enhance chickpea yield and hence food security.

Keywords: Chickpea, Drought, Linkage Map, Yield Traits, Quantitative Trait Loci (QTL), Molecular Markers

SUSTAINABLE GOVERNANCE MODEL IN HEALTH CARE ON WORK FORCE OUTCOMES: AN ANALYSIS OF LEVEL FIVE (5) HOSPITALS IN MOMBASA AND KILIFI COUNTIES

Ratanya S.

Technical University of Mombasa, KENYA
Correspondence: rschola@tum.ac.ke

Abstract

Transparency disclosure of information and accountability are key factors for good governance in public hospitals. The general objective of this study is to determine sustainable governance in healthcare on workforce outcomes in Level 5 Hospitals in Mombasa and Kilifi Counties. This study will be guided by two independent objectives: transparency, disclosure and accountability and control. The dependent variable will be workforce outcomes and organization culture will be the moderation variable. The scope of the study is Level five (5) Hospitals in Mombasa and Kilifi Counties. Agency theory, Stewardship theory and Dennison's model of culture will form the theoretical basis of this study. Both Mombasa and Kilifi Counties have private and public level 5 hospitals. A conceptual framework is presented showing the relationship between the key variables of the study. This study will conduct a cross-sectional involving public and private level 5 hospitals in Mombasa and Kilifi Counties. The target population will be the Hospitals' executive management team from the senior, middle- level and lower-level management cadres. Patients that access services in these Hospitals will also participate in the study. This will be a comparative analysis study which will focus on level 5 public and private hospitals in two counties at the Coast region of Kenya. Two Semi-structured questionnaires will be formulated for the study. One questionnaire for the executive management in the Hospitals and the other for the consumers. A pilot study will be done to measure authenticity of the data collection tool using Cronbach alpha reliability estimates. The study will apply quantitative and qualitative methods to evaluate data. The outcomes of this study will make available the most appropriate principles of governance as an effective model of ensuring Hospitals are transparent and accountable in their practices. Data will be analyzed using Statistical Package for Social Sciences (SPSS) for windows version 21 and will be presented using tables and figures.

Keywords: *Sustainable, Governance, Model, Healthcare Workforce, Outcomes, Analysis, Level Five (5) Hospitals, Mombasa County, Kilifi County.*

TUMOUR MICROENVIRONMENT (TME) TARGETING AS A PROMISING THERAPEUTIC STRATEGY IN HIGH RISK TNBC PATIENTS

Mburu S.

Kirinyaga University, KENYA

Correspondence: swanjiku@kyu.ac.ke

Abstract

Triple negative breast cancer (TNBC) is a heterogeneous sub-type of breast cancer. Within this subtype, a number of other distinct subsets presenting with highly genetically, clinically, pathophysiologically diverse tumors have been recognized. These subsets range from the highly proliferative, invasive and very aggressive BL subtypes, to the low proliferating, indolent tumors with luminal characteristics not only associated with relatively worse prognosis and poor treatment outcomes, but also chemo resistant. Given the global pathological complete response (pCR) for TNBC patients after neoadjuvant chemotherapy (NACT) of only 20 - 30%, the limitation of chemotherapy due to intolerance by majority of patients, new and more effective strategies for improving the treatment outcomes, while at the same time minimizing cytotoxicity, are urgently required. The main objective of this systematic review and metaanalysis was to evaluate the utility of TME as a promising therapeutic target in the high risk TNBC patients. This was done by pooling multiple randomized controlled trials studying the current therapeutic interventions available for this subtype in a single analytic model. Relevant data was systematically searched from research databases such as PubMed, Google Scholar, Science Direct, reviewed and articles selected for this study using a predefined eligibility criterion. The required information was extracted using standardized methods of extraction, analyzed using both narrative and statistical synthesis of the available evidence. The research evidence obtained from the synthesis was organized and summarized using summary tables. Some key results of this study include the finding that addition of TME targeting agents to standard chemotherapy prolongs the overall survival of the patients compared to standard chemotherapy alone. Fundamentally, TME targeting agents were able to achieve not just some of the highest relative risk reductions (e.g. 68% with mTOR Inhibitors), but also very high pCR of up to 88.2% (addition of Carboplatin to the standard NACT). Given the biological complexity, heterogeneity, specificity of TNBC subtypes and TME, this makes TME targeting an attractive strategy for not just optimizing the current chemotherapy interventions, but also minimizing the well-recognized associated cytotoxicity. These findings will have a direct impact in the current treatment practices and management of TNBC and breast cancer in Kenya.

Keywords: *Tumour Microenvironment, TNBC, TNBC Therapeutic Targets, TME Targeting Strategies*

**UNVEILING THE PATH TO HEALTHY HABITS: EFFECT OF SCHOOL-LED
TOTAL SANITATION INTERVENTION ON SANITATION AND HYGIENE
KNOWLEDGE AND PRACTICES AMONG SCHOOL-GOING CHILDREN
(GRADE 4-7) IN BARINGO COUNTY, KENYA**

Omari P.K.,¹ Karanja S.M.,² Mambo S.²

¹ University of Kabianga, KENYA

²Jomo Kenyatta University of Agriculture and Technology, KENYA

Correspondence: phanicekerubo@gmail.com

Abstract

Poor hygiene and sanitation knowledge and practices pose serious health risks to vulnerable populations such as school-going children. Kenya is among the 26 countries worldwide that account for 90% of open defecation. School-Led Total Sanitation (SLTS) is a novel intervention that has been successfully implemented in South African countries to improve sanitation and hygiene outcomes among school-going children. Despite the intervention's success elsewhere, it has not been implemented in Kenya. The main aim of this study was to assess SLTS' effectiveness in improving sanitation and hygiene knowledge and practices among school-going children in Baringo County. A quasi-experiment study involving 434 pupils divided into intervention and control arms across three schools in each study arm was conducted. A six-month intervention included triggering, formation of health clubs, training sessions, and distribution of information, education, and information materials. Thereafter, an evaluation was conducted 3 months' post-intervention. Data was analyzed using SPSS V18. The chi-square test was used to compare knowledge and practices in both groups, while the difference in differences (DID) method assessed intervention effectiveness. In the intervention arm, significantly more children (63.2%) showed high knowledge levels compared to the control group (15.2%), with a ($\chi^2=104.67$, $df=1$, $p<0.0001$). There was a 52.3% mean increase in knowledge among children in the intervention arm. Significantly more pupils (85.6%) in the intervention schools washed their hands with soap compared to 65.5% ($X^2=23.57$, $df=1$, $p<0.0001$) in the control arm, an increase of 19.6%. In the intervention arm, there was a significantly lower proportion of pupils who practiced open defecation at home (16.3%) compared to 35.4% in the control arm ($X^2=25.0$, $df=1$, $p<0.0001$). The SLTS intervention led to an increase in sanitation and hygiene knowledge and an increase in handwashing and toilet use at home among school-going children. These findings show that SLTS is an effective approach that can be adopted by county and national governments, and other stakeholders as an additional intervention to address the problem of poor hygiene and sanitation in Kenya.

Keywords: *School-Led Total Sanitation, Hygiene, Sanitation, Intervention.*

DISCRIMINATION OF BLUE AND BLACK BALLPOINT PENS' INK AND ITS EFFECTIVENESS IN FORENSIC INVESTIGATIONS

Kirui M.K., Obondi G., Nderu D., Munde E.

Kirinyaga University, KENYA

Correspondence: kirui.meshack@students.kyu.ac.ke

Abstract

The Government of Kenya has made great attempts at fighting corruption. However, document fraud and manipulation are still rampant. This study aimed to determine the profile of the ink of blue and black ballpoint pens commonly used in Kenya. Through an analysis of the ink composition of these frequently used writing instruments, the study intends to identify any possible connections between document security and the instruments that are widely used in Kenya. Understanding of the subtleties of document fraud will aid in the development of focused counter measures. Results will help current anti-corruption efforts and offer useful recommendations for improving document integrity and thwarting fraudulent activity in future. This was a laboratory experimental study design; whereby mixed methods approaches were used to collect both quantitative and qualitative data. The ink analyses which included the composition of the inks, discrimination, and resolution in different solvents were conducted using thin-layer chromatography (TLC), Fourier Transform Infrared Spectroscopy (FTIR), and Ultraviolet-visible UV-vis) spectroscopy. A total of ten ballpoint pens were included in the study. Six were blue ballpoint ink pens and the remaining four were black from distinct manufacturers. The number of pigments identified in ink from blue and black ballpoint pens varied based on TLC analyses. Importantly, the discriminating power (DP) of blue and black ballpoint pens was 0.87 and 0.83, respectively. In addition, UV-Vis spectroscopy attained a discriminating power (DP) of 0.93 for blue ink and 0.67 for black ink, whereas FTIR spectroscopy had a DP of 1.0 for both blue and black ink. Further, the FTIR spectra analyses identified presence of hydroxyl, carboxyl, amino, nitro, and ester/ether functional groups in the ballpoint ink pens. Multivariate analysis at different wavelengths revealed no statistically significant differences between the absorption of the blue and black inks in different solvents ($p > 0.05$). This study demonstrates the qualitative composition of blue and black ballpoint pen inks and the functional group. More importantly, the study provides baseline data on the chemical composition of ballpoint pen inks that may be used to establish a database suitable for forensic investigations. The study further demonstrates that TLC, FTIR, and UV-Vis spectroscopy might be useful techniques for discriminating ballpoint pen inks in Kenya.

Keywords: Ballpoint Ink Pen, TLC, FTIR, UV-Vis Spectroscopy, Discrimination.

OUTCOME OF SEXUAL ASSAULT OFFENSES' FORENSIC INVESTIGATION IN BUTERE SUB-COUNTY, KAKAMEGA COUNTY, KENYA: THE INFLUENCE OF COORDINATION BETWEEN MEDICAL AND LEGAL SECTORS

Alwora A., Butto A., Marwa I.

Kirinyaga University, KENYA

Correspondence: aalwora@kyu.ac.ke

Abstract

The criminal justice system has been faced with challenges to conclusively address the plight of victims and survivors of sexual assault offences. In Kenya, it is estimated that only 25% of total sexual offense cases presented before a court of law are successfully convicted. The primary focus of this study was to establish the influence of coordination between medical and legal sectors on the outcome of sexual assault offenses' forensic investigation in Butere sub-county. The significance of the study is to give insight into the successful investigation of sexual offenses and guide policy formulation regarding investigation of sexual offenses. The study adopted a descriptive survey design to provide an explanation of the variables and an explanatory research design to explain causal links between variables. Stratified random sampling was used to pick police respondents from police stations and police posts from Butere Sub County and snowball and purposive sampling was used to pick survivors of sexual assault offences within Butere sub county and health workers from level 4 hospitals in Butere Sub County respectively. Data was collected using closed and open-ended questionnaires administered to police officers, interview guides administered to health workers and survivors of sexual assault offenses. Data was subjected to thorough editing and summarizing before actual analysis. Data was analyzed both qualitatively and quantitatively. Qualitative data was analyzed thematically with the help of NVivo software. Quantitative data was analysed using Statistical Package for Social Sciences (SPSS) version 24 and results presented using tables. There was poor coordination between the medical and legal sectors concerning sexual assault investigation in Butere Sub County, a composite mean of 2.48 and that there is currently no integrated model providing comprehensive services for both the medical and legal sectors in this context. The transfer of P3 and PRC forms among pertinent stakeholders lacks smoothness and efficiency. Government pathologists demonstrate only moderate cooperation during the collection and preservation of precise scientific findings in medical examinations. An established collaboration exists between expert stakeholders and relevant service providers concerning sexual assault victims within Butere sub-county. Both medical professionals and police investigating officers are familiar with the permissible legal requirements regarding sexual assault evidence.

Keywords: *Sexual Assault Offenses, Forensic Investigation.*

ASSESSING THE IMPACT OF NANO-ENCAPSULATED REPELLENT APPLICATION TO CATTLE EARS ON *RHIPICEPHALUS APPENDICULATUS* INFESTATION

Kariuki M.W.

Kirinyaga University, KENYA
Correspondence : mkariuki@kyu.ac.ke

Abstract

East Coast Fever (ECF), also referred to as theileriosis, is a tick-borne disease caused by *Theileria parva*, posing substantial challenges to livestock farming and food security in numerous developing nations. The primary transmitter of ECF is *Rhipicephalus appendiculatus*. Previous studies have indicated that adult *R. appendiculatus* tend to feed predominantly around and within the ears of their hosts. Through a combination of a repellent blend from the anal region and an enticing blend near the ears, researchers have identified inherent "push" and "pull" mechanisms that steer ticks towards their preferred feeding sites. Initial research utilizing a crude repellent blend from the anal region resulted in tick confusion, prompting many to detach from the cattle. Further investigations revealed 4-methylguaiacol as the primary compound in bovine anal odor, demonstrating strong repellent properties against *R. appendiculatus*. Study of 4-methylguaiacol analogues identified 4-propylguaiacol as the most potent variant. Comparative analysis of the release rate of 4-propylguaiacol in ethylcellulose, polyvinylpyrrolidone, and β -cyclodextrin revealed β -cyclodextrin microcapsules as the most efficient. The aim of this research was to evaluate on-host the effect of microcapsules of 4-propylguaiacol polymers towards tick infestation and to assess their duration of protection. 0.5g of the microcapsules was tagged to one and two ears of the bovines respectively. The ticks were released from different body parts, and their behavior was assessed. Application of the treatment to both ears ensured 100% protection for seven days, showcasing superior efficacy compared to single-ear application. The β -cyclodextrin complex demonstrated a protracted "push" effect, effectively repelling ticks over an extended duration. These findings indicate the potential of the complex as a valuable tool in safeguarding cattle against brown ear ticks.

Keywords: Assessing, Impact, Nano-Encapsulated Repellent Application, Cattle Ears, *Rhipicephalus Appendiculatus* Infestation.

NUTRITIONAL VALUE OF ZINC IONS IN ENDOMETRIOSIS PAIN MANAGEMENT

Maore S.,¹ Mecha E.,^{2,3} Wabwile J.,² Maoga J.,³ Omwandho C.O.A.,^{2,4} Oreng P.,⁵ Konrad L.³

¹Department of Food Science Nutrition and Technology, University of Nairobi, KENYA

²Department of Biochemistry, University of Nairobi, Nairobi, KENYA

³Department of Gynecology and Obstetrics, Justus-Liebig University, Giessen, GERMANY

⁴Kirinyaga University, Kerugoya, KENYA

⁵Institute of Primate Research, KENYA

Correspondence: maoresharonm@gmail.com

Abstract

Good nutrition is important in several physiological processes important in maintaining the normal body metabolism and serves as a remedy for several metabolic disorders in our bodies. Of importance are mineral ions which have been found to act as coenzymes in many physiological processes in our bodies. Zinc metal an abundant trace element which plays a major role in genetic stability and function has been associated with pain relief in endometriosis. It is normally present in many parts of the cell which include the cell nucleus, nucleolus and chromosomes whereby it is involved in the stabilization of DNA and RNA structure. This study aimed to investigate the nutritional value of zinc ions in endometriosis patients and its possible role in endometriosis pain management. Endometriosis patients were given zinc ions as a nutritional supplement and to ease their pain during endometriosis over six months and their blood samples taken, serum obtained from blood, and Prostaglandin E2 (PGE2) and PGF2 in serum from patients and controls quantified.

Results showed that serum samples from endometriosis patients secreted higher levels of PGE2 compared to controls. Patients who had taken higher amounts of zinc ions had lower levels of prostaglandin secretions suggesting that zinc ions added as nutritional supplements to endometriosis patients led to reduction in pain. On the other hand, PGF2 secretion in serum obtained from endometriotic patients and controls showed no significant difference.

The study showed significant secretion of PGE2 by cell line supernatants upon treatment with 5 μ M zinc underscoring importance of zinc in pain relief. These results obtained formed a basis for further experiments.

Keywords: *Nutritional Value, Zinc Ions, Endometriosis, Pain Management.*

MORPHOLOGICAL DIVERSITY OF PILOBOLUS FUNGI ON HERBIVORE DUNG AT THE PWANI UNIVERSITY FARM

Oreng P.A.,¹ Wabwile J.J.², Mecha E.O³., Maore S. M⁴., Omwandho C⁵., Mwetheria P⁶.

¹ Department of Reproductive Health and Biology, Kenya Institute of Primate Research,
KENYA

²Centre for Biotechnology and Bioinformatics (CEBIB), University of Nairobi, KENYA

³Department of Biochemistry, University of Nairobi, KENYA

⁴Department of Food Science Nutrition and Technology, University of Nairobi, KENYA

⁵Kirinyaga University, Kerugoya, KENYA

⁶Department of Environmental health and Occupational Health, Kenyatta University, KENYA

Correspondence: orengpurity@gmail.com

Abstract

The Pilobolus fungi is a dung (coprophilous) fungus found in the Pilobolaceae family under order Mucorales with several species like the Pilobolus crystallinus, Pilobolus kleinii, Pilobolus roridus, Pilobolus pullus, Pilobolus umbonatus among others. Generally, the species in this family have a widespread distribution as a manure-dwelling fungus that grows on herbivore dung. This fungus functions as a saprotroph living and feeding on dead and decaying organic materials in herbivore dung. Pilobolus species are grouped under the class Zygomycetes. They are important to the ecosystem as they play a part in recycling nutrients in the herbivore dung, hence making the dung more nutritious and beneficial to the ecosystem. This study seeks to assess the morphological diversity of Pilobolus fungi in domestic herbivore dungs at Pwani University farm. Dung from at least 10% of cows, donkeys and goats were pooled, separately for each animal species, and incubated for seven days before being observed under microscopy for fungi identification. A total of four Pilobolus fungal species were observed namely Pilobolus crystallinus, Pilobolus kleinii, Pilobolus umbonatus and Pilobolus lentiger. *P. crystallinus* was the most dominant species and *P. lentiger*, the least. The highest diversity was observed in cow dung with Simpson's Diversity index (D) of 2.023, followed by goat (D = 1.916) and donkey (D = 1.167) dungs. Results indicate that cow and goat dung environmental favor growth of most of the fungal species compared to donkey dung which seemed to be the least favorable. This might be because of the difference in coprogen compositions that impacts fungal growth seemingly being higher in cow and goat dung compared to donkey dung. There is need to undertake additional research using molecular techniques.

Keywords: Morphological Diversity, *Pilobolus* Fungi, Herbivore Dung, Pwani University Farm.

MEMBRANE-TYPE 1 MATRIX METALLOPROTEINASE (MT1-MMP, MMP14) IN SERUM SAMPLES OF PATIENTS WITH ENDOMETRIOSIS

*Maoga J.,^{1,2} Muhammad A.R.,¹ Mecha E.,^{1,3} Wabwile J.J.,³ Mwaura A.,¹ Oreng P.,⁴
Omwandho C.O.A.,^{3,5} Scheiner G.,² Konrad L.¹*

¹Department of Gynecology and Obstetrics, Justus-Liebig University, Giessen, GERMANY

²Vascular Biology Program, Department of Surgery, Children's Hospital Boston, Boston, USA

³Department of Biochemistry, University of Nairobi, Nairobi, Kenya

⁴Institute of Primate Research, KENYA

⁵Kirinyaga University, Kerugoya, KENYA

*⁶Institute of Veterinary-Physiology and Biochemistry, Justus-Liebig University, Giessen,
GERMANY*

Correspondence : janeykemunto@gmail.com

Abstract

Endometriosis, a gynecological condition mainly associated with chronic pelvic pain and infertility, is characterized by presence of endometrial-like tissue outside the uterine cavity. It affects 50-60% of women experiencing chronic pelvic pain and infertility. Membrane-type matrix metalloproteinases are membrane-anchored proteins that are involved in extracellular matrix remodeling as well as in other physiological and pathological processes including proliferation, angiogenesis and cell invasion. Recently, the role of MMPs in endometriosis has been described. The aim of this study was to investigate the levels of MT1-MMP in serum samples of patients with and those without endometriosis and its correlation with different clinical characteristics. ELISAs were used to measure the levels of MT1-MMP in serum samples of patients with (n=71) and without (n=61) endometriosis. MT1-MMP levels were significantly higher in the menstrual phase compared to secretory phase but not the proliferative phase. On the other hand, patients with endometriosis showed higher levels compared to those without endometriosis. No associations were observed in MT1-MMP levels and different clinical characteristics associated with endometriosis. These findings suggest that MT1-MMP levels in serum samples of endometriosis patient's might be dysregulated, however further experiments are necessary to elucidate the facts.

Keywords: *Membrane-type 1, Matrix Metalloproteinase (MT1-MMP, MMP14), Serum Samples of Patients, Endometriosis.*

CYCLOOXYGENASE 2 (COX2) AND PAIN MANAGEMENT IN HUMAN ENDOMETRIOSIS

Mecha E.,^{1,2} Wabwile J.J.,¹ Maore S.,³ Oreng P.,⁴ Omwandho C.O.A.,^{1,5} Maoga J.,^{2,6}
Muhammad A. R.,³ Scheiner-Bobis G.,⁵ Konrad L.,³

¹*Department of Biochemistry, University of Nairobi, Nairobi, KENYA*

²*Department of Gynecology and Obstetrics, Justus-Liebig University, Giessen,
GERMANY*

³*Department of Food Science Nutrition and Technology, University of Nairobi, KENYA*

⁴*Institute of Veterinary-Physiology and Biochemistry, Justus-Liebig University,
Giessen,
GERMANY*

⁵*Department of Health Sciences Kirinyaga University, Kerugoya, KENYA*

⁶*Vascular Biology Program, Department of Surgery, Children's Hospital Boston, USA
Correspondence: emecha@uonbi.ac.ke*

Abstract

Endometriosis is a chronic disease affecting approximately 6-10% of all women during their child-bearing ages worldwide. It is an estrogen-dependent disorder that manifests through chronic pelvic pain, dyspareunia, and infertility affecting 30-40% of women in the USA. Currently, surgical laparoscopy followed by histological classification remains the gold standard for diagnosis. Cyclooxygenase (COX; syn. Prostaglandin Endoperoxide Synthase, PGHS) is an enzyme that facilitates bioconversion of arachidonic acid (AA) to inflammatory prostaglandins (PGs). To date, three distinct isoforms have been identified namely, COX-1, COX-2 and COX-3. Regulation of COX-2 in endometrial epithelial and stromal cells by estrogens and/or progesterone or by hormone withdrawal is unresolved. Thus, in this study we aimed to analyze COX-2 protein levels in endometrial stromal and epithelial cells with and without hormones in vitro. To address this objective, primary endometriosis epithelial and stromal cells were stimulated with and without estrogen and progesterone hormones and afterwards the hormones were withdrawn and Prostaglandins (PG) secretion quantified. Results showed that treatment of both stromal and epithelial cells with estrogen and progesterone led to increased secretion of PGE2 and PGF2 while their withdrawal led to reduced secretion of the two prostaglandins. We observed that co-cultures of epithelial cells and stromal cells had a high secretion of PGE2 and PGF2 upon treatment of cells with both the two hormones compared to monocultures. This underscores the need for a model of co-cultures in attempting to understand the pathophysiology of pain generated during menstruation and endometriosis.

Keywords: Cyclooxygenase 2 (COX2), Pain Management, Human Endometriosis.

MYOFIBER-SPECIFIC ACCUMULATION OF MITOCHONDRIAL DNA DELETIONS CAUSES BODY WEIGHT LOSS AND BONE ABNORMALITIES IN MICE

Kmoloi S.,¹ Baris O.,² Wiesner R.³

¹*Masinde Muliro of Science and Technology, KENYA*

²*Institut Mito Vasc, Université d'Angers, FRANCE*

³*University of Cologne, GERMANY*

Correspondence: Kmoloi@mmust.ac.ke

Abstract

In mammals' mitochondrial DNA (mtDNA) deletions accumulate to detrimental levels in few myofibers, ultimately leading to respiratory chain defects, segmental fiber atrophy, breakage and loss. Whether this aging-related accumulation of mtDNA deletions in a few myofibers contribute to systemic body effects remains unclear. The objective of this study was to determine the effects of myofiber-specific effects mtDNA deletions on body weight, adiposity and bone health. We expressed a dominant-negative variant of the mitochondrial TWINKLE helicase under the control of myosin light chain 1f (MLC1f)-Cre, thereby generating a mouse line that accumulate mtDNA deletions specifically in differentiated myofibers (K320E-Twinkle^{skm}). The body weight of K320E-Twinkle^{skm} age-matched controls was then monitored for 24 months. The length and mass of the femur bones was measured and bone structure analyzed by peripheral quantitative computed tomography (pQCT) at 24 months of age. Data was analyzed with Graphpad Prism (GraphPad Software, version 4.03). Two factor analysis of variance (ANOVA) was used to analyze data on age-dependent changes in body weight, with post hoc analysis where appropriate. Student t-test was used to compare bone health parameters. Statistical significance was accepted at $P < 0.05$. Data was reported as mean \pm standard error of mean (SEM). Results showed that body weight of K320E-Twinkle^{skm} was not different compared to the controls at 12 months and 18 months of age. However, at 24 months of age, K320E-Twinkle^{skm} had a significantly lower body weight compared to age-matched controls. The K320E-Twinkle^{skm} also appeared small in size and exhibited less observable abdominal and subcutaneous adiposity. Peripheral quantitative computed tomography (pQCT) analysis showed significant increase of femur cortical porosity at 24 months of age compared to controls (student t-test $p=0.011$). These results suggest that mitochondrial DNA alterations in differentiated myofibers causes whole body weight loss and negatively affects bone health. There is need for more detailed studies to determine the mechanism linking myofiber specific-mtDNA accumulations and such systemic effects.

Keywords: Myofiber-Specific Accumulation, Mitochondrial DNA Deletions, Causes, Body Weight Loss, Bone Abnormalities, Mice.

THE LEVEL OF KNOWLEDGE AND PRACTICE OF SECONDARY PREVENTION AMONG TYPE 2 DIABETES MELLITUS PATIENTS AT SELECTED HEALTHCARE FACILITIES IN MERU COUNTY, KENYA

Mbisi A.,¹ Ngari D.M.,² Kinoti T.,³ Njogu T.⁴

¹Kirinyaga University, KENYA

^{2,3}Chuka University, KENYA

⁴University of New South Wales, AUSTRALIA

Correspondence: ambisi@kyu.ac.ke

Abstract

Diabetes mellitus (DM) is a chronic metabolic disease of multiple etiologies that results from a deficit in insulin production, insulin action or both. Diabetes affects millions of people globally and is among the chronic diseases that take a huge toll on human health as well as resources, and regardless of this, the condition continues to face neglect by individuals, communities and states. The disorder is associated with significant disability, premature deaths and enormous medical costs often resulting from the chronic complications. Chronic complications of diabetes result from inadequate secondary prevention practices and they include both microvascular and macrovascular complications affecting the kidneys, eyes, neurons, heart, and the circulation. Upon diagnosis with T2DM, secondary preventive practices are fundamental in the prevention of the occurrence of chronic complications. However, inadequate knowledge on these measures among the patients and healthcare providers has been indicated as a major reason for the development of complications. Thus, the study sought to assess the level of knowledge and practice of the secondary prevention among patients with type 2 diabetes mellitus at Consolata Nkubu and Meru Level Five Hospital in Meru County. A descriptive correlational study design was adopted to collect data from 357 purposively sampled participants with T2DM using questionnaires and Focus Group Discussion Guide. Quantitative data was analyzed at 95% confidence interval and a significance level $p \leq 0.05$. Most respondents had T2DM for 5-10 years and the main comorbidity that affected 79% of the respondents was hypertension. The last BP measurements for most respondents was $>140/90\text{mmHg}$ and blood glucose level of $>7.8\text{mmol/L}$ with 53.7% having a BMI score of more than 25 kg/m^2 . Concerning secondary prevention 70.6% ($n=250$) did foot examination during every visit, 56.5% ($n=200$) had their eyes examined annually, 26% ($n=92$) had urine checks annually, 18.9% ($n=67$) had body cholesterol level check-up regularly and 69.5% ($n=246$) had regular blood pressure monitoring. The mean score was 48.3% and SD was 30.1. Most respondents had overall poor knowledge of prevention practices. Knowledge level significantly influenced T2DM secondary prevention at a p value ≤ 0.05 . Measures to

improve the knowledge and practice of secondary disease prevention should be instigated.

Keywords: *Diabetes Mellitus, Healthcare, T2DM Secondary Prevention.*

**NITROGEN AND PHOSPHORUS MINERALIZATION AND MONETARY VALUE
UNDER SELECT INTEGRATED SOIL FERTILITY MANAGEMENT PRACTICES
IN A FERRALSOLS OF WESTERN KENYA**

Bolo P.^{1,2} Mucheru M.² Monicah K.¹

^{1,2}*Alliance of Bioversity International and International Centre for Tropical Agriculture (CIAT)*

²*Department of Environmental Sciences and Education
Kenyatta University, KENYA*

Correspondence: [*p.bolo@cgiar.org*](mailto:p.bolo@cgiar.org)

Abstract

Nitrogen (N) and phosphorus (P) serve as vital nutrients for plant growth, typically obtained through expensive inorganic amendments. This investigation delved into the impact of microbial-mediated N and P mineralization on enhancing soil fertility, thereby reducing reliance on costly inorganic nutrients. While microbial nutrient mineralization proves to be a more economical and environmentally friendly alternative, providing financial relief to farmers by alleviating the need for inorganic fertilizers, there is a notable lack of information on its potential economic benefits for resource-constrained smallholder farmers. Addressing this knowledge gap is crucial for developing sustainable agricultural policies, especially in the Ferralsols-rich western Kenya region, characterized by low N and P availability. The research employed the in-situ resin core method to assess the effects of select integrated soil fertility management (ISFM) practices on N and P nutrient mineralization in two long-term trials (17 years) in western Kenya. Results revealed that FYM application enhanced various soil chemical parameters, while fertilizer (NPK) led to a decrease in soil pH and organic carbon (SOC). Phosphorus application increased mineralized P and its corresponding monetary value within 30 and 60 days of incubation. Nitrogen mineralized and their monetary equivalents varied with fertilizer application and incubation times. Nitrogen fertilization reduced P mineralization and monetary benefits. FYM application, on the other hand, increased P mineralization and its associated monetary gains within 30 and 60 days of incubation. Reduced tillage led to a higher nitrogen mineralization (17.74 kg ha⁻¹, ~ USD 23.13) than conventional tillage within 60 days. Residue application augmented mineralized N (17.48 kg ha⁻¹; ~USD 22.79 ha⁻¹) after 60 days. Additionally, maize and soybean intercropping demonstrated an increase in nitrogen mineralization (45.81 kg N ha⁻¹) and monetary value (USD 59.76 ha⁻¹). These findings underscore the potential soil-nutrition based economic advantages of ISFM practices with likely benefits to smallholder farmers.

Keywords: *Nitrogen and Phosphorus Mineralization, Monetary Value, Integrated Soil Fertility Management Practices, Ferralsols, Western Kenya.*

EXPLORING PHYTOCHEMICAL COMPOSITION AND THERAPEUTIC POTENTIAL OF ROSMARINUS OFFICINALIS USING GC-MS ANALYSIS

Wabwile J.J.,¹ Mecha E.O.,² Oreng P.A.,⁴ Maore S.M.,³ Sheth C.,⁴ Chandrakant,⁷ Till B.,⁶ Omwandho C., Twieku G.,⁵ Nyaboga E.N.²

¹*Centre for Biotechnology and Bioinformatics (CEBIB), University of Nairobi, KENYA*

²*Department of Biochemistry, University of Nairobi, KENYA*

³*Department of Food Science Nutrition and Technology, University of Nairobi, KENYA*

⁴*Department of Reproductive Health, Kenyatta University, KENYA*

⁵*Kirinyaga University, Kerugoya, KENYA*

⁶*Heidelberger Institute Für Global Health, Heidelberg University, GERMANY*

⁷*Department of Medicine and Surgery, CEU Cardenal Herrera University, SPAIN*

⁸*Department of Molecular Medicine, Kwame Nkrumah University of Science and Technology, GHANA.*

Correspondence: jamesbwile@gmail.com

Abstract

Rising global lifestyle diseases like diabetes, heart disease, stroke, obesity, and high blood pressure are linked to poor diet, often managed with conventional drugs, that harbour adverse side effects. Natural products, rooted in traditional medicine, offer bioactive compounds with not only nutritional use but with therapeutic potentials, such as anti- inflammatory and antioxidant agents, fostering human adherence and holistic health well- being. Natural products' cultural significance enhances individualized care, emphasizing illness prevention as seen in many ancient traditions such as Ayurveda and traditional Chinese. Moreover, natural products align with sustainable healthcare practices, reducing environmental impact. However, their integration requires scientific scrutiny to optimize efficacy and safety, ultimately paving the way for a holistic, human-centred healthcare approach that focuses on the benefits of natural medicine. Leaf samples from indigenous *Rosmarinus officinalis* were collected and processed at the Center for Biotechnology and Bioinformatics (CEBIB), University of Nairobi. After air- drying and grinding, DNA extraction and PCR amplification were conducted. DNA sequencing was done followed by phylogeny reconstruction to confirm plant species. The plant's crude extracts were then analyzed for phytochemical composition using Liquid Chromatography-Mass Spectroscopy. The resulting compounds were categorized, and computed to reveal their percentage composition. A total of 64 different phyco-compounds were identified. The compounds were classified into respective chemical classes, which revealed diverse percentages, reflecting the complexity of the phytochemical composition. Ester compounds dominated, comprising 59.29%, followed by terpenes (10.76%) and aromatic aldehydes (3.26%). These compounds hold significant implications for both

nutritional and therapeutic applications. Ester compounds often possess aromatic and fruity flavours, contributing to taste and aroma of food products. Additionally, they exhibit various biological activities, including antioxidant and antimicrobial properties, potentially promoting health and well-being. Terpenes, abundant in essential oils, have been linked to numerous therapeutic benefits, such as anti-inflammatory and analgesic effects, suggesting their potential in natural remedies. Aromatic aldehydes, known for their pleasant fragrance, also display antioxidant and antimicrobial properties, offering potential therapeutic applications. Understanding the diverse compound groups and their percentages provides insights into the nutritional value and therapeutic potential of the extract, highlighting its significance in complementary and alternative medicine approaches. The comprehensive analysis of compound groups in the extract reveals the plant's rich phytochemical profile, suggesting promising nutritional and therapeutic implications. Further exploration of these compounds may uncover novel applications in promoting health and well-being through natural remedies and dietary supplements.

Keywords: *Phytochemical Composition, Therapeutic Potential Rosmarinus Officinalis, GC-MS Analysis.*

IMPACT OF FAMILY ROLES AND DYSFUNCTION ON CHILDREN'S MENTAL HEALTH: A COMPREHENSIVE ANALYSIS

Naibei S.M., Nyakundi E.B.

Kirinyaga University, KENYA

Correspondence: michaelnaibei953@gmail.com

Abstract

This study investigates the impact of family roles and dysfunction on children's mental health, addressing growing concerns in contemporary society. Utilizing an interdisciplinary approach, the research synthesizes literature from psychology, sociology, and family studies. Results reveal pervasive consequences, including identity issues, emotional neglect, communication difficulties, trauma, and a heightened risk of anxiety and depression. Notably, the study emphasizes the potential perpetuation of dysfunctional patterns across generations. The findings underline the urgency of interventions promoting clear communication, healthy boundaries, and breaking generational cycles of dysfunction. The study contributes to enhanced strategies for fostering children's mental well-being within familial contexts.

Keywords: *Family Roles, Dysfunction, Children's Mental Health, Interdisciplinary Analysis, Consequences, Generational Patterns.*

HOW SOCIAL MEDIA HAS NEGATIVELY AFFECTED THE MENTAL HEALTH OF THE YOUTH IN KENYA

Nyakundi E.B., Naibei S.M.

Kirinyaga University, KENYA

Correspondence: nyakundi.enock@students.kyu.ac.ke

Abstract

In the wake of heightened scrutiny on social media platforms, particularly those under the Meta umbrella, this paper endeavors to unravel the complexities surrounding the impact of social media on the mental health of the youth. Departing from the idealized view of social media as a universally positive force, the study adopts a literature review methodology to comprehensively analyze existing research. Key areas of discussion include 'Trauma Dumping,' investigating the consequences of sharing distressing experiences online; 'TikTok Suicide Content,' examining the implications of exposure to self-harm content; and 'Replacement of Phones for the Third Space,' exploring the shift from traditional face-to-face interactions to digital connections. By synthesizing findings, this paper aims to contribute valuable insights into the multifaceted relationship between social media and youth mental health, guiding future research and interventions for a healthier digital landscape.

Keywords: *Trauma Dumping, Third Space, Mental Health, Social Media.*

EVALUATION OF ANTI-NOCICEPTIVE, ANTIOXIDANT ACTIVITIES AND PHYTOCHEMICAL COMPOSITION OF *FAGAROPSIS ANGOLENSIS* AND *FAGAROPSIS HILDEBRANDTII*

Maloba P.M. Kimoloi S., Onyancha J.

Masinde Muliro University of Science and Technology, KENYA

Correspondence: Malobapeter54@yahoo.com

Abstract

Fagaropsis angolensis and *Fagaropsis hildebrandtii* have been traditionally employed in folk medicine for alleviating conditions associated with pain and oxidative stress. However, there remains a dearth of experimental data regarding the antinociceptive and antioxidant properties of these plant species. Thus, this study aimed to assess the antinociceptive, antioxidant activities, and phytochemical composition of *F. angolensis* leaves and *F. hildebrandtii* stem bark. Extraction was carried out via maceration using water and methanol. The antinociceptive activity of increasing concentrations of the extracts (2-250 mg/kg) was evaluated using the acetic acid-induced writhing animal model, compared against aspirin (150 mg/kg). Antioxidant activity of the extracts at increasing concentrations (0.01 to 1000 µg/ml) was assessed using the 2,2-Diphenyl-1-picrylhydrazyl (DPPH) method, with ascorbic acid as the standard. Preliminary phytochemical analysis was conducted using qualitative methods. Additionally, total phenolic and flavonoid content were determined using Folin-Ciocalteu and Aluminium chloride calorimetric methods, respectively. Data were analyzed using two-way ANOVA followed by Tukey's post hoc test for multiple comparisons, with statistical significance set at $p \leq 0.05$. Analysis of the percentage writhing inhibition did not reveal any significant difference between tested doses of both *F. angolensis* and *F. hildebrandtii* methanolic extracts at 50 mg/kg-250 mg/kg compared to aspirin, indicating potent *in vivo* antinociceptive activity ($p > 0.05$). Both plant extracts exhibited potent antioxidant activity, with comparable percentage radical scavenging activity to ascorbic acid ($p > 0.05$). Phenols, steroids, flavonoids, alkaloids, and coumarins were present in all extracts, while anthocyanins were absent. *F. angolensis* and *F. hildebrandtii* methanol extracts had significantly higher total phenolic and flavonoid content compared to water extracts ($p < 0.05$). This study confirms the antinociceptive and antioxidant activities of both *F. angolensis* and *F. hildebrandtii* leaves and stem bark, as utilized in Embu and Makueni Counties, respectively. Further testing in non-human primates and clinical trials is recommended.

Keywords: Evaluation, Anti-Nociceptive, Antioxidant Activities, Phytochemical Composition, *Fagaropsis Angolensis*, *Fagaropsis Hildebrandtii*.

**A METRIC SCALE-BASED ASSESSMENT FRAMEWORK FOR RISKS
CATEGORIZATION AND ASSOCIATED HARM FOR LMS IN PUBLIC UNIVERSITIES
OF KENYA**

Kiplimo J., Mburu S., Nyamu J.

Kirinyaga University, KENYA

Correspondence: kiplimo.jacob@students.kyu.ac.ke

Abstract

The evolution of e-learning stands as one of the most successful applications of Information and Communication Technology (ICT) in Kenyan public universities. Recent years have witnessed significant shifts in higher education's learning paradigms, driven by the imperative and necessity of e-learning, particularly accentuated by crises such as the Covid-19 pandemic and its associated disruptions. However, akin to other internet-based systems, Learning Management Systems (LMS) are vulnerable to cyber threats and attacks. Given the inherent insecurity of the internet, ensuring the robust security of these systems is imperative. This study aimed to explore prevalent risks and assess their impact on the LMS of Public Universities in Kenya, with the overarching objective of devising a metric-based assessment framework for categorizing risks and their associated harms. Employing a hybrid research design, the study utilized a combination of survey and cross-sectional methods to gather both quantitative and qualitative data. Analysis encompassed statistical and qualitative methods. The findings highlighted technology deficiencies, infrastructure inadequacies, and skill gaps as primary contributors to the vulnerability of LMS. The culmination of this study is the development of a comprehensive risk assessment framework, poised to serve as a vital forensic tool for stakeholders. Additionally, this framework promises to reshape current risk management practices pertaining to LMS, potentially influencing policy development in this domain.

Keywords: *Learning Management System, LCM, E-Learning, Risk Assessment Framework.*

DISTRIBUTION OF FINGERPRINT PATTERNS AMONG NON-SIBLINGS, GENDER AND SUB-ETHNIC POPULATIONS IN WESTERN KENYA

Lunani M. W.¹Webale M.K.¹, Munyekeny G.O.¹, Chimbevo L.M.²

¹ *Kirinyaga University, KENYA*

²*Pwani University, KENYA*

Correspondence: [*mikelunani@gmail.com*](mailto:mikelunani@gmail.com)

Abstract

Fingerprints are the most reliable biometric tools for individual identification. However, there is inconsistent information on association between gender, ethnicity and familial relationship status with fingerprint patterns. The study determined the distribution of fingerprint patterns in two sub-ethnic populations (Bukusu and Tachoni) of Western Kenya. Association between fingerprint patterns with individual digits, gender, sub-ethnic group and familial relationships was determined in a study population of 240 participants. A cross-sectional study was applied with clustered sampling technique. Demographic information was collected using a questionnaire. Fingerprint patterns were collected using fingerprint ink pad and analyzed according to Henry's classification system. The association of fingerprint patterns with individual digits, gender, sub-ethnic groups, and familial relationship was determined using the Chi-square (χ^2) test with statistical significance set at $P \leq 0.05$. No variation was observed in the frequency of arch, composite, loop, and whorl patterns across the five digits. Similarly, all fingerprint pattern frequencies did not vary with gender or sub-ethnic group ($P > 0.05$). The frequencies of all fingerprint patterns were comparable across the right-hand digits ($P = 0.736$) and the left-hand digits ($P = 0.937$), respectively. However, when arch, composite, loop, and whorl patterns were compared between siblings and non-siblings, significant variations were observed on both right and left hand digits ($P < 0.05$). The most prevalent fingerprint sub-pattern observed among the study participants was ulnar loop. The distribution of fingerprints patterns frequency across the ten digits, gender and sub-ethnic groups was not discriminatory. The significant variation in the frequency of fingerprint patterns among non-siblings is an important observation which makes fingerprints an important tool in discriminating among non-siblings.

Keywords: *Fingerprints, Distribution, Gender, Non-Siblings, Identification.*

MODELING THE DYNAMICS OF CHOLERA: A PERSPECTIVE ON BLOOD GROUPS, TREATMENT, AND OPTIMAL CONTROL

Ngari C. W.

Kirinyaga University, Kenya

Correspondence: *wanjohicharlie90@gmail.com*

Abstract

Vibrio cholerae, an infectious bacterium prevalent in regions with limited access to safe water and sanitation facilities, is the causative agent of cholera, a highly transmissible disease. This study delves into the impact of medication and blood groupings on cholera dynamics through mathematical modeling. Various mathematical frameworks concerning cholera transmission have been previously proposed and examined. For instance, Faruque et al. (2006) explored how bacteriophages can mitigate cholera epidemics. Notably, individuals with blood type O are most susceptible to the disease, while those with blood type AB exhibit higher resistance. Investigating the influence of blood groups on cholera transmission patterns is a primary objective. Model analysis reveals that when the basic reproduction number exceeds unity, the disease-free equilibrium is asymptotically stable both locally and globally, while the endemic equilibrium is locally asymptotically stable. Three control strategies—disease prevention, therapy, and screening—are employed to address the optimal control problem. Cost-effectiveness analysis of these control measures suggests that a combined approach involving prevention, treatment, and screening is the most economical intervention strategy against the cholera pandemic. Numerical simulations conducted using MATLAB software illustrate the impact of blood type on cholera propagation, highlighting severe illness among individuals belonging to certain blood groups during outbreaks. Proper treatment of individuals with blood group O can significantly reduce mortality and the transmission rate of cholera.

Keywords: *Cholera, Mathematical model, Blood group O phenotype, Stability analysis, Numerical Simulation.*

SUB-THEME: MATHEMATICS

ON THE NORM OF FINITE LENGTH ELEMENTARY OPERATOR IN TENSOR PRODUCT OF C*-ALGEBRAS.

Muiruri P.G., King'ang'I D.N., Wabomba S.M.

Chuka University, KENYA

Correspondence: *sm13masterspure@gmail.com*

Abstract

Many properties of Elementary operators, including spectrum, numerical ranges, compactness, rank, and norm have been studied in depth and some results have been obtained. However, little has been done in determining the norm of finite length elementary operator in tensor product of C*-algebras. The norm of basic elementary operator in tensor product of C*-algebras have been determined and results obtained. This paper determines the norm of finite length elementary operator in a tensor product of C*-algebras. More precisely, the bounds of the norm of finite length elementary operator in a tensor product of C*-algebras are investigated. The paper employs the techniques of tensor products and finite rank operators to express the norm of an elementary operator in terms of its coefficient operators.

Keywords: *Norm, Finite Length Elementary Operator, Tensor Product, C*-Algebras.*

DISCRETE ERLANG MIXED DISTRIBUTIONS AND THEIR PROPERTIES

Gathongo B.

University of Nairobi, KENYA

Correspondence : beatricegathongo@gmail.com

Abstract

The Erlang distribution was introduced by Agner KErlang, when he applied it in analyzing the number of telephone calls made concurrently to switching station operators. It is used to model events that occur in a given interval of time, where the shape parameter predicts the number of events while the rate/scale predicts the time interval between these events. It has a wide applicability due to its relation to the exponential and Poisson distributions. Over time the Erlang distribution has been modified by using mixing weights to form finite mixtures and by varying the shape parameter to form discrete Erlang mixtures and the rate/scale parameter to model continuous Erlang mixtures. The mixed distributions have a wider applicability compared to the Erlang distribution. The focus of this work is on discrete Erlang mixtures, which have been constructed and their raw and central moments derived in terms of moments of the mixing distributions. Cumulants obtained from the cumulant generating function were also used in deriving the moments. The posterior distribution and posterior moments were also presented. Bayesian estimation was used in parameter estimation of the mixed Erlang distributions. Some methods and special functions used in the study are the exponential series, logarithmic series, geometric series, Modified Bessel function of the first kind and the Touchard polynomials. The discrete mixing distributions used are the geometric, Poisson and logarithmic. The Erlang geometric distribution was shown to be the exponential and its posterior distribution the Poisson. The Erlang-Poisson mixture and its posterior distribution were expressed in terms of the modified Bessel function of the first kind. The posterior distribution of the Erlang-logarithmic Distribution was shown to be the truncated Poisson distribution, and the posterior moments were expressed as Touchard polynomials.

Keywords: Discrete Erlang Mixtures, Moments, Cumulant, Cumulant Generating Function, Posterior Distribution, Poisson, Geometric, Logarithmic.

ON INTERRELATIONSHIP BETWEEN DENSITY AND DENTABILITY IN NORM-ATTAINABLE CLASSES

Owuor J.,¹ Okelo B.,¹ Owino J.,¹ Kinyanjui J.²

¹Jaramogi Oginga Odinga University of Science and Technology, KENYA

²Kirinyaga University, KENYA

Correspondence: josephowuorowino@gmail.com

Abstract

Characterization of structures in the dual space of Banach spaces have been done. Of interest has been density and dentability in norm-attainable classes. However, the interrelationship between density and dentability is still lacking. In this paper, we completely characterize the relationship between density and dentability in norm-attainable classes. This work is based on the link between norm-attainability and optimization problems in convex optimization. We also give an application to a concrete optimization problem at a deeper level.

Key words: *Convex sets, Dentability, Density, Norm-Attainable Class, Optimization, and Norm-attainability.*

MODELLING AND FORECASTING DAILY COVID-19 CASES IN KENYA USING SARIMA MODEL

Kamotho C.,¹ Ngure J.,¹ Kinyua M.²

¹*Kirinyaga University, KENYA*

²*Karatina University, KENYA*

Correspondence : carolinekamotho13@gmail.com,

Abstract

The primary goal of this research was to forecast Kenya's daily COVID-19 case count using the Seasonal Autoregressive Integrated Moving Average (SARIMA) model. SARIMA is a time series forecasting technique that combines seasonal, moving average, autoregressive, and differencing components to capture intricate temporal patterns. This study aimed to forecast future case counts, assess seasonal variations, and evaluate efficacy of mitigation measures by utilizing historical COVID-19 incidence data from Kenya. The study shows how well SARIMA captures and predicts epidemic dynamics through rigorous model evaluation and validation against real-world data. Results aid in improving epidemiological surveillance and providing guidance for decision-making regarding Kenya's COVID-19 pandemic response.

Keywords: COVID-19, Pandemic, SARIMA.

STUDY OF W_9 -CURVATURE TENSOR ON LORENTZIAN PARA-KENMOTSU MANIFOLDS

Mburu F.N.,¹ Njori P.W.,¹ Gitonga C.N.,¹ Moindi S.K.,²

¹*Kirinyaga University, KENYA*

²*University of Nairobi, KENYA*

Correspondence: fmburu@kyu.ac.ke

Abstract

This paper presents a study of the W_9 -curvature tensor on Lorentzian para-Kenmotsu manifolds, expanding upon existing research to explore areas including W_9 flatness, $\xi - W_9$ flatness, $\phi - W_9$ flatness, and W_9 -semi-symmetric on LP-Kenmotsu manifolds. The findings enhance knowledge of geometric properties of these manifolds and offer fresh insights into behavior of the W_9 -curvature tensor within this context.

Keywords: *Para-Contact Metric Manifold, Lorentzian, Paracontact Manifold, Lorentzian Para-Kenmotsu Manifold, Einstein Manifold, W_9 -Curvature Tensor, W_9 Flat, $\Xi - W_9$ Flat, $\Phi - W_9$ Flat, W_9 -Semi-Symmetric.*

ON K+1*D-OPERATOR

Wanjala V.¹ Adhiambo B.O.¹ Mburu F.N.²

¹Rongo University, KENYA

²Kirinyaga University, KENYA

Correspondence: wanjalavictor421@gmail.com

Abstract

This paper introduces the class of k+1-*D-Operator a bounded linear operator T is said to be a k +1*D-Operator if $T^{*2k+1} (T^D)^2 = (T^D T^*)^2$ for a positive integer k. The study investigates the basic properties of this class and also shows that this class is closed under strong operator topology. Methodology mainly involved use of adjoint properties of bounded operator T. Results show that these class converges to the strong operator Topology.

Keywords: D-Operator, *D-Operator, Class (Q), K*D-Operator.

CHARACTERIZATION OF SQUARE NORMAL OPERATORS

Warue E.,¹ Musundi S.,¹ Ndung'u J.²

¹*Chuka University, KENYA*

²*Kirinyaga University, KENYA*

Correspondence: warueedith2@gmail.com

Abstract

The study of operators in Hilbert spaces holds significant importance, finding broad applications in diverse fields such as computer programming, financial mathematics and quantum physics. Many authors have extended normal operators in an attempt to provide practical solutions to complex problems in diverse fields. This paper focuses on a class of square normal operators in a Hilbert space denoted by H , where $B(H)$ represents bounded linear operators acting on H . An operator T in $B(H)$ is said to be a square normal if $T^2(T^*)^2=(T^*)^2T^2$. The study investigates the commutation relations and properties unique to this class of operators. A detailed analysis of their relation with other classes of operators is presented shedding more light on the unique features that distinguish square normal operators within the mathematical landscape. Through this paper, we aim to produce a valuable resource for mathematicians and physicists interested in the properties and applications of square normal operators fueling further innovations in functional analysis. To achieve this, we extend the properties of normal operators and other operators related to normal to square normal operators. In this paper, the algebraic properties of square normal operators are presented. The relationship between square normal operators with some operators such as isometry, unitary and n-normal is also given.

Keywords: *Normal Operators, Square Normal Operators, Commutation Relations.*

OPTIMIZING FINE NEEDLE DESIGN TO MINIMIZE NEEDLE TRACT SEEDING IN CANCER DIAGNOSIS: A COMPUTATIONAL FLUID DYNAMICS STUDY

Kamau, J. N., Njori, P.W.

Kirinyaga University, KENYA

Correspondence: kamau.17804@students.kyu.ac.ke

Abstract

This study investigates the optimization of boundary layer flow around fine needles to minimize the potential for needle tract seeding in cancer diagnosis procedures. Needle tract seeding, a common complication in biopsy procedures, occurs when cancer cells spread along the needle tract and can lead to disease recurrence or metastasis. By studying the flow dynamics around fine needles, researchers propose a strategy to minimize the risk of needle tract seeding. The findings of this study may have important implications for improving the safety and efficacy of cancer diagnosis procedures.

Keyword: *Boundary Layer, Fine Needle, Needle Tract Seeding, Cancer and Optimization.*

EXPLORING THE NATURE OF TIME AS A FORM OF ENERGY AND A DIMENSION OF SPACE

Njori P.

Kirinyaga University, KENYA
Correspondence: fmburu@kyu.ac.ke

Abstract

Time has long been a source of fascination, its elusive nature captivating minds for centuries. This scientific exploration aims to unravel the multifaceted essence of time, revealing its duality as both a form of energy and a dimension of space. Through an analysis of diverse scientific theories and empirical evidence, this study offers a comprehensive examination of time, shedding light on its enigmatic properties.

Keywords: *Time, Energy, Dimension, Space, Quantum Mechanics, Relativity, Theoretical Frameworks, Empirical Evidence, Universe.*

ON THE CYCLOTOMIC CO-SETS OVER GF (37)

Ongili P. , Lao H, Kinyanjui J.

Kirinyaga University, KENYA

Correspondence: ongili.17841@students.kyu.ac.ke

Abstract

The study of cyclotomic co-sets over Galois fields (GF) is a fundamental aspect of algebraic number theory. Cyclotomic co-sets are sets of integers that share common properties when raised to certain powers in a given modulus. Coding theory is concerned with data transmission across noisy channels and recovering the original information. Error-correcting codes, such as BCH codes and Reed-Solomon codes, rely heavily on the properties of cyclotomic co-sets over Galois fields. The study of cyclotomic cosets in GF (37) leads to the development of new codes and, improving the efficiency and error-correction capability of existing ones. This research is aimed at investigating the number of cyclotomic co-sets over a Galois field, (GF (37)), and understanding their properties and behavior. The research employs rigorous mathematical analysis and computational methods to enumerate and analyze the cyclotomic cosets over GF (37), establishing that cyclotomic cosets over GF (37), C_a , from a cyclic group of the form $\{a \cdot 37^b \bmod k \in \mathbb{Z} : b = 0, 1, 2, 3 \dots\}$ where the gcd of $k \in \mathbb{Z}$ and 37 is 1. This research contributes to the understanding of the properties of GF (37), with potential applications in various areas of mathematics and computer science. Additionally, it contributes to the construction of BCH codes, a class of error-correcting codes widely used in digital communications to ensure data integrity. The unique property of GF (37) can also contribute to defining the parity-check and generator matrices in the cryptographic system algorithms that can help in enhancing the security of public key cryptosystems, leading to improved reliability of digital communications and the security of digital data, as well as enriching the field of research in cyclic codes over prime fields.

Keywords: *Galois Field, GF (37), Error Correction and Detection, Cyclotomic Cosets,*

Communication Systems.

THE PROPERTY OF UNITARY QUASI-EQUIVALENCE ON θ -OPERATORS

Karanu K.K., Kayiita Z., Kinyanjui J.

Kirinyaga University, KENYA

Correspondence: *karanu.17842@students.kyu.ac.ke*

Abstract

The study of unitary quasi-equivalence was pioneered by Othman in 1996. Two operators, denoted as F and K, both bounded and linearly defined on a Hilbert space H, are considered unitary quasi-equivalent if there exists a unitary operator U such that $F^*F = PK^*KP^*$. Previous research has established that the θ -operator preserves almost similarity and unitary equivalence of an operator. However, the study of unitary quasi equivalence on θ -operators has not been established. An operator F, linear and bounded in Hilbert space H, is said to be a θ -operator if F^*F and $F + F^*$ commute. The class of all theta-operators in $B(H)$ is denoted by θ and defined as $\theta = \{F \in B(H) : [F^*F, F^* + F] = 0\}$. This study aims to determine whether the θ -operator preserves the unitary quasi-equivalence property. The significance of this research lies in its potential contribution to the fields of functional analysis and operator theory. Understanding operator equivalence is crucial in the broader context of mathematical physics and quantum mechanics, where such equivalences often form the basis of theoretical models and computational methods. By investigating the structural properties and equivalence relations of theta-operators, this study aims to provide valuable insights. To achieve this goal, the study will leverage knowledge from functional analysis and operator theory, while also reviewing previous work on other equivalence operators such as almost similarity and unitary equivalence.

Keywords: *Property, Unitary Quasi-Equivalence, Θ -Operators*

MODELLING EMISSIONS OF CARBON(IV)OXIDE FROM FOSSIL FUELS AND HUMAN ACTIVITIES

*Gicheru J.G., Gitonga C. N., Njori, P. W.
Kirinyaga University, KENYA
Correspondence: jamesgicheru94@gmail.com*

Abstract

Carbon (iv) oxide is a major greenhouse gas that causes global warming, which poses great threat to humanity. Studying the emissions of CO₂ plays a significant role in tackling climate change which is a global concern, and attainment of Sustainable Development Goal number 13 on Climate Action, which targets the reduction of greenhouse gas emissions, and has not yet been achieved. Despite many studies on greenhouse gas emission reductions, there is scanty information on compartmental models showing the interaction of humans and fossil fuels. In this study, a compartmental model was proposed to model the emissions of CO₂ so as to complement the existing models. This study aimed to develop a compartmental model on the emissions from a global perspective unlike many other studies which have addressed it from a regional and national level. The ordinary differential equation solvers of Runge-Kutta order 45 were be used, which is an inbuilt numerical scheme. The numerical results were presented graphically. The numerical simulations for the model were implemented in MATLAB to observe the dynamics of the emissions of CO₂. The findings of this study will help in reduction of emissions of CO₂ so as to address the issues of rising temperatures, melting ice and rising sea levels, unpredictable weather patterns, Ocean acidification and human health risks.

Keywords: *Modelling, Emissions, Fossil Fuels, Human Activities and Simulations.*

MODELLING DENSITY DEPENDENT ESCHERICHIA COLI IN WASTEWATER TREATMENT

Karunditu J.W., Gitonga C, Wanjohi P.N.

Kirinyaga University, KENYA

Correspondence: wanjikujuilia7@gmail.com

Abstract

Escherichia coli (E.coli) contamination is a worldwide issue and comprehending its behaviour plays a part in tackling global concerns and attainment of sustainable development goals(SDG6) . SDG6 on clean water and sanitation has not been achieved because water related diseases are still a major cause of morbidity and mortality worldwide with over 485,000 deaths occurring annually due to diarrhea and E.coli infections (?). E.coli pollution continuously affects both developed and undeveloped countries. Most of the studies on E.coli focus on experimentation and are too costly, more so they require highly skilled man power to combat E.coli. There is still very scanty quantitative knowledge of E. coli dynamics especially using mathematical models. Previous studies on mathematical compartmental models focused on the impact of E. coli in lakes pollution and water sources. There is still limited and scanty information on E. coli dynamics in wastewater treatment plants. More so on E. coli resistance, bacteriophage predation and monod growth. This study aimed at formulating a compartmental model that incorporates resistance, bacteriophage predation and monod growth. The developed model was simulated using inbuilt Runge kutta-45 softwares and results presented graphically. The findings of this study will be used in advancing scientific knowledge, safeguarding the environment, protecting public health and ensuring the safety of water supplies.

Keywords: *E.Coli, Wastewater Treatment, Modelling and Simulation*

HYPERCYCLICITY OF BASIC ELEMENTARY OPERATOR

¹Kawira E, ²King'ang'i D, ³Musundi S.

¹Chuka University, ²University of Eldoret, KENYA

Correspondence : estherkawira67@gmail.com

Abstract

Hypercyclicity, a field in linear dynamics, investigates linear and continuous operators characterized by dense orbits. It stands as one of the focal points in the study of linear dynamics, garnering considerable attention in research circles. Notably, hypercyclicity of elementary operators such as generalized derivations and left/right multiplication operators has been extensively examined, yielding diverse results. This paper contributes to the discourse by presenting novel findings on the hypercyclicity of basic elementary operators.

Keywords: *Hypercyclicity, Basic Elementary Operator, Orbit*

SUB-THEME: NATURAL & PHYSICAL SCIENCES
EFFECTS OF ZINC AND IRON CONCENTRATIONS ON OPTICAL AND STRUCTURAL PROPERTIES OF TITANIUM DIOXIDE NANOPARTICLES

Waweru G.S., Kiprotich S., Waithaka P.

Murang'a University of Technology, KENYA
Correspondence: 40257442021@student.mut.ac.ke

Abstract

Desirable optical, morphological and structural properties of titanium dioxide (TiO_2) can be obtained and improved by doping with a calculated amount of foreign atoms. When choosing a dopant, it must be compatible and should not change the nature of the substrate but rather improve its properties. TiO_2 has been employed as a photoanode in Dye sensitized solar cells (DSSC) due to its excellent optical properties and chemical stability. Over reliance on fossil fuels has contributed to environmental degradation calling for global action to mitigate the effect. As a result, the quest for greener and renewable sources of energy is inevitable with solar energy leading in realization of this vision. The inefficiency and a relatively high band gap of around 3.2eV inhibit TiO_2 to fully utilize solar radiation creating a research need with a view to solving this challenge. Sol-gel synthesis method was employed to help study the effects of dopant concentration on TiO_2 with the aim of improving its structural and optical properties. The study applied two dopants among the many dopants Zn and Fe and doping concentration between 1 - 10% mol. X-ray diffractometer (XRD), SEM, UV-Vis and FTIR spectrophotometers were used to characterize the synthesized samples. FTIR results showed variation in the stretching vibrations at 1033 and 668 cm^{-1} with different orientation depending on the dopant concentration confirming creation of defects in TiO_2 . XRD analysis displayed differences in peak intensities as the dopant concentration was varied in both Fe and Zn doped. Optical analysis showed that 5% mol of Fe gave the best optical properties.

Keywords: *TiO_2 , Optical Properties, Doping, Band Gap, DSSC.*

EFFECTS OF pH ON STRUCTURAL AND OPTICAL PROPERTIES OF CaAl_2O_4 : Eu^{2+} , Dy^{3+} NANOPARTICLES

Waithira S. N.,¹ Kiprotich S.,² Wako A. H.,¹ Simba N.²

¹*University of Embu, KENYA.*

²*Murang'a University of Technology, KENYA.*

Correspondence: 1487@student.embuni.ac.ke

Abstract

Calcium aluminate phosphor nanomaterials co-doped with europium and dysprosium, (CaAl_2O_4 : Eu^{2+} , Dy^{3+}) were prepared using a facile solution combustion technique. The structural and optical properties were investigated. X-ray diffraction (XRD) results confirmed presence of monoclinic phase in all the samples. Fourier-transform infrared analysis gave the expected chemical combustion results of the final product with few traces of $\text{Ca}_3\text{Al}_2\text{O}_6$ impurities at low and very high pH. The XRD patterns showed presence of impurity phase at low pH. This impurity phase is caused by preferential precipitation in the starting mixture due to lack of homogeneity in the precursor mixture between the urea and metallic ions, hence poor combustion. The diffraction angles of the major peaks shift to lower 2theta for all the samples except for the sample synthesized at pH=3.4 which shifts to higher 2theta. The crystallite sizes of the as-prepared samples were determined using the Debye-Scherrer equation. There was variation in the crystallite sizes with changes in pH. The estimated crystalline size of low pH (pH=3) and that of higher pH (pH=4.5) is high (54.02 and 52.24 respectively) while that of pH=3.9 is very small. The UV-Vis graph shows that the sharp absorption edges shift with change of PH. The band gap increases with increase in pH from pH=2.9 to pH=3.9 but decreases at higher pH (pH=4.5). Scanning electron microscope micrographs showed that all samples were agglomerated and had irregular shape with pores and cracks. The study provides a simple route to synthesizing CaAl_2O_4 : Eu^{2+} , Dy^{3+} phosphors with optimum synthesis pH producing the most crystalline sample for use in lighting devices.

Keywords: *Calcium aluminate, Phosphors, pH, Combustion, Luminescence.*

EXPLORING THE ROLE OF GUT MICROBIOTA IN HUMAN HEALTH

¹*Isiaka A.B.,²Anakwenze V.N.,³Ezembu C. C.,⁴Ilodinso C.R.,⁴Chikodili G. Anaukwu⁵, C G., Ezeokoli⁶, C.M, Uzoka⁷, U.H*

¹*Qatar Airways Medical Division, Doha, QATAR*

²*Department of Applied Microbiology and Brewing, Nnamdi Azikiwe University, Awka, NIGERIA*

³*Chchy Gilgal Laboratory and Consultancy Services, NIGERIA*

^{4,5,6,7}*Department of English Language and Literature, Nnamdi Azikiwe University, Awka, NIGERIA*

Correspondence: ilodinsoamara@yahoo.com

Abstract

The intricate interplay between the human gut microbiota and overall health has become a focal point of scientific investigation in recent years. This study seeks to provide a comprehensive analysis of the multifaceted relationship between gut microbiota and human health. The human gut is host to a dynamic microbial ecosystem, collectively known as the gut microbiota, whose multifaceted roles extend beyond digestion to influence host metabolism, immune responses, and overall well-being. Beginning with an exploration of the composition and diversity of gut microbial communities, the review delves into the dynamic interactions that occur within the gut ecosystem. Emphasis is placed on the symbiotic relationship between the host and microbiota, elucidating how these microbial communities influence metabolic processes, immune responses, and nutrient absorption. The impact of gut dysbiosis, characterized by an imbalance in microbial composition, is scrutinized in relation to various health conditions, including inflammatory bowel diseases, metabolic disorders, and mental health issues. Moreover, the review highlights recent advancements in research methodologies, such as metagenomics and metabolomics, which have enabled a deeper understanding of the functional aspects of gut microbiota. In addition to the health implications, the review explores the role of external factors, including diet, lifestyle, and antibiotic use, in shaping the gut microbiome. Critical insights into the potential therapeutic interventions, such as probiotics and fecal microbiota transplantation, are discussed, offering a glimpse into the future of personalized medicine. By analyzing a wealth of literature, this review seeks to elucidate the potential of manipulating the gut microbiota as a therapeutic strategy for promoting

human health and preventing disease. The synthesized knowledge presented here not only contributes to our current understanding of the intricate relationship between gut microbiota and human health but also highlights avenues for future research and interventions targeting the microbiome.

Keywords: *Gut Microbiota, Human Health.*

SEASONAL VARIATION OF ANTIBIOTIC PRODUCING ACTINOMYCETES FROM MENENGAI CRATER, KENYA

Waithaka P.N.¹ Githaiga B.M².

¹*Kirinyaga University, KENYA*

²*Egerton University, KENYA*

Correspondence: [*pnjenga@kyu.ac.ke*](mailto:pnjenga@kyu.ac.ke)

Abstract

After the discovery of penicillin by Sir Alexander Fleming, people thought antibiotics would remain potent forever. However, cases of antibiotic resistance were reported from different parts of the world. This was attributed to their indiscriminate use. The search for novel antibiotics ensued. One of the most promising sources of novel antibiotics is actinomycetes. The success of isolating actinomycetes from soil samples is affected by scantily known factors. This study aimed at determining the seasonal variation of antibiotic producing actinomycetes from Menengai crater, Kenya. Soil samples were collected in February which receives 52mm of rainfall, July (100mm) and May (194mm). Actinomycetes were isolated using serial dilution and spread plate bioassays. Antibiotic property of the isolates against *Staphylococcus aureus* (ATCC 25923), *Streptococcus pneumoniae* (ATCC 49617), *Enterococcus faecalis* (ATCC 29212), *Escherichia coli* (ATCC 25922), *Pseudomonas aeruginosa* (ATCC 27853) and *Proteus vulgaris* (ATCC 49990) was determined. Based on the size of the zone of inhibition and broad spectrum of activity, four actinomycetes coded PAN 25, 41, 75 and 110 were selected for further analysis. Physicochemical properties of the soil samples did not vary significantly ($P=0.42$). However, the number of actinomycetes isolated varied significantly ($P=0.035$) between February, May and July. The mean zone of inhibition varied between 22 ± 0.3 in PAN 110 to 27 ± 0.3 mm in PAN 75. Isolate PAN 110 produced 829 bp fragments, PAN 75 (971 bp), PAN 41 (1250 bp) and PAN 110 (829bp). The 16S rRNA gene sequence and nucleotide BLAST from NCBI revealed that isolate PAN 110 had 99% similarity with *Streptomyces Acrimycinistrain K30*, PAN 75 (*S. luteogriseus* strain ZG728), PAN 41 (*S. indiaensis*) and PAN 25 (*S. variabilis*). Very dry and wet conditions reduced the number of actinomycetes isolated from the soils of Menengai crater.

Keywords: *Characterization, Extraction, Isolation, Molecular and Samples.*

SUSTAINABLE WATER DEFLUORIDATION TECHNOLOGY: DEVELOPMENT AND TESTING OF ADSORBENTS AT EnviReN RESEARCH GROUP, SOUTH AFRICA

Gitari W.M.¹, Mudzielwana R.,² Ayinde W.B.,² Izuagie, A.A.,² Denga E.,³

¹*Technical University of Kenya.*

²*University of Venda, SOUTH AFRICA*

³*Adeyemi College of Education, NIGERIA*

Correspondence: Mugera.gitari@tukeny.ac.ke

Abstract

Groundwater is a source of drinking water for most rural communities in many developing countries. However, the groundwater may contain chemical species above-recommended limits for drinking water and could be detrimental to human health. Such chemical species of concern include fluoride and Arsenic, which are often in high concentrations. This presents a technical challenge for the supply of potable water in rural set-ups. Fluoride ion is essential for the formation of teeth and bone if present in drinking water at $\approx 1.5 \text{ mg/L}$ as recommended by World Health Organization (WHO). However, excessive intake of fluoride in drinking water leads to adverse health effects such as dental or skeletal fluorosis. Therefore, fluorosis mitigation is a significant issue of concern for researchers, water suppliers and governments in most developing countries. Reliable and sustainable defluoridation technologies are constantly being sought. Of the technologies available, methods based on the principals of sorption are most suited to rural and remote locations. The systems are relatively simple, requiring a reactor vessel to contain the media, which, once it is exhausted, can be regenerated or replaced, has low initial and operating costs. Technical challenge is availability of cheap and reliable adsorbents that have high F^- adsorption capacity and can be effectively regenerated. Researchers concur that adsorbents based on locally available natural materials would be most suitable for fabrication of adsorbents. This technical review presents a chronology of attempts at EnviReN Research Group, University of Venda, South Africa to develop high capacity fluoride adsorbents based on locally available materials such as clay minerals and soils, diatomaceous earth and biopolymers-nanoparticle composites, their modification with metal oxides and their fluoride adsorption potential. This was also an attempt to develop sustainable defluoridation technology and upscaling it. The paper also discusses the success and shortcomings of the technologies developed and the future outlook.

Keywords: Adsorption, Chitosan, Diatomaceous Earth, Drinking Water, Fluorid.

OPTO-ELECTRICAL CHARACTERIZATION OF BIO-DYE EXTRACT FROM BAOBAB AND NEEM TREE LEAVES FOR DYE SENSITIZED SOLAR CELL APPLICATION

Onsate W.N.¹ Keheze F.M.¹ Muna J.K.²

¹Pwani University, KENYA

²Kirinyaga University, KENYA

Correspondence: [*onsatewislay@gmail.com*](mailto:onsatewislay@gmail.com)

Abstract

Solar power research mainly centers on developing cost-effective, eco-friendly solar cells. Perovskite, Quantum Dot (Q.D), and Dye Sensitized Solar Cells (DSSCs) are prominent subjects. DSSCs with ruthenium-complex dyes exhibit high efficiency, but ruthenium's scarcity, cost, and toxicity drive exploration of natural dye substitutes. This study examines blending multiple natural dyes to alter the optical band gap and subsequently enhance DSSC efficiency. The change in E_g in response to blending at 33%, 50% and 67% by volume of baobab to neem extract has been determined and explored using UV-Vis spectroscopy and Tauc's approximation method. The individual band gap energies for pure baobab and pure neem extracts were identified as *ca.*1.65eV and *ca.*1.76eV, respectively. The Bandgap Energy for the blends obtained were 1.718 eV for 1:1, 1.778eV for 1:2, and 1.693 eV for 2:1 blend. This observed shift in band gap energy signifies an enhancement in the optical characteristics of the resultant dyes. Consequently, the blended extracts exhibit superior optical absorption properties compared to their parent dyes, positioning them as more effective sensitizers for dye-sensitized solar cells. The DSSCs sensitized with 33% Baobab 67% Neem ratio showed a significant enhancement in short-circuit current density (JSC) and open-circuit voltage (VOC). This blending approach also led to a substantial increase in power conversion efficiency (η) for Baobab DSSCs. The findings underscore the potential of these blended bio-dye extracts in advancing the efficiency of solar cell technologies.

Keywords: *Chromophore, Band Gap Energy, Optical Absorbers, Neem, Baobab, Dye Sensitized Solar Cell, Power Conversion Efficiency.*

SUB-THEME: BUSINESS AND SUSTAINABLE DEVELOPMENT

STREETS FOR PEOPLE, CLIMATE FOR TOMORROW: A SYSTEMATIC REVIEW OF ACTIVE TRANSPORT SOLUTIONS AND ADAPTIVE LEADERSHIP IN SOCIETAL DEVELOPMENT

Gideon, E.M.

Kisii University, KENYA

Correspondence: enockmusau@kisiiumiversity.ac.ke

Abstract

Urbanization, coupled with the escalating impacts of climate change, necessitates a critical examination of strategies to ensure both environmental sustainability and societal well-being. This systematic review investigates the interplay between active transport solutions and adaptive leadership in the context of creating streets that prioritize people. By synthesizing empirical evidence, this study aims to contribute to a comprehensive understanding of how adaptive leadership influences the effectiveness of active transport initiatives in fostering climate-resilient urban development. The Objectives of this study are to evaluate the current state of active transport initiatives in urban settings, analyze the role of adaptive leadership in promoting and sustaining these initiatives, and evaluate the collective impact of active transport and adaptive leadership on climate-related outcomes in societal development. A systematic search of databases such as PubMed, Scopus, and Web of Science will be conducted to identify studies published between 2010 and 2023. Inclusion criteria will encompass empirical research, reviews, and case studies focusing on active transport, adaptive leadership, and their intersection in societal development. The review will employ both qualitative and quantitative synthesis methods to analyze and present the findings. Preliminary findings suggest a growing body of literature highlighting the positive correlation between active transport solutions, adaptive leadership, and climate resilience in urban development. Key themes emerging from the review include community empowerment, policy frameworks, and successful case studies showcasing the integration of active transport with adaptive leadership strategies. This systematic review contributes to the existing knowledge base by synthesizing evidence on the intricate relationships between active transport solutions, adaptive leadership, and societal development in the context of climate change. The results will inform policymakers, urban planners, and researchers about effective strategies for creating streets that prioritize people and foster climate-resilient communities. Further research

avenues and practical implications will be discussed in light of the synthesized evidence.

Keywords: *Active Transport, Sustainable Mobility, Adaptive Leadership, Climate Change, Urban Development, Cycling Infrastructure.*

INDIGENOUS LANGUAGES: KEY TO CLIMATE CHANGE MITIGATION AND ADAPTATION

Chege, S.N., Githaiga N.M.

Murang'a University of Technology, KENYA

Correspondence : ngithaiga@mut.ac.ke

Abstract

This study delves into the critical role of indigenous languages in combating climate change, highlighting the deep connections between indigenous communities and their environments. Central to our investigation is understanding how these languages contribute to ecological knowledge, cultural perspectives on environmental stewardship, adaptation strategies, policy inclusion, knowledge dissemination, community resilience, and international collaboration in the context of climate change. Employing a qualitative methodology, we used purposive sampling to select key respondents. These included indigenous community leaders, environmental activists, academics specializing in indigenous studies and environmental science, and policymakers involved in climate change strategies. Through this approach, we reviewed the existing literature, conducted interviews, and analyzed relevant case studies. Our findings revealed that indigenous languages are not only rich in ecological knowledge, providing unique insights into the sustainable management of land and resources, but also embody cultural values that foster environmental stewardship and resilience. These languages are pivotal in offering diverse solutions to environmental challenges and are crucial for policy inclusion and international collaboration in climate change mitigation. The study concludes that preservation and revitalisation of indigenous languages are paramount for effective and inclusive climate change strategies and for ensuring both cultural continuity and environmental sustainability.

Keywords: *Indigenous Languages, Climate Change Mitigation, Environmental Stewardship, Traditional Ecological Knowledge, Cultural Resilience, International Collaboration.*

RISK ASSESSMENT OF ERP SYSTEMS IMPLEMENTATION

Mwenja J., Mugi K.

Meru University of Science and Technology, KENYA

Correspondence: jmwenja@must.ac.ke

Abstract

In the era of digital transformation, institutions widely adopt Enterprise Resource Planning (erp) Systems to streamline processes and enhance business operations. Use of digital technology has enhanced business operations, increased productivity, enabled publicity and access to information. However, lack of thorough risk analysis in erp implementation contributes to over 70% of projects failing to meet their targets. The study delved into identifying potential risks associated with erp implementation, ranging from technical issues to organizational resistance. The emphasis was on the significance of proactive risk management strategies to mitigate the impact of potential pitfalls. The study employed Multi-Criteria Decision Analysis (MCDA) based on standard risk assessment methodologies that identified risks in the erp implementation process flow, failure mode and root cause analysis, risk analysis and ranking, and utilization of decision modeling to guide organizational risk handling and mitigation strategies. The research successfully identified key risks linked to erp systems that system developers, policymakers, and stakeholders need to consider during implementation. Ultimately, the study offered valuable insights and recommendations to improve the success rate of erp implementations and navigate potential challenges effectively.

Keywords: *Enterprise Resource Planning (ERP) Systems, Proactive Risk Management, ERP risks, Multi-criteria Decision Analysis.*

TRADITIONAL AND MODERN MARKETING CHANNELS FOR HORTICULTURAL PRODUCE IN KENYA, A MAP OUT OF CHANNELS CURRENTLY IN USE BY FARMERS

Rutto D.K. L., Omami E. N.

University of Eldoret, KENYA
Correspondence: ruttodkl@gmail.com

Abstract

Horticultural produce can be retained on the farm or marketed through local fresh produce markets; local processed markets, fresh export markets, or processed produce export markets. Kenya has ecological conditions which favor a range of horticultural products produced to meet consumer needs. The marketing structure depends on the point of production and point of use. This study sought to determine the channels used by farmers to move these produce to consumers. Primary data was obtained through field survey using questionnaires and interviews and respondents selected through stratified random sampling method. Secondary data was obtained from varied sources (FPEAK, HCDA and MOA reports) compared and analyzed using descriptive and qualitative methods. The qualitative analysis indicated that farmers pass and dispose off their horticultural produce through various market outlets including; supermarkets, online trading portals and exports as well as traditional channels including rural and urban wholesale or retail markets. It was concluded that marketing channels of horticultural produce in Kenya are varied and diverse. It is recommended that marketers use varied marketing channels at their disposal to deliver produce to consumers.

Key words: *Channels, Crops, Marketing, Modern, Structure, Traditional.*

THE MODERATING EFFECT OF TECHNOLOGICAL INNOVATION ON THE RELATIONSHIP BETWEEN MOBILE BANKING ACCESSIBILITY AND FINANCIAL PERFORMANCE OF SMES IN KAJIADO COUNTY, KENYA.

Koech A. and Korir, Loice

Umma University, KENYA

Correspondence:[*drfernando173@gmail.com*](mailto:drfernando173@gmail.com)

Abstract

Technological innovation (e-commerce) continues to have a profound impact on the global business environment, but technologies and applications also have begun to focus more on mobile computing, the wireless Web, and mobile commerce. Mobile banking is a financial service provided by banks that allows customers to access their bank accounts and perform various financial transactions using their mobile devices, such as smartphones and tablets. The effective utilization of mobile banking by SMEs to enhance financial performance and the factors influencing its effectiveness remain unclear. This study aimed at examining the relationship between mobile banking accessibility and the financial performance and the moderating effect of Technological innovation of SMEs in Kajiado county, Kenya. Despite the widespread availability and adoption of mobile banking technology, research on its specific impact on the financial performance of Small and Medium Enterprises (SMEs) is lacking. A descriptive research design was adopted targeting a population of fifty-eight (58) licensed SMEs in Kajiado County, Kenya. The study was guided by Technological Acceptance Model. Data was collected using self-administered, structured questionnaires and items were grounded on a five-point Likert scale with data analysis being done using descriptive and inferential statistics. The hypotheses of the study were tested using multiple regression models and Hayes process macro. Results showed that mobile banking accessibility significantly predicts SMEs financial performance ($\beta=0.109$, $p< 0.05$) and this relationship is partially moderated by Technological efficiency ($\beta = .2483$, $p < .001$). Theoretically, the study supported the incorporation of the key mobile banking accessibility, and technological efficiency, where the outcome of the results indicated the significant relationship in achieving financial performance of SMEs. Finally, there is a need to undertake similar studies covering other geographical locations to make generalization of this study.

Keywords: *Mobile Banking, Technological Innovation, Financial Performance.*

HARNESSING CAPACITY BUILDING AND CO-CREATION OF INDIGENOUS KNOWLEDGE FOR CLIMATE CHANGE RESILIENCY IN KENYA.

Mabururu, M.N., Cosmas, B.

Rongo University, KENYA

Correspondence: michealntabo@gmail.com

Abstract

Climate change has gained a significant relevance now more than ever before. The 4th industrial revolution approach to sustainability in reality has negative impacts on the natural environment. The authors of this paper are of the view that for sustainability of climate, there are no two ways about it other than the need to revert to indigenous approach to nature which created a conducive environment for biodiversity, and healthy relationship within the ecosystem. African cultural beliefs protected environmental interference for survival and a balanced ecosystem through sacred, pragmatic, medicinal, food, agricultural, and cultic values. This paper presents ways or means through which sustainability of the climate in Africa can be viable for the healthy co-existence of both humans and other beings. Further, the paper deliberates on the issue of nature preservation, advocacy and sensitization of indigenous ways of climate change and adaptation and proposes a framework for reengineering a new takeoff for climate change sustainability. A systematic review of theories, concepts and life experiences from various indigenous communities in Kenya on how they co-existed with nature is adopted. The writer's view is clear that our diversion from indigenous ways of life has contributed heavily to the current destruction of the environment which is now reacting back through air pollution, global warming, unpredictable weather patterns, depletion of ozone layer just to mention a few. As a consequence, this has led to the detriment of human beings and other beings. From the above arguments one can safely conclude that the only cost effective way of sustaining the environment is to revert to the indigenous African way of reciprocal benefit.

Keywords: Capacity Building, Co-Creation, Indigenous Knowledge, Climate Change Resiliency.

LEVERAGING INNOVATION, TECHNOLOGY AND DIVERSIFICATION AS STRATEGIC BUSINESS RESPONSES TO ECONOMIC CHALLENGES IN KENYA: A REVIEW

Kiiru G.

Kirinyaga University, KENYA

Correspondence: gkiiru@kyu.ac.ke

Abstract

Kenya, a nation possessing great potential, finds itself embroiled in a complex economic landscape. While strides have been made in recent years, persistent challenges cast a long shadow, threatening to dim the prospects of countless households, individuals and businesses. Unemployment persists, casting a net of uncertainty over countless aspirations. Poverty tightens its grip on many, hindering upward mobility and perpetuating inequalities. The specter of economic stagnation looms, threatening to dampen the national spirit and limit opportunities for all. Yet, amidst these formidable challenges, there lies a ray of hope. Strategic businesses are recognizing the limitations of traditional approaches, and are weaving a new tapestry of strategic responses by adopting three impactful threads: innovation, technology, and diversification. This paper reviews the potential of leveraging innovation, technology, and diversification as strategic business responses to economic challenges in Kenya. The review aims at exploring the link between innovation, technology, and economic diversification, culminating in the provision of recommendations for leveraging these strategies to address the economic challenges in Kenya. The review on relevant evidences indicates that, in today's increasingly interconnected and fast-paced world, innovation and technological oriented business strategies have emerged as key drivers of economic growth, fostering job creation, competitiveness, and sustainable development. Additionally, economic diversification has proven to be a key element of economic development in which a country moves to a more diverse production and trade structure. On the other hand, effective leveraging of science, technology and innovation are essential ingredients for wealth creation in all nations. Technology and innovation is also a key component of social integration, sustainable development and poverty eradication based on equity, freedom, justice, governance, peace and prosperity. The review therefore provides valuable insights and support for the findings and recommendations for leveraging these strategies to address the economic challenges in Kenya.

Keywords: *Innovation, Technology, Diversification, Strategic Business Responses, Economic Challenges.*

INFLUENCE OF LEADERSHIP ON INNOVATION EFFICIENCY IN MANUFACTURING FIRMS IN KENYA

Gachanja I.M.

University of Embu, KENYA

Correspondence: Gachanjai39@gmail.com

Abstract

The emerging strategic intent of firms is to expand their growth opportunities by optimizing their capacities. Leadership has therefore been tasked with the responsibility of utilizing the resources efficiently for the attainment of current and future goals. This calls for leadership to focus on Innovation Efficiency (IE) for sustained performance improvement. The objective of this paper is therefore to determine the influence of leadership on Innovation Efficiency (IE) in manufacturing firms in Kenya. A mixed research methodology and cross-sectional design was applied. The target population was 2484 leaders and multi-stage sampling was used to sample 345 respondents. Primary data was collected. Results revealed that leadership has a significant influence on IE. It was concluded that management should practice and encourage creativity, exploration, inspiration, exploitation and mindset to promote IE. Further research should be conducted to find out how leadership should balance the trade-off between risk management and IE.

Keywords: *Leadership, Innovation Efficiency, Exploration, Entrepreneurial Mindset.*

EFFECTS OF TRANSFORMATIONAL LEADERSHIP ON EMPLOYEE MOTIVATION AMONG HOSPITALITY ENTERPRISES IN KENYA

Elingit R.O.

Kisii University, KENYA

Correspondence: elingitokwi@yahoo.com

Abstract

Transformational leadership has played a vital role in impacting employee motivation which has resulted into positive results by improving organizational financial performance and sustainability. Hospitality industry has the potential to create employment to many youths in Kenya and paying taxes to run various government endeavors in Kenya. However this field was impacted negatively by Covid- 19 pandemic from which tourism both domestic and international was affected and many employees lost their jobs .The study examines the effects of transformational leadership on employee motivation among hospitality institutions in Kenya .The study used desk research from which data was collected from secondary data sources derived from recent online journals and magazines from the global and local authors related to the topic of the study .This method is easy to get current details from various authors to support the study. The study findings revealed that transformational leadership is a powerful leadership style to transform the dying hospitality enterprises and make it vibrant to continue serving the local and international community. Because of the challenges the industry faced investors should bank on transformational leadership training and provide resources for employees' involvement and motivation to support transformational efforts of the leader and teach employees crisis management for many who lost jobs were negatively affected. The study concluded that transformational leadership affects employee motivation on the positive and should be encouraged even during difficult times. The study recommends training of employees to support transformational leaders and provision of resources for employee training and crisis training especially after negative effects of post COVID-19 pandemic. Finally reward transformational leaders as per their effort as a measure to retain them.

Keywords: *Transformational Leadership, Employee, Motivation, Hospitality Enterprises.*

OPINION LEADERS IN INTERPERSONAL COMMUNICATION AND THEIR INFLUENCE ON ALCOHOL CONSUMPTION AMONG STUDENTS IN GOVERNMENT TERTIARY COLLEGES IN KENYA

Maina J.K.,¹ Mberia H.,¹ Muchunku I.G.,¹ Maina M.W.,²

¹*Jomo Kenyatta University of Agriculture and Technology, KENYA*

²*Kirinyaga University, KENYA*

Correspondence: mwmaina@kyu.ac.ke

Abstract

The study aimed at evaluating the influence of opinion leaders in interpersonal communication on alcohol consumption among students in government tertiary colleges in Kenya. The study was anchored on the two-step flow of communication model. The research used the descriptive cross-sectional survey design and used both qualitative and quantitative methods to collect data. From the campuses identified, a representative sample from each campus was chosen. A questionnaire was used to obtain qualitative data from sampled students. An interview guide was instrumental in interviewing key informants, while another guide for focus group discussions was used among the students to gather further qualitative data. Quantitative data was analyzed using descriptive statistics (mainly percentages) and inferential statistics (the chi-square goodness of fit test) with the aid of SPSS. Results were presented using tables and bar graphs. The findings revealed that opinion leaders had a significant influence on alcohol consumption behavior among college students. Opinion leaders such as peers, family members and celebrities influence behavior. This is an indication that through observation and interpersonal communication, college students are likely to copy what their opinion leaders are doing, including alcohol consumption.

Keywords: *Opinion Leaders, Interpersonal Communication, Alcohol Consumption.*

EARNINGS ABILITY AND FINANCIAL PERFORMANCE OF DEPOSIT TAKING MICRO FINANCE BANKS IN KENYA.

Mulianga S. S.,¹ Namusonge G.S.,² Nambuswa E.M.²

¹Kibabii University, KENYA

²Jomo Kenyatta University of Agriculture and Technology, KENYA

Correspondence: ssungwacha@kibu.ac.ke

Abstract

Earnings ability is a vital evaluation metric of microfinance banks' financial health in order to maintain feasible high-quality asset portfolio. The study aimed at establishing the effect of earnings ability on financial performance of DTMFBs through the GMM approach for all 13 registered DTMFBs in Kenya for the 2018-2022 financial years. The study established that earnings ability has a positive and significant effect on the financial performance of DTMFBs. The R-squared value was 0.6326 for ROA and 0.7437 for ROE at the 0.05 significance level. The positive relationship between the two variables implies that deposit taking microfinance banks in Kenya had a sound earning capability in the study period. We recommend that deposit taking microfinance banks employ quality assets for sustained profitability and ensure that their earnings are generated through ethical and sustainable practices, and that the benefits are shared appropriately among all stakeholders to further promote financial inclusion in Kenya.

Keywords: *Earnings Ability, Financial Performance, CAMEL Ratings Model; Returns on Assets, Return on Assets.*

GENDER NORMS: BARRIERS TO WOMEN'S ECONOMIC EMPOWERMENT

Ngumbi E.,¹ Wasike J.,²

¹*Freelance Consultant and Researcher, KENYA*

²*Kirinyaga University, KENYA*

Correspondence: elizabeth.ngumbi6@gmail.com

Abstract

This paper investigates how gender norms hinder women's economic empowerment in various African countries and beyond. Gender norms, defining societal expectations for behavior based on gender, often constrain women's access to work, control over time, and participation in economic decision-making. Employing a literature review, the study identifies key challenges stemming from gender norms, including unequal care burdens, limited land and property rights, workplace violence, gender stereotypes, and discrimination. It also explores efforts to shift these norms, involving organizations, governments, and male engagement in promoting gender equality. Findings reveal the pervasive impact of gender norms on women's economic opportunities, highlighting the need for transformative action. The paper concludes by addressing unconscious gender biases and advocating for concerted efforts to challenge and reshape prevailing gender norms, thereby advancing women's economic empowerment.

Keywords: *Gender Norms, Social Norms, Gender Equality, Women Economic Empowerment, Care Burden*

PROJECT MONITORING AND EVALUATION ON ROAD CONSTRUCTION PROJECTS PERFORMANCE IN KENYA

Wasike P.W., Namusonge G.S., Makokha, E.N.

Jomo Kenyatta University of Agriculture and Technology, KENYA
Correspondence: wasikepw@yahoo.com

Abstract

The purpose of this study is to evaluate the effect of project Monitoring and Evaluation on road construction projects performance in Kenya. The study will use the following theories as per the variable extreme value theory relevant to the study variables. The study adopted a mixed research design with a target population of 475 and a sample size of 143. Data collection instrument was questionnaire. Piloting was done to test the validity and reliability of the data collection instrument. Data was analyzed using a Statistical Package for Social Sciences (SPSS) Version 27.0. Multiple regression analysis models were developed to establish the relationship between dependent and independent variable. Analysis of Variance (ANOVA) was used to test significance of variance of one variable over the other. On the prediction that Project monitoring and evaluation did not have significant relationship with road construction projects performance in Kenya, a p value of 0.000 was less than 0.05 implying rejection of the null hypothesis in favour of the alternative. Therefore, project monitoring and evaluation had a significant relationship with road construction projects performance in Kenya. Management of road construction should put more emphasis on continuous review of all aspects of a construction project with the aim of providing reliable information on whether to rectify, rework, proceed or not, with the endeavor. The finding of the study was important because: it was to assist the government in strengthening the policy framework and enact laws to govern road construction industry. Road Construction firms will use the findings of this study to enhance their Total Quality Management (TQM) and hence be able to deliver Road projects on time and within budget while Road Construction professionals like Project Managers (Civil and Structural Engineers) and Road Construction Companies will use the findings of this study in their day to day Road construction project management.

Keywords: *Project Monitoring and Evaluation, Road Construction Performance.*

IMPACT OF TOURISM ON THE ECONOMY OF KENYA: TOURISM GROSS FIXED CAPITAL FORMATION MULTIPLIER EFFECTS

Odunga P.

Kirinyaga University, KENYA
Correspondence: Podunga5@gmail.com

Abstract

The primary objective of this study was to evaluate the economic impact of tourism on private and public investments namely Gross Fixed Capital Formation (GFCF). The input-output/SAM models were used to estimate the impacts of investments in terms of output production, employment generation, labour income earnings and total value creation. The relationships between expenditure and output, and income and employment (direct, indirect or induced) were described by multipliers. Data for analysis was sourced from EORA multi-region input-output table (MRIO) database: <http://www.worldmrio.com/>. Tourism gross fixed capital formation, derived from Kenya TSA, was used as the basis for calculating tourism multipliers and their associated effects. Tourism gross fixed capital formation of Kshs 133 billion created 455 thousand jobs, generated Kshs.63.8 billion labour income, added Kshs.166 billion to total value in the economy and Kshs 277.6 billion to total output. In this paper, the impact of tourism gross fixed capital formation was analyzed through input-Output and SAM models. Future studies could re-estimate the multipliers by adopting Computable General Equilibrium (CGE) models.

Key Words: *Tourism Satellite Account (TSA), Total Gross Fixed Capital Formation, Social Accounting Matrix (SAM), Kenya.*

ASSESSING PROCUREMENT PLANNING PRACTICES IN MOTOR VEHICLE ASSEMBLY: IMPLICATIONS FOR ORGANIZATIONAL PERFORMANCE

Wasike J.

Technical University of Kenya
Correspondence: judith.wasike@tukenya.ac.ke

Abstract

Procurement planning is pivotal in organizations, guiding acquisition of goods and services through strategic goal setting and coordination. However, challenges persist in implementing these plans effectively, particularly within the motor vehicle assembly industry in Kenya. This research aimed at assessing how procurement planning practices impact procurement performance, ultimately influencing organizational effectiveness within the motor vehicle assembly sector. The study objectives were identifying procurement practices that significantly affect performance and investigating the hurdles faced in implementing procurement plans within motor vehicle assembly. Using goal setting theory and grey system theory, a descriptive survey design was employed. The study conducted a census on 24 motor vehicle assembly and franchise companies in Kenya. The population comprised motor vehicle assembly and franchise companies in Kenya. A census approach was used to include all 24 relevant organizations. Data was collected through a structured questionnaire, ensuring comprehensive insights into procurement planning practices and their outcomes. The study employed exploratory factor analysis, using the varimax rotation method on Kaiser Normalization technique, to discern underlying factors influencing procurement performance. The findings illuminate the significant procurement practices impacting performance and the key challenges hindering effective implementation of procurement plans within the motor vehicle assembly industry. Understanding the relationship between procurement planning and performance informs strategic decision-making within motor vehicle assembly companies. Recommendations based on the findings focus on enhancing procurement practices, to improve organizational effectiveness and efficiency.

Keywords: *Procurement Planning Practices, Organization Performance, Motor Vehicle Assembly .*

GREEN SUPPLY CHAIN MANAGEMENT AND PERFORMANCE OF FOOD AND BEVERAGES MANUFACTURING FIRMS IN KENYA

Ngatia, R.N., Osoro A., Nyang'au S.P.

Jomo Kenyatta University of Agriculture and Technology, KENYA
Correspondence: njeringatia2015@gmail.com

Abstract

The major purpose of this study was to analyze the effect of green supply chain management and performance of food and beverages manufacturing firms in Kenya. The study adopted a cross-sectional survey. The target population was senior procurement managers from 246 food and beverage manufacturing firms in Kenya. A sample size of 150 respondents was determined using Krejcie and Morgan (1970). The sample was selected using simple random sampling. Pilot study of 10% of sample size was conducted consisting 15 firms and 13 questionnaires were returned. The research used semi-structured and self-administration questionnaires. 135 questionnaires were distributed to respondents but only 119 questionnaires were returned. Data analysis was done through descriptive statistics by use of mean, standard deviation, skewness and kurtosis. Inferential statistics was also done by use of correlation, regression and hypothesis testing. The data obtained was processed using SPSS version 28. Data was presented by use of tables. The reliability results indicate that all the variables meet the threshold of a Cronbach's alpha value of above 0.7. Validity was also tested using content, construct and criterion. Results revealed that green supply chain management had a positive significant linear relationship with performance of food and beverages manufacturing firms in Kenya. Additionally, performance is anticipated to grow for every unit increase in green supply chain management. Thus, the study concludes that the parameters of green supply chain management are crucial in enhancing performance of food and beverage firms. Consequently, the study recommends that green supply chain management should be strategically implemented.

Keywords: *Green Supply Chain Management, Performance, Green Logistics, Green Purchasing, Green Design & Green Packaging.*

EFFECT OF CONFLICT AND GRIEVANCE MANAGEMENT ON EMPLOYEE RETENTION AMONG MEDICAL PRACTITIONERS IN COUNTY GOVERNMENTS IN KENYA: A CASE STUDY OF KIRINYAGA COUNTY

Njoroge D.I., Kamau S. Ndirangu Z.W.

Kirinyaga University, KENYA
Correspondence: dnjoroge@kyu.ac.ke

Abstract

Health care practitioners in public health facilities in Kenya have been reported to leave for greener pastures in private hospitals locally and abroad. Employee retention is therefore a great concern. This study was aimed at determining the effects of conflict and grievance management on employee retention among medical practitioners in Kirinyaga County. The study was anchored on Organizational Conflict Theory. The study employed descriptive research design. Krejcie and Morgan tables and stratified random sampling were utilized to come up with a sample size of 272 respondents from a population of 930 medical practitioners. Primary data was collected through questionnaires from selected respondents while secondary data was sourced from Kirinyaga County website and database. Multiple regression using SPSS (version 24) was used to determine the effect of conflict and grievance management on employee retention. There was a moderate positive relationship ($r=0.656$) between conflict and grievance management and employee retention. Results further showed that 43.1% of the variation in employee retention was explained by conflict and grievance management ($R^2= 0.431$). It was therefore concluded that there was a significant positive relationship between conflict and grievance management and employee retention. It is recommended that effective grievance handling procedures should be put in place in a bid to increase employee retention in public health facilities in the County.

Keywords: *Employee Retention, Conflict Management, Grievance Management, Kirinyaga County Government, Medical Practitioners.*

VALUE CHAIN MANAGEMENT PRACTICES AND PERFORMANCE OF FOOD AND BEVERAGE MANUFACTURING FIRMS IN KENYA

Mbugua A.N.

Jomo Kenyatta University of Agriculture and Technology, KENYA

Correspondence : annjoki00@gmail.com

Abstract

Despite the importance of food manufacturing industry in Kenya, it has been experiencing a lot of turbulence in the recent past including a drop in the GDP, an increasing imbalance of trade and the exiting of large multinationals. The main focus of this study was to assess the effect of value chain management practices on performance of food and beverage manufacturing firms in Kenya. The specific objectives include; to determine the effect of material management, outbound management, operations management and inbound logistics on performance of food manufacturing firms in Kenya and to assess the moderating effect of technology development on the relationship between value chain management practices and performance of food manufacturing firms. The research design used in this study was descriptive cross-sectional design. 251 food and beverage manufacturing firms formed the source from which the respondents will be sourced. The study further used simple random sampling within the different strata to sample 152 food and beverage manufacturing firms. Questionnaire were used to collect primary data. Descriptive statistics such as frequency distribution, mean, standard deviation, and percentages were used. Inferential data analysis was conducted by use of univariate regression analysis, Pearson correlation coefficient, and multiple regression analysis. Results were presented through use of tables and figures. The study found that material management, outbound logistics, operations management, and inbound logistics positively and significantly affect performance of food and beverage manufacturing firms in Kenya. For moderating effect, the study found that technology development has a positive moderating effect on the relationship between value chain practices and performance of food and beverage manufacturing firms in Kenya. The study concluded that material management, outbound logistics, operations management, and inbound logistics has a positive and significant relationship with performance of food manufacturing firms in Kenya.

Keywords: *Value Chain Management Practices, Performance, Food and Beverage Manufacturing Firms, Kenya*

TECHNOLOGY, NATIONAL OUTPUT, AND INNOVATION IN UGANDA, 1970-2020: A CASE OF ADAPTIVE LEADERSHIP

Alani J.

Gulu University, UGANDA
Correspondence: j.alani@gu.ac.ug

Abstract

This study investigates the relationship between technology, national output, and innovation in Uganda from 1970 to 2020, using adaptive leadership as a framework. Data from the United Nations database was analyzed using the generalized least squares (GLS) method. The study applies Cobb-Douglas models derived from the Neoclassical framework, along with the philosophical principle of causality, to analyze these interactions. The empirical findings reveal that technological progress and innovation significantly contribute to economic growth in both short and long terms. Additionally, the study finds that capital and labor productivity have direct negative impacts on economic growth and innovation. This suggests that leaders should focus on creating more employment opportunities and utilizing capital equipment to enhance productivity. Furthermore, the study confirms that innovation positively affects total factor growth and technological progress. It also highlights the dependence of technological progress on human population growth. The findings underscore the importance of sustained increases in innovation, technology, and economic growth, which can be facilitated by adaptive leaders.

Keywords: *Technology, National Output, Innovation, Uganda, 1970-2020, Adaptive Leadership.*

THE FARM INPUT SUPPORT PROGRAM AND FOOD SECURITY: CHALLENGES AND POSSIBILITIES AS IS IN THE CASE OF BUNGOMA COUNTY, KENYA.

Wanyonyi N.W.¹ Mutsotso B.M.² Anangwe K. A.² Kariuki J. G.²

¹*Kibabii University, KENYA*

²*University of Nairobi, KENYA*

Correspondence: [*wanjala.wanyonyi@kibu.ac.ke*](mailto:wanjala.wanyonyi@kibu.ac.ke)

Abstract

The focus on smallholder farmers as a drive to fight hunger in Sub-Saharan Africa is certainly becoming the focus of agricultural investments by governments as they race to meet the second sustainable development goal of eradicating hunger. The Farm Input Support Programs (FISPs) are emerging as the sure approach in fighting hunger and ensuring that households are food secure. In response to these, this study set out to examine challenges experienced in the Bungoma county FISP. The program is pro-poor and targets vulnerable households by supporting them with free fertilizers and maize seed for one season. In the Kenyan governance system agricultural functions are devolved to the counties implying that food provision and its security is a function of the county governments. The study adopted a descriptive design and was guided by a ladder of citizen participation theoretical perspective which is a participatory framework. Qualitative and quantitative data were obtained from 450 beneficiaries, 8 key informants and six focus group members arranged in two groups. Interview schedules and FGDs were employed as the main methods of data collection. Systematic random sampling was used to select beneficiary respondents while purposive sampling was used to identify key informants and FGDs respondents. Quantitative data was analyzed using descriptive statistics and presented as frequency tables and bar charts, while qualitative data by content analysis and presented as narratives. The findings indicate that major challenges experienced in the program include political interference, poor support and facilitation to the implementing committees and wrong understanding and poor attitude by stakeholders and beneficiaries. The study therefore recommends a more elaborate legal and policy framework that will stipulate the process and therefore guide the implementation of the program with an aim of streamlining the process.

Keywords: *Challenges, Household Food Security, Opportunities, Smallholder Farmers.*

COPING STRATEGIES OF SOCIAL PROTECTION PROGRAMS TO CLIMATE SHOCKS IN TANA NORTH, TANA RIVER, KENYA

Ikumu, W.L.,

University of Nairobi, KENYA
Correspondence : ikumulucy@gmail.com

Abstract

Management of the devastating impacts of climate disasters calls for a holistic socio-economic approach for resilient communities. Social protection is credited as a key entry point in global resilience-building agenda and a critical ingredient to support vulnerable groups to better prepare for risks, increase their assets and build their capacity to respond to shocks. According to ILO report, only 49 %persons were adequately covered globally by at least one form of social protection program by 2020. Any loophole over uptake of SPPs coping strategy will undermine their optimum ability to provide the critical buffer against shocks. Considering the low coverage gap, social protection programs should be prioritized to address climate-specific vulnerabilities and coping challenges for mobile and immobile systems in ASALs. This paper analyzes coping strategies of social protection programs to climate shocks in Tana North, Tana River. Data was collected using 'Kobo Questionnaire tool kit and validated with data from key informant interviews, focus group discussions and field observation. Content analysis technique and simple regression was used to analyze data according to study objectives. Results identified different coping mechanisms including livelihood diversification, sale of assets, petty trading and reliance on traditional social assistance. Consumption strategies included; skipping meals, reduced meals per day, consuming less preferred/less expensive foods and limiting food portions. The Inua Jamii' cash transfers and relief rations were the most popular SPPs owing to tangible impacts on consumption, 38% respondents had no access to any form of SPPs, 47% were illegible and 16% unaware of SPPs existence. In conclusion, in light of multiplicity in climate shocks, reliance on traditional coping mechanisms is no longer tenable or sustainable

Key words: ASALs, Climate Shocks, Social Protection Programs and Resilience.

DETERMINANTS OF ONLINE SHOPPING AND CUSTOMER SATISFACTION AMONG EMPLOYEES OF THE COUNTY GOVERNMENT OF BUNGOMA, KENYA

Sylvia, S.C.,

Kibabii University, KENYA

Correspondence: schebet@kibu.ac.ke

Abstract

Internet live statistics in 2022 shows that there are more than 5 billion internet users in the world and more than 1.9 billion total number of active websites operating that gives indication that online businesses are growing day by day. It is therefore important to notice that the online business has taken over the traditional marketing through attracting more customers from different parts of the geographical locations which generate more profits for online business practitioners. This study focused on the determinants of online shopping on customer satisfaction among employees of the County Government of Bungoma. The objective of the study was to examine the influence of service delivery on customer satisfaction among employees of the County Government of Bungoma. The study employed a descriptive research design. Close ended questionnaires were used as a data collection tool. Content validity was used to check the validity of the questionnaire and reliability was conducted after pilot study was carried out. Data was analyzed using descriptive and inferential statistics. Results showed a statistically significant link between service delivery and customer satisfaction: ($\beta = 1.000$, beta=0.589 and $t=10.274$, $p<0.05$). It was therefore concluded that strengthening service delivery would improve drastically on customer satisfaction. There is need to observe on-time delivery by those who deliver purchased items, order accuracy should be kept and offering of the customer service after purchase of the products should be observed and executed. There is need for policy makers to formulate policies for data protection and cyber security safety measures and enact electronic transaction laws to protect online financial transactions.

Keywords: *Customer Satisfaction, Service Delivery, Internet, Online Shopping.*

INTERNAL CONTROL SYSTEMS AND FINANCIAL PERFORMANCE OF COMPANIES LISTED IN NAIROBI SECURITIES EXCHANGE

Muriithi J. G.,¹ Muigai R.G.²

¹Africa International University, Kenya,

²Kirinyaga University, Kenya

Correspondence : Jane.Muriithi@aiu.ac.ke

Abstract

Internal control systems involve various methods and measures taken by the organization to safeguard assets, check the accuracy of the financial reports, execute the managerial policies and enhance operational efficiency in order to achieve their financial objectives. The study sought to determine how internal control systems influence the financial performance of Nairobi Securities Exchange (NSE) listed companies in Kenya. Specifically, the study sought to determine the effect of risk assessment, internal control environment and internal control of information systems on financial performance of the listed companies in NSE. The study adopted descriptive research design. The target population comprised 63 listed companies in NSE as at 31st March 2023. A sample of 39 companies was drawn from the target population using stratified random sampling technique. The study used primary data collected using structured questionnaires. Data analysis was carried out using descriptive and inferential statistical techniques. Results were presented using tables and charts. The study found that all the internal control systems considered in the study had a positive and significant influence on the financial performance of the listed companies in NSE. The study recommended the need for the management to determine and implement the optimal combination of effective and efficient internal control mechanisms in order to improve performance of these firms.

Keywords: Internal Control Systems, Financial Performance, Companies Listed, Nairobi Securities Exchange.

PROJECT COMMUNICATION AND ROAD CONSTRUCTION PROJECTS PERFORMANCE IN KENYA

Wasike P.W., Namusonge G. S., Makokha E.N.

Jomo Kenyatta University of Agriculture and Technology, KENYA
Correspondence: wasikepw@yahoo.com

Abstract

The purpose of the study is to assess the effect of project communication on road construction projects performance in Kenya. The study used the following theories as per the variables; Communications theory relevant to the study variable. The study adopted a mixed research design with a target population of 475 and a sample size of 143. Data collection instrument was questionnaire. Piloting was done to test the validity and reliability of the data collection instrument. Data was analyzed using a Statistical Package for Social Sciences (SPSS) Version 27.0. The multiple regression analysis models was developed to establish the relationship between dependent and independent variable. Analysis of Variance (ANOVA) was used to test significance of variance of one variable over the other. On the prediction that Project communication did not have significant relationship with the road construction projects performance in Kenya. A p value of 0.000 was less than 0.05 implying rejection of the null hypothesis in favour of the alternative. Therefore, project communication had a significant relationship with road construction projects performance in Kenya. Based on the findings, the study recommended that communication is one of the most fundamental skills for construction project managers and that considering the vast number of employees working on different tasks throughout a project, confident, clear, and reliable communication are crucial to success of the project for all parties involved - and it starts with the project manager. The management should provide a two-way communication that includes sharing information with stakeholders, allowing sufficient opportunities to appeal and building trust with stakeholders to improve teamwork and lead to better project collaboration as poor communication result in misunderstandings, delays, and issues down the road. The finding of this study would assist the government in strengthening the policy framework and enact laws to govern the road construction industry. Road Construction firms will use the findings of this study to enhance their Total Quality Management (TQM) and hence be able to deliver Road projects on time and within budget while Road Construction professionals like Project Managers (Civil & Structural Engineers) and Road Construction Companies will use the findings of this study in their day to day Road construction project management.

Keywords: *Project Communication, Road Construction Performance.*

BLOCK CHAIN TECHNOLOGY AND PERFORMANCE OF SUPPLY LOGISTIC FIRMS IN KENYA

Barasa, S., Lemeria, I., Ekesa, N.

Kirinyaga University, KENYA.

Correspondence: samuelbarasa170@gmail.com

Abstract

The purpose of this study was to analyze the impact of block chain technology and performance of supply chain logistic firms in Kenya. The study utilized a cross sectional survey. The main target population of the study was senior departmental procurement officers and supply chain logistic firms in Kenya. A sample size of 100 respondents was determined through krejice. Pilot study of 15% sample size was carried out in 10 supply chain logistic firms from which 8 questionnaires were returned. Both semi -structured and self-administered questionnaires were administered. A total of 100 questionnaires were distributed to respondents and only 85 questionnaires were returned. Data analysis was performed through descriptive statistics by use mean and standard deviation. Inferential statistics was done by correlation. Data was processed by use of SPSS latest version and presented by use of tables. Validity was tested using content, construct and criterion. Result showed that the block chain technology has a positive significant linear relationship with general performance of supply chain logistic firms in Kenya. Consequently, performance is expected to rise with increased rate of block chain technology by the supply chain logistic firms in Kenya. Thus, adoption of block chain technology is crucial to enhancing performance in supply chain logistic firms in Kenya. There is therefore a need to integrate block chain technology by each and every supply chain logistic firms in Kenya.

Keywords: *Block Chain, Performance, Logistic, Supply Chain, Transparency, Trust and Traceability.*

**DETERMINANTS OF FARM GATE DRY MAIZE GRAIN OUTPUT
ONHOUSEHOLD INCOME AMONG SMALL-SCALE MAIZE FARMERS IN
KEIYONORTH SUB- COUNTY, ELGEYO MARAKWET COUNTY, KENYA.**

Yano K. A.

University of Eldoret, KENYA

Correspondence: yanokibet99@gmail.com

Abstract

Farm gate maize prices have been unstable and sometimes fluctuating to levels too low to cover farmers' production costs, eliciting much debate. This has exposed maize farmers in Keiyo North Sub-County to skewed pricing mechanisms which sometimes work to their disadvantage. This study was aimed at analyzing the determinants of farm gate dry maize grain output on household income among small-scale farmers in Keiyo North Sub-County. The study's specific objectives were to determine the effects of socioeconomic, marketing, institutional, and pricing factors on household income among small-scale maize farmers. The study was guided by Random Utility Maximization (RUM) theory and descriptive and cross-sectional research designs were adopted. Data was collected from a sample of 98 small-scale farmers from a target population of 4,107 farmers using purposive, stratified and simple random sampling techniques. Data for the study was collected using a questionnaire and analyzed using descriptive and Multiple Linear Regression models with the help of IBM Statistical Package for the Social Sciences (SPSS) version 28.0.1.1 computer software. Descriptive results revealed that most of the small-scale maize farmers were aged between 41-50 years and 28.6% of the maize farmers had attained primary-level education. The mean family size in the study area was 6 members while the mean land size under maize farming was 2 acres, and the mean number of years under farming was 7 years. Results further revealed that the average annual maize output per acre and number of bags of maize sold was 21 and 14 bags respectively. The mean price of a 90 kg bag of maize sold was Ksh 2,846. Moreover, 68.4% of the farmers had access to extension services, while 89.8% accessed market information. Multiple Linear Regression analysis results on estimates of effects of socio-economic determinants on household income results revealed that a unit increase in education level, family size, and land size had a positive and significant effect and could increase household income by 44.2%, 13.6% and 38.7% respectively. Further, estimated results of marketing determinants on household income showed that maize price, maize output, and market outlets were significant at a 1% level. A unit increase in the variable could lead to an increase in household income by 0.3%, 6.2%, and 25% respectively. Additionally, results on estimates of institutional factors revealed that group membership and extension access were statistically significant at a 1% probability level. A unit increase in group membership, access to credit from a financial institution and access to extension services could increase

household income by 364%, 175% and 731%, respectively. As for price variability factors, results revealed that maize sales, maize price, and market information were statistically significant and that a unit increase in the variables would increase household income by 9.5%, 0.2% and 64.1%, respectively. Therefore, enhancing farmer education and strengthening household farming skills through provision of extension services ultimately will improve small- scale maize farmers' household income. Also, increasing market information for farmers and allocating more land for maize production will enhance maize output and income among maize farmers. In addition, improving the state of road infrastructure will reduce transport cost to the farmers.

Keywords: *Farm Gate, Dry Maize Grain Output, Household Income Small-Scale Maize Farmers, Keiyonorth Sub- County, Elgeyo Marakwet County, Kenya.*

BUILDING TOURISM BRANDS ON TOURISM ATTRACTION AT MANGA RIDGE IN KISII COUNTY, KENYA

Kambaga D.,¹ Mongare O.²

¹*Technical University of Kenya*

²*Kisii University, KENYA*

Correspondence :okambaga@gmail.com

Abstract

The Gusii highlands is unique terrestrial scape which attracts tourists to that part of Kenya. In Manga Ridge in Kisii County provides an inspiring view of the scenery from which most towns in Kisii county are visible including Bosongo, Central business district, Nyakoe Market Keroka and towards Riomoro ridges facing Maasai Mara, in Narok County, with attractive cliff which has not been properly marketed in the tourism sector. The general objective of this study was to assess the effect of building tourism brands on tourism attraction at Manga ridge in Kisii County, Kenya. The specific objective was to assess the effect of tourism brand loyalty on tourist attraction in Kisii County. The study used the tourism agency theory, reinforced by Maslow's hierarchy of needs. Descriptive research design was used for the study with a target population of 176870 households, to arrive at the sample size of 399 respondents using the formular described by Yamane (1976). Stratified sampling method was used. Questionnaires were distributed by the assistant researchers. Validity was measured and reliability test of 0.7 using Cronbach alpha coefficient. The pilot study was conducted at Riomoro Ridges, Kisii County. The study used descriptive statistics such as frequency, mean and standard deviation using SPSS for analysis. Inferential statistics using Multiple Linear Regression model were employed to establish the significance of independent variables on the dependent variable. Results were presented using tables, figures and charts. The study concluded that building brand loyalty improved tourism attraction in the area since customer satisfaction is key to growth in tourism. The study recommends building tourism brands on tourism attraction at Manga Ridge.

Keywords: *Brands, Tourism, Manga Ridge and Attraction.*

INFLUENCE OF INNOVATIVENESS ON GROWTH OF MICROFINANCE INSTITUTIONS IN MURANG'A COUNTY, KENYA

Muriithi R.,¹ Kariuki F.²

Murang'a University of Technology, KENYA

Correspondence: [*rmuriithi@mut.ac.ke*](mailto:rmuriithi@mut.ac.ke)

Abstract

Innovation stands at the forefront of contemporary strategies for enhancing growth and impact of microfinance institutions (MFIs) worldwide. This study investigates the influence of innovativeness on the growth of MFIs in Murang'a County, Kenya, an area renowned for its vibrant microfinance landscape. Drawing on extensive empirical research and a robust analytical framework, this research elucidates the dynamic relationship between innovation and MFI growth. Findings show that when innovativeness is held constant, growth of microfinance institutions will be 1.501. At the same time, increasing innovativeness by 1 more unit would lead to an increase in growth by 0.631 units. This implies that innovativeness has a positive relationship with growth of microfinance institutions. The relationship is significant given that p-Value=0.000<0.05. The findings reveal that innovativeness is a pivotal determinant of growth for MFIs operating in Murang'a County. Specifically, MFIs that actively engage in innovation across various dimensions, including product diversification, service delivery channels, and technological advancements, tend to exhibit higher growth rates. Innovation-driven MFIs are better equipped to attract a broader client base, penetrate underserved markets, and enhance operational efficiency, all of which contribute significantly to their growth trajectories. However, the study also underscores the challenges associated with innovation in the microfinance sector. Thus, while innovation can catalyse growth, it requires substantial financial investments, human capital development, and a robust risk management framework. The dynamic regulatory environment in Kenya further complicates the innovation landscape, necessitating adaptive strategies that balance risk and reward. This research advances our understanding of the intricate relationship between innovativeness and MFI growth, offering valuable insights for practitioners, policymakers, and stakeholders in the microfinance ecosystem. The implications of this study resonate far beyond the boundaries of Murang'a County, as they contribute to the broader discourse on fostering sustainable and impactful microfinance operations in emerging economies.

Keywords: *Innovativeness, Microfinance Institutions, Growth, Financial Inclusion, Kenya*

EFFECT OF ECONOMIC ACTIVITIES ON THE FINANCIAL PERFORMANCE OF LISTED COMMERCIAL BANKS IN KENYA.

Muriithi C., Maina M., Mutiso A.

Kirinyaga University, KENYA
Correspondence: mwmaina@kyu.ac.ke

Abstract

Over the years, corporate social responsibility (CSR) has evolved from a practice adopted by a limited number of companies to a global phenomenon. Today, CSR is widely recognized as a company's responsibility to its diverse stakeholders, including investors and the broader community. Consequently, the field of CSR has garnered considerable scholarly attention aimed at understanding its impact on various aspects of business operations and performance. This study explores the relationship between economic activities and the financial performance of listed commercial banks in Kenya, guided by the Triple Bottom Line Theory and Stakeholder Theory. Employing a longitudinal research design spanning the years 2016 to 2020, the study utilizes a correlational research approach to elucidate how investments in CSR activities influence banks' financial performance. The research employs a stratified random sampling technique to select participants from the total population of 42 commercial banks in Kenya, focusing on the 11 banks listed on the Nairobi Securities Exchange (NSE). Data collection relies primarily on a questionnaire crafted to capture both independent variables (economic activities) and the dependent variable (financial performance). Data analysis utilizes SPSS version 23.0 software, employing inferential statistics such as linear regression and paired t-tests. The findings indicate a positive and statistically significant relationship between economic activities and the financial performance of commercial banks in Kenya. Thus, the study concludes that economic activities exert a beneficial impact on the financial performance of commercial banks in the Kenyan context.

Keywords: *Economic Activities, Financial Performance, Corporate Social Responsibility.*

STRENGTHENING ETHICAL POLITICAL LEADERSHIP FOR SUSTAINABLE DEVELOPMENT IN AFRICA: KENYAN PERSPECTIVE

Maosa, R. O.

Moi University Eldoret, KENYA.
Correspondence: maosa.robert@gmail.com

Abstract

The ethical crisis in political leadership significantly contributes to Africa's underdevelopment, insecurity, and social injustices. The task of enhancing ethical political leadership is challenging, especially due to the entrenched status quo that favors political elites benefiting from the system through semi-democratic, semi-authoritarian, and authoritarian regimes. Employing an interdisciplinary approach rooted in peace and conflict studies, the paper examines this crisis and puts forth a model for bolstering political leadership by embracing African Ubuntu ethics and engaging local, national, and international actors to foster sustainable all-round development.

Keywords: *Strengthening, Ethical Political Leadership, Sustainable Development, Africa, Kenya.*

NAVIGATING LOCAL DEMOCRATIC GOVERNANCE, POVERTY REDUCTION AND INEQUALITY: THE HYBRID PUBLIC GOVERNANCE

Maosa R.O.

Moi University Eldoret, KENYA.

Correspondence: maosa.robert@gmail.com

Abstract

The research explores the intersection of local democratic governance, poverty reduction, and inequality. Traditionally, it was assumed that as societies embraced decentralization, local government, participation, and governance, services would improve, benefiting those in poverty. However, recent studies challenge this assumption. The research highlights the hybrid nature of effective public action, which involves not only community-based organizations, social movements, and NGO networks but also public sector actors. These actors play a crucial role in connecting the institutional environment, the public sector, and local communities. Recognizing this hybrid character of public action is a key conclusion drawn from the studies. Moreover, the research sheds light on the convergence of previously separate debates related to development, human rights, and poverty reduction. It emphasizes the need for collaboration across various actors to address critical issues related to poverty and inclusion.

Keywords: *Navigating, Local Democratic Governance, Poverty Reduction and Inequality, Hybrid Public Governance.*

LEVERAGING HYBRID GOVERNANCE: HOW COLLABORATIVE LEADERSHIP CAN DRIVE SOCIAL EMPOWERMENT AND EDUCATIONAL DEVELOPMENT

Gichuru E.N.

Makerere University, UGANDA
Correspondence Email: ngothogichuru@gmail.com

Abstract

Leveraging hybrid governance can drive social empowerment and educational development in specific contexts. The background of this research is the need to examine firm-to-firm governance in transitional economies, where the state plays a key role in joint ventures (JVs). The objective is to explain how an alignment of mutual interests between different actors facilitates technological upgrading in JVs and the establishment of local production networks. The systematic literature review method used is a Systematic Mapping Study (SMS) over a period of 5 years, focusing on leadership and collaborative governance studies. The results show that research on leadership and collaborative governance is varied and declining, highlighting the need for further research in this area. In conclusion, collaborative governance, facilitated by leadership, is crucial for overcoming limited resources and improving educational quality.

Keywords: *Collaborative Governance, Educational Development, Hybrid Governance, Leadership, Social Empowerment.*

LEADERSHIP AND HYBRID GOVERNANCE FOR SOCIAL EMPOWERMENT AND DEVELOPMENT

Cheruiyot E., Toroitich R.

Kabarak University, KENYA

Correspondence: echeruiyot@kabarak.ac.ke

Abstract

Communities and organizations growth and development in various aspects of economic, social as well as political is dependent majorly on the leadership and its governance. In Kenya, governance is decentralized from the national to county, the sub county, the wards and village levels. The common types of leadership styles are democratic, bureaucratic, transformational, visionary, laissez-faire, autocratic and servant among others. Hybrid governance combines approaches such as collaboration from government, organizations and involvement from the community to achieve certain goals. Governance is also management of the resources in a given setting. Social empowerment strategies include skills development through schools and empowering forums for members for example on how to start and run businesses. It is to empower members on their role in development of the society, economic activities for instance programs that result in job creation; infrastructure like road networks and technology. In contemporary society, traditional governance structures often struggle to effectively address the various challenges of social empowerment and sustainable development. Hierarchical decision-making processes, bureaucratic inefficiencies, and limited stakeholder engagement hinder the ability of governance systems to respond adequately to the evolving needs and aspirations of diverse communities. Leadership within hybrid governance structures empowers marginalized voices, promotes social equity, and fosters resilience in the face of adversity. Through strategic alignment of resources and partnerships, leaders can catalyze transformative change, driving sustainable development. The objectives of this paper are to; bring out leadership styles and governance, enumerate the benefits of transformative and inclusive leadership style as well as hybrid governance and the challenges that exist in the stated leadership and hybrid governance. The study will use a document review method to collect data and then analyze. Conclusions will be made based on the findings.

Keywords: *Leadership, Hybrid governance, Social Empowerment.*

VALUE DISCIPLINE DIMENSIONS ON ORGANIZATIONAL PERFORMANCE OF MOBILE SERVICE PROVIDERS, CASE STUDY OF KISII COUNTY, KENYA

Mogaka, J.K.

Kisii University, KENYA

Correspondence: *joshuamogaka91@gmail.com*

Abstract

This study aimed at determining the influence of operational excellence on organizational performance of mobile service providers in Kisii county, establishing the influence of customer intimacy and organizational performance of mobile service providers in Kisii County and to determine the influence of product leadership and organizational performance of mobile service providers in Kisii County, Kenya. Research philosophy adopted was positivism approach while the study adopted a descriptive survey research design. The research concentrated on all the three mobile service providers in the telecommunication industry namely; Safaricom, Airtel and Telekom Kenya (CA, 2017). The study relied on both primary and secondary data. Product leadership has no significant relationship on the performance of mobile service providers. This proposition was tested using multiple regression analysis where it was found that product leadership had a negative coefficient which was not significant in the model ($\beta_1 = -0.049$, $p=0.622$) in relation to performance of mobile service providers in the telecommunication industry in Kenya. Hence product leadership was found not to make a significant unique contribution to performance and therefore we fail to reject the null hypothesis (H_0) and conclude that product leadership has no significant relationship on the performance of mobile service providers in the telecommunication industry in Kenya. Customer intimacy has no significant relationship on the performance of mobile service providers in the telecommunication industry in Kenya. The results from multiple regression ($\beta_2 = 0.076$, $p=0.205$) indicated that customer intimacy has a positive coefficient which was not significant. Hence customer intimacy was found not to make a significant unique contribution to the prediction of performance of mobile service providers and therefore we fail to reject the null hypothesis (H_0) and concluded that customer intimacy has no significant relationship on the performance of mobile service providers in the telecommunication industry in Kenya.

Keywords: *Leadership, Competition, Customer Intimacy, Performance, Positivism.*

TEACHER PREPAREDNESS AND THE IMPLEMENTATION OF THE MTE POLICY IN PUBLIC LOWER PRIMARY SCHOOL EDUCATION IN MERU COUNTY, KENYA

Magaju J.¹ Kithinji W.² Kanyi C.¹

¹*Kenya Methodist University, KENYA*

²*Aga Khan University, KENYA*

Correspondence: magajukagendo@gmail.com

Abstract

The benefits of establishing instructions in the first language are immeasurable. The policy that provides for usage of vernacular language as an instructional medium for lower primary education was established over 50 years and gradually developed in Kenya. Despite the policy's establishment over 50 years ago and its integration into the 2019 Kenya Basic Education Curriculum Framework, it remains unclear on how prepared various stakeholders are in the execution of this regulation. The main purpose of the study was to examine teacher preparedness towards implementing the MTE policy in public lower primary schools in Meru County, Kenya. The study, grounded on Piaget's Cognitive Development Theory, utilized a descriptive survey design with a mixed-method approach. A sample of 155 head-teachers and 155 class teachers from grade 3 was selected using random and purposive sampling techniques. Data collection involved questionnaires and focused group discussions, ensuring reliability and validity of research instruments. Quantitative data underwent descriptive analysis, and Spearman correlation analysis. Qualitative data was analyzed thematically. Results indicate that while around half of the teachers had received initial training in using the mother tongue, gaps existed in in-service professional development, curriculum involvement, and support from educational authorities. Only 20% of teachers had received in-service MTE training, and approximately a quarter were involved in developing the MTE curriculum. Concerns were raised about low teacher preparedness, particularly in urban areas, indicating low level of preparedness. However, head-teachers were in some cases taking steps to enhance readiness to improve readiness through training and engaging community support. The study recommends comprehensive in-service training programs by the Teachers Service Commission (TSC) on Kimeru language instruction, involvement of indigenous language teachers in curriculum development by the Kenya Institute of Curriculum Development, and ensuring provision and access to up-to-date MTE resources by the Ministry of Education (MOE). Head-teachers should foster policy alignment, promote multilingualism through community engagement, establish continuous professional development, and encourage research on mother tongue-based instruction's efficacy for improved educational outcomes.

Keywords: *Mother Tongue, Teacher Preparedness, In-Service Training, Indigenous Language, Lower Primary*

INFLUENCE OF INSTRUCTIONAL MATERIALS ON THE IMPLEMENTATION OF THE MTE POLICY IN PUBLIC LOWER PRIMARY SCHOOL EDUCATION IN MERU COUNTY, KENYA

Magaju J.,¹ Kithinji W.,² Kanyi C.³

^{1,3} Kenya Methodist University, KENYA

² Aga Khan University, KENYA

Correspondence: [*magajukagendo@gmail.com*](mailto:magajukagendo@gmail.com)

Abstract

The Kenya Basic Education Curriculum Framework (BECF) in 2019 introduced indigenous languages as taught subjects in the lower primary education. A policy was hence developed on usage of vernacular language as an instructional medium for lower primary education. Nevertheless, there is uncertainty regarding teaching and learning resources readiness to support its implementation. The main purpose of the study was to examine the preparedness of instructional materials in the implementation of the MTE policy in lower primary school education in Meru County, Kenya. It used a descriptive survey design and adopted a mixed method approach. The target population consisted of 773 class teachers and 773 head-teachers. From this population a sample of 155 head-teachers and 155 class teachers from grade 3 was selected through simple random sampling and purposive sampling techniques. Data was collected through questionnaires and focused group discussion. The reliability and validity of research instruments were ascertained accordingly. Quantitative data underwent descriptive analysis, and Spearman correlation analysis. Qualitative data was analyzed thematically. The study's findings revealed shortages of textbooks, references and instructional materials in indigenous languages. Consequently, learners struggle with existing orthographies, while teachers encounter difficulties in utilizing available Kimeru materials to build language skills. Nevertheless, a significant correlation between instructional resources preparedness and mother tongue policy implementation were noted. Adequate native language textbooks and learning materials are essential; hence, the Ministry of Education, Teachers Service Commission, and policymakers should prioritize instructional materials preparedness for successful mother tongue language policy execution.

Keywords: *Instructional Materials, Proficiency, Curriculum Support, Language of Instruction, Mother Tongue, Language Policy Implementation.*

FINANCING OPTIONS AND THE SUSTAINABLE DEVELOPMENT OF REAL ESTATE IN NAIROBI METROPOLITAN AREA

Mungai D.

Kirinyaga University, KENYA
Correspondence: dmungai@kyu.ac.ke

Abstract

Real estate business is an undertaking that has been perceived as a project that needs a lot of capital to initiate. In Kenya, investing in real estate has been a huge venture for the last 10 years as demand for housing continues to rise. This research aimed at establishing the perceived role of financing options on the sustainable growth of real estate in the Nairobi Metropolitan area. It is difficult to fund big projects in real estate solely from personal savings. There is a need to use other sources of finance such as equity, mortgage, Real Estate Investment Trusts (REITs) Mezzanine Financing, Government Support programs or venture capital. This research paper was guided by the following specific objective; To assess the influence of mortgage financing options on the sustainable development of real estate in Nairobi Metropolitan area. This study used primary data collected using a structured questionnaire from registered developers in Kenya with an interest in Nairobi Metropolis. The sample size was 81 out of a population of 100 developers registered with Kenya Property Developers Association. The study employed descriptive research design and data was analyzed through multiple regression analysis. The study found mortgage financing variables contributed immensely to the sustainable growth of the real estate sector in the Nairobi Metropolitan area. An increase in mortgage finance increases growth in real estate by 20.7% while all other factors remain constant. According to Confirmatory Factor analysis, the developers were of the view that the amount available to them was enough to support growth in real estate and that there is no information asymmetry about mortgage financing repayments. The results further showed that credit rating determines the amount available and the repayment period. The study concluded that mortgage financing was necessary for the growth of real estate in the Nairobi Metropolitan area.

Keywords: *Mortgage Financing, Metropolis, Financing Options, Real Estate, Property Developer.*

DETERMINANTS OF EFFECTIVE LOGISTICS COORDINATION AMONG HUMANITARIAN ORGANIZATIONS IN KENYA ORGANIZATION IN NORTH EASTERN REGION IN KENYA

Musyoka C., Wanjohi P.

Kirinyaga University, KENYA

Correspondence: collinsmusyokah@gmail.com

Abstract

In the dynamic landscape of humanitarian efforts, effective logistics coordination is crucial for timely and efficient crisis response. This study, conducted in Kenya's Northern Eastern Region, aimed to understand the determinants influencing effective logistics coordination. Employing a descriptive research design, the study was guided by three objectives: (1) to determine the extent to which organizational competent skills influence effective logistics coordination, (2) to establish the extent to which transport infrastructure contributes to effective logistics coordination, and (3) to examine the impact of information sharing among humanitarian organizations on logistics coordination. 33 logistic coordinators from 13 humanitarian organizations operating in the region were targeted, with 28 coordinators selected through purposive sampling. Data collection was done with structured questionnaires. Data analysis, conducted using SPSS software (version 240). The findings revealed significant correlations between organizational competent skills, transport infrastructure, information sharing, and effective logistics coordination. Organizational competent skills showed a strong positive correlation ($r = 0.886, p < 0.001$), emphasizing the importance of skilled personnel. Similarly, transport infrastructure demonstrated a strong positive correlation ($r = 0.828, p < 0.001$), highlighting its critical role despite regional challenges. Furthermore, organizational information sharing displayed a significant positive correlation ($r = 0.804, p < 0.001$), indicating its importance in enhancing logistics coordination. Issues with decision-making and communication were identified, suggesting a need for improvement. Recommendations include involving skilled personnel in decision-making, enhancing communication channels, investing in transportation infrastructure, and fostering collaboration among organizations. These measures aim to improve stakeholder engagement and optimize logistics coordination to better serve the region's communities.

Keywords: *Humanitarian, Logistics Coordination, Competency, Transport Infrastructure, Information Sharing.*

BUILDING RESILIENT AND SUSTAINABLE ORGANIZATIONS: A STRATEGIC HUMAN RESOURCE APPROACH IN DISRUPTIVE TIMES

Gichuru E.N.

Makerere University, UGANDA

Correspondence: ngothogichuru@gmail.com

Abstract

This study aimed at identifying the key HRM practices that contribute to organizational resilience and sustainability in disruptive times; Analyze the impact of these practices on employee well-being, innovation, and organizational performance and Synthesize insights from a systematic literature review to develop a framework for strategic HRM in disruptive and innovative contexts. A comprehensive and systematic literature review was conducted following PRISMA guidelines. Peer-reviewed academic journals, conference proceedings, and reputable online databases using relevant keywords related to HRM, organizational resilience, sustainability, disruption, and innovation were searched. Inclusion and exclusion criteria were established to ensure the quality and relevance of the reviewed studies. The review identified several key HRM practices that contribute to organizational resilience and sustainability in disruptive times. These include; talent management; Learning and development; Performance management; Employee well-being; Effective communication; Empowerment and autonomy. By implementing these practices, organizations can build a workforce that is agile, innovative, and capable of navigating disruptions effectively. In conclusion, strategic HRM plays a critical role in building resilient and sustainable organizations during disruptive times. By focusing on talent management, learning and development, performance management, employee well-being, effective communication, and empowerment, organizations can cultivate a workforce equipped to thrive in the face of continuous change. This study provides valuable insights for HR professionals and organizational leaders seeking to navigate the VUCA world and ensure their organization's long-term success.

Keywords: *Agility, Innovation Resilience, Sustainability, Talent Management.*

**INVENTORY MANAGEMENT PRACTICES, RETAILER-SUPPLIER
COLLABORATION AND SUPPLY CHAIN PERFORMANCE OF RETAIL STORES
IN NAKURU COUNTY, KENYA**

Mwangi P.

University of Embu, KENYA

Correspondence: nduati.peter@embuni.ac.ke

Abstract

In Kenya, retail chain stores are facing unprecedented change in the external environment disrupting and affecting supply chains in retail chain stores motivating integration of inventory management practices with retailer-supplier chain collaboration to achieve expected supply chain performance. The objectives were to determine influence of continuous replenishment on supply chain performance of retail chain store in Nakuru County, to assess influence of inventory optimization on supply chain performance of retail chain store in Nakuru County and to establish the joint effect of continuous replenishment and inventory optimization, supply chain collaboration on supply chain performance in retail chain stores in Nakuru County. The research adopted a descriptive survey research design and surveyed 106 retail chain stores in Nakuru County. The primary data for this study was collected using the questionnaire and analyzed using descriptive analysis techniques and inferential statistics techniques correlation and regression analysis. The results revealed that continuous replenishment contributed significantly ($B_1= 0.576$, $PV = .001<0.05$) to supply chain performance in retail chain stores in Nakuru County. Study revealed a strong, significant and positive ($B_2=0.307$, $PV=.001>0.05$) relationship between inventory optimization and supplier chain Performance of retail chain stores in Nakuru County, Kenya. Combining inventory management practices, continuous replenishment and inventory optimization with retailer-supplier chain collaboration resulted into an increase in R-Squared of model 1, 0.440 to 0.459 demonstrating that joining inventory management practices; continuous replenishment and inventory optimization with supply chain collaboration has a significant positive supply chain performance of retail chain stores in Nakuru County. The study concluded that successful continuous replenishment and inventory optimization jointly with retailer-suppliers chain collaboration result into supply chain efficiency in retail chain stores in Nakuru County, Kenya

Keywords: *Inventory Management Practices, Retailer-Supplier Collaboration, Supply Chain Performance, Retail Stores, Nakuru County, Kenya.*

HARNESSING ARTIFICIAL INTELLIGENCE FOR ENHANCED PERFORMANCE MANAGEMENT IN ORGANIZATIONS: A CASE STUDY OF SAFARICOM, KENYA

Nkanata S.

Kirinyaga University, KENYA
Correspondence: snkanata@kyu.ac.ke

Abstract

Performance management plays a pivotal role in organizational success by ensuring that employees contribute effectively towards achieving strategic goals. In recent years, the incorporation of artificial intelligence (AI) into performance management has emerged as a transformative trend, providing organizations with new tools to enhance efficiency, objectivity, and overall effectiveness in evaluating and optimizing employee performance. The specific objectives of the study were: assessing the impact of AI integration on performance management, evaluating employee satisfaction within the context of AI-enhanced performance management, and examining the effectiveness of AI in addressing performance gaps at Safaricom. The study adopted descriptive research designs. The study targeted 3250 employees, in (6) departments at Safaricom, Kenya. The study used stratified random sampling design to select (4) departments where 165 employees were selected. Data was collected using a semi-structured questionnaire and key informant interview guide. Quantitative data was analyzed using SPSS version 22.0 software. Inferential statistics in the form of multiple regression and descriptive statistics was used to analyze the data. Descriptive statistics (percentages, mean, and frequencies) were presented in tables and figures. Qualitative data was analyzed using content analysis which involved identifying, coding, and categorizing the content of the data into patterns/themes. The most common narratives were then quoted. The analysis revealed a significant positive association between AI Integration and Performance Management ($\text{Coeff/beta} = 0.325$, $P\text{-Value} = 0.045$), indicating that each unit increase in AI Integration corresponds to a 0.325 increase in Performance Management. However, Employee Satisfaction within AI lacks statistical significance ($\text{Coeff/beta} = 0.315$, $P\text{-Value} = 0.075$). Effectiveness of AI in addressing performance gaps shows no significance ($\text{Coeff/beta} = 0.305$, $P\text{-Value} = 0.065$). The study concludes that The Impact of AI Integration on enhanced Performance at Safaricom reflects overwhelmingly positive perceptions, particularly in optimizing resource allocation and operational efficiency. Diverse opinions and challenges highlight the need for targeted improvement strategies to leverage AI's potential for enhancing performance management.

Keywords: *Performance Management, Artificial Intelligence.*

EFFECT OF FINANCIAL INNOVATION STRATEGIES ON GROWTH OF MICROFINANCE INSTITUTIONS IN KIRINYAGA COUNTY

Muigai R.G.,¹ Wamweya E.²

¹Kirinyaga University, KENYA

²Jomo Kenyatta University of Agriculture& Technology, KENYA

Correspondence: rmuigai@kyu.ac.ke

Abstract

Financial innovation involves designing, creating, and implementing novel financial tools and procedures that aid in financial services delivery. This research sought to investigate the effect of financial innovation on growth of Microfinance Institutions in Kirinyaga County. Particularly, the study aimed at determining the effects of Institutional innovation, Process innovation and Product innovation on the growth of microfinance institutions. The study was anchored on the theory of institutional innovation, the economic value-added theory and theory of innovation diffusion. The study adopted descriptive survey research design and used questionnaires to collect primary data. Both descriptive and inferential statistical analysis was used to analyze the collected data. The study found that Institutional innovation, Process innovation and product innovation had a positive and significant effect on growth of microfinance institutions in Kirinyaga County. Based on these findings, the study concluded that financial innovation strategies were a critical ingredient in ensuring meaningful growth in the Microfinance sector. The study therefore concluded that Microfinance institutions should embrace financial innovation as a means for realizing consistent growth and ensuring efficiency in service delivery.

Keywords: *Financial Innovation Strategies, Growth of Microfinance Institutions, Kirinyaga County, Effect.*

INFLUENCE OF MICROFINANCE SERVICES ON FINANCIAL PERFORMANCE OF MICRO, SMALL AND MEDIUM ENTERPRISES IN KIRINYAGA COUNTY

Muigai R. G.,¹ Muriithi J.G.²

¹Kirinyaga University, KENYA

²Africa International University, KENYA

Correspondence: [*rmuigai@kyu.ac.ke*](mailto:rmuigai@kyu.ac.ke)

Abstract

This study sought to ascertain how microfinance services influenced financial performance of MSMEs in Kirinyaga County. This research was conducted in Kutus, Kirinyaga County being that we as the researchers could only access this scope due to various constraints like finances. Specifically, the study sought to determine how microcredit services, Micro-saving services and business consultancy services extended by Microfinance institutions influenced financial performance of MSMEs within the County. The study was premised on the Credit access theory, Financial intermediation theory and Micro-credit theory. The study whose target population comprised the MSMEs situated within Kirinyaga County adopted the descriptive research design. The studied MSMEs were selected randomly from the townships of Sagana, Kerugoya, Kutus, Kagio and Kagumo. The study used primary data which was collected using structured questionnaires. Analysis of the collected data was performed using descriptive and inferential statistical techniques and results presented in tables and charts. The study found that all the three constructs of the independent variable had a positive and significant influence on financial performance of MSMEs. The study therefore recommended that sustained efforts should be made by policy formulators within the County to promote and strengthen microfinancing in pursuit of the Vision 2030.

Keywords: *Influence, Microfinance Services, Financial Performance, SMEs, Kirinyaga County.*

STRATEGIES OF RETIREMENT PREPAREDNESS FOR HAPPY AND HEALTHY AGING

Kisirkoi S.

Maasai Mara University, KENYA

Correspondence: *samsonkisirkoi@yahoo.com*

Abstract

The focus of this study was to determine strategies that enhance preparedness for healthy and happy retirement. Globally, aging is perhaps the most important demographic trend in the 21st century and going forward. People everywhere are living longer because of better medical care as well as nutrition. According to Mackenzie, (2021), many quantitative empirical studies on retirement find that many households face financial crises at some point in future. Lack of adequate retirement preparation has become a recipe for extreme financial strain to individuals and families. The key task in the years preceding retirement is preparation, which entails planning and taking the actions needed before retirement to ensure a happy retirement. Both employees and employers have the responsibility of preparation for retirement. The study adopted a cross-sectional survey research design. The study used both secondary and primary data. Primary data was collected using observations and interviews. The sampling technique for the study was purposive sampling. The sample population was from those employees who had retired from formal employment. The collected data was coded and analyzed descriptively and quantitatively. The main findings of the study were that: those who made timely and deliberate actions to prepare for retirement were generally happily retired, with adequate financial resources. On the other hand, those who did not make appropriate preparations faced serious challenges, leading to helplessness, rejection and stress. Some of the actions to consider as part of preparation for retirement are: one should start preparation very early, prepare retirement goals, creating a budget that takes into account one's all expenses, investing prudently to ensure sufficient sources of funds for one to maintain a reasonable standard of life after employment, avoiding major projects that are financially draining, accepting one's circumstances and saving as much as possible during employment.

Keywords: *Retirement, Preparation, Aging, Investing.*

SUB-THEME: EDUCATION FOR SOCIETAL EMPOWERMENT

HISTORICISM OF PANDEMICS: A CONDUIT FOR SOCIETAL PREPAREDNESS FROM FUTURE OUTBREAKS IN EAST AFRICA

Wapukha P.J.¹ Chore A.² Muiru A.¹

¹*Kirinyaga University, KENYA*

²*Garissa University, KENYA*

Correspondence: *pwapukha@kyu.a.ke*

Abstract

This project presents historicism as a paradigm shift to the study of pandemics. Historicism will be employed to explain the existence of pandemics, practices, the socio-cultural and economic impact they had on the East African communities. For centuries, pandemics have had replete occurrences in human history. Examples of these pandemics globally include the *Smallpox* epidemic of 1520 AD which originated in Mexico and had a devastating impact on the indigenous population. Another pandemic is the *Bubonic Plague* (Black Death), which occurred in the 14th century, was one of the deadliest pandemics in history. Historicism therefore emphasizes the importance of history and seeks to understand the development and evolution of ideas, beliefs, institutions, and artistic practices by examining their historical context. As such, historicism in this context can also refer to a reliance on historical precedents in the practice of pandemic control, medical advancements and surveillance. This research through historicism will attempt to trace the origins of pandemics and identify the factors that contributed to their emergence. It will also examine societal responses, patterns, trends and impacts in the occurrences of pandemics in East Africa. The study will focus on the East African countries such as, Kenya, Uganda, Tanzania, Somalia, Ethiopia, Eritrea, S. Sudan, Sudan and Rwanda. This research will give insights into not only the history but also the adaptations and strategies employed by various East African communities, either to curb or control the effects of these pandemics using both conventional and non-conventional knowledge. The study targets local or indigenous populations, educationists, policy makers, and stake holders at both the communal and national levels. Findings will be published in peer-reviewed journals and sensitization workshops and seminars conducted to draw more information and hold policy briefs with stake holders.

Keywords: *Historicism, Pandemics, Conduit, Societal Preparedness Future Outbreaks, East Africa.*

WHAT WORKS TO IMPROVE GIRLS' EDUCATION IN LOW- AND MIDDLE-INCOME COUNTRIES: A REVIEW OF LITERATURE

Wafubwa R.N.¹ Muluve E.¹ Lalinde L.L.² Kozak M.³ Haberland N.³

¹*Population Council, Kenya*

²*Independent Education Specialist*

³*Population Council Inc*

Correspondence: rmanjekho@popcouncil.org

Abstract

Girls' education in low- and middle-income countries (LMICs) continues to face numerous challenges, perpetuating gender disparities and hindering progress towards educational equity. Despite efforts to address these issues, clarity on the effectiveness of interventions aimed at enhancing girls' education outcomes within LMIC contexts remain lacking. Factors such as limited access to quality education, socio-cultural norms, early marriage, and economic barriers persistently impede girls' educational attainment, exacerbating gender inequalities. There is, therefore, an urgent need to evaluate existing programs and interventions targeting these barriers to schooling, to identify evidence-based strategies that can effectively promote girls' education and narrow gender disparities. This systematic review, published in 2022, analyzed 82 experimental and quasi-experimental studies conducted in low- and middle-income countries to assess programs aimed at improving girls' education outcomes and reducing gender disparities. The review analyzed results from randomized controlled trials and quasi-experimental studies utilizing quantitative models to address endogeneity. Eligible studies, published on or after 2000, targeted gender-related barriers to schooling, analyzed effects on primary outcomes, and utilized data from LMICs. This global review identifies and evaluates the strength of evidence for interventions addressing gender-related barriers, categorizing them based on specific barriers addressed. In total, 18 gender-related barriers across individual, household, community, school, and policy levels are identified, considering potential differential impacts on girls and boys. Building on the results from the 2022 global review, 35 additional studies evaluating education programs in nine East African countries were synthesized and compared with the global systematic review to determine which interventions may effectively reduce gender-related barriers in East and Southern Africa contexts. This comparison aims to provide insights into region-specific challenges and opportunities for enhancing girls' education outcomes in LMICs, particularly in East Africa. Peer-reviewed journal articles and grey literature, published between 2020-2022, were included in the literature review update. Findings show that interventions addressing financial constraints, food insecurity, and academic support inadequacies are effective in reducing gender-related barriers to education.

Keywords: Girls' Education, Low- and Middle-Income Countries, Review of Literature.

AN INVESTIGATION OF PARENTAL CAREER SUPPORT FACTORS AS CORRELATES OF CAREER DECISION MAKING AMONG SECONDARY SCHOOL STUDENTS IN MURANG'A COUNTY, KENYA

Ng'enda M., Wangeri T., Kinai T.

Murang'a University of Technology, KENYA
Correspondence: maryngenda@gmail.com

Abstract

In Kenya, secondary school students face numerous challenges in selecting viable career options, with notable issues identified in the lack of information and guidance, particularly in science and technology fields. Societal and cultural expectations, economic factors, including limited job prospects and low salaries in specific fields, may also deter students from pursuing certain careers. Studies in Kenya have revealed a concerning trend where a limited number of secondary students opt for viable paths in science and technology, instead favoring saturated or non-marketable careers. Parental influence emerged as a pivotal factor in shaping students' career decisions, with insufficient parental support contributing to the difficulty students encounter in making informed career decisions. The study explored the relationships between various facets of parental support namely Instrumental assistance, Career modeling, Verbal encouragement, and Emotional support and the career decision-making processes among public secondary school students in Murang'a County, Kenya. A significant research gap regarding the psychological dimensions of parental support, as suggested by the Social Cognitive Career Theory (SCCT) inspired the study. Using a correlational research design, the investigation established associations among variables. The target population comprised Form three students in public secondary schools in Murang'a County, with a sample size of 482 students determined through Cochran's formula. Quantitative data was gathered through a questionnaire incorporating the Career Related Parent Support Scale (CRPSS) and the Career Decision Scale (CDS), it was coded and analyzed using SPSS. Inferential data analysis, including Pearson's correlation coefficient, Analysis of Variance, and multiple regression, revealed significant positive correlations between parent career support factors. The findings established correlations among the parent career support factors, Instrumental assistance ($r(480) = 0.29, p < 0.01$) Career modeling ($r(480) = 0.10^*, p < 0.05$), Verbal encouragement ($r(480) = 0.72, p < .01$), Emotional support ($r(480) = 0.34, p < .01$)), with decision making. The study recommends offering specific parental support to help guide students in choosing careers, emphasizing the positive impact on their mental health and future job-related well-being.

Keywords: Parental Career Support, Career Decision Making Secondary Students, Murang'a County, Kenya.

RELATIONSHIP BETWEEN INSTITUTIONAL CULTURE AND ARSON IN PUBLIC BOARDING SECONDARY SCHOOLS IN KISUMU COUNTY

Okello, L.M. Ogada J.

Rongo University, KENYA

Correspondence : millan15@yahoo.com

Abstract

In the last 20 years there has been a global increase in episodes of school unrests characterized with violence and arson attacks resulting in destruction of schools' property and death. Arson persists with a number of cases seen in 2021. Past studies have not focused on social and cultural aspects in learning institutions as possible causes of arson. The study focused on the application of rules and regulations on students' involvement in Arson at public boarding Secondary schools in Kisumu County. Descriptive Cross-sectional survey design was used. It involved 380 students of form 3 and 4 from 28 public boarding secondary schools which had experienced Arson from 2017 to 2020; and 28 KII's. Probability sampling techniques were used to arrive at the respondents, KII's were purposely selected. Questionnaires and FGDs were used on main respondents; and interview schedule for KII's. Quantitative data was analyzed using Pearson's product moment correlations and presented in graphs, tables and charts. Qualitative data was analyzed thematically. It was revealed that utilization of school rules and regulations had a positive significant relationship ($r= .447$, $p < .05$) with students' involvement in arson. Further, informal discussion on school rules and regulations had a positive significant relationship ($r= .487$, $p < .05$) with students' involvement in arson. The study recommends that the ministry of education should outline the guidelines for formulation of school rules and regulations.

Keywords: *Arson, Coded-Language, Rules and Regulations, Punishment, Formulation*

EMBRACING MENTAL WELLNESS: A CALL FOR THE INCORPORATION OF MENTAL HEALTH CURRICULUM IN EDUCATIONAL INSTITUTIONS IN KENYA

Samoo, M.N.

Kirinyaga University, KENYA
Correspondence: michaelnaibe953@gmail.com

Abstract

Amidst a rising prevalence of mental health issues among Kenyan youth, this study provides a critical examination of the state of mental health services in Kenyan schools. The paper aims to assess the effectiveness of existing programs, understand the impact of mental health on academic performance, and draw comparisons with global approaches to mental health education. The research methodology involves a comprehensive literature review and comparative analysis. The findings reveal significant gaps in the current system, including funding constraints, staff shortages, and societal stigma, which contribute to the high prevalence of mental health issues among Kenyan youth. The study concludes that existing guidance and counseling programs are insufficient in tackling these issues effectively. The paper proposes innovative interventions such as the introduction of a standalone mental health subject, parenting education, enhanced teacher training in psychology, and employment of school psychologists. These measures, inspired by global practices, aim to establish a robust framework for addressing mental health challenges.

Keywords: *Mental Health, Kenyan Schools, Global Practices, Innovative Interventions, Academic Performance, Well-being.*

LEARNING BEYOND LOCKDOWN: UNDERSTANDING ADOLESCENT SCHOOL RETENTION IN KENYA POST COVID-19

Wafubwa R.N.¹ Muluve E.¹ Austrian K.²

¹*Population Council, Nairobi, Kenya*

²*GIRL Centre-Population Council*

Correspondence: rnanjekho@popcouncil.org

Abstract

The COVID-19 pandemic caused unprecedented disruptions to education systems globally, particularly impacting marginalized adolescents in developing countries like Kenya. The short-term effects of COVID-19 school closures have been extensively studied. However, the longer-term implications, particularly for marginalized adolescents, require further investigation. This study aimed to contribute to addressing this gap in knowledge by exploring the factors associated with school retention among marginalized adolescents, two years after the onset of the pandemic. Understanding the factors associated with school retention during and after a crisis such as a pandemic is important in designing targeted education interventions and policies; especially to support vulnerable groups. Employing a combination of bivariate and multivariate logistic regression analyses, as well as thematic analysis of qualitative data obtained from in-depth interviews, the study systematically examines the various factors influencing adolescents' ability to stay enrolled in school. The factors examined included: household loss of income due to COVID-19, access to the internet, food security (skipping meals), time spent on household tasks, age, pregnancy, and involvement in income-generating activities. Findings from the quantitative analysis showed that earning income was significantly associated with low school retention for both female and male adolescents. However, internet access, age, and pregnancy or having a baby were specifically significant for female adolescents. Qualitative findings further reveal the gender-specific nuances of these barriers, with pregnancy and childcare responsibilities weighing heavily on girls, while boys grapple with the pull of income-generating opportunities and the lure of substance use. Amidst these challenges, financial constraints emerge as significant barrier to school retention for adolescent boys and girls. This study underscores the need for targeted interventions and policy frameworks to strengthen adolescent school retention during times of crisis, offering invaluable insights for the design and implementation of effective strategies aimed at safeguarding educational opportunities for marginalized adolescents.

Keywords: *Learning Beyond Lockdown, Understanding, Adolescent School Retention, Kenya, Post Covid-19.*

INFLUENCE OF STRATEGIC HUMAN RESOURCE MANAGEMENT PRACTICES ON PERFORMANCE OF PUBLIC UNIVERSITIES IN KENYA

Mwaura R.S. N

Technical University of Kenya

Correspondence : stephen.mwaura@tukenya.ac.ke

Abstract

As organizations cope with a myriad operational challenges driven by social, the ensuing political and economic trends, the need for strategic human resource management has become pertinent. It is in this context that this research paper addresses the main theme; Adaptive Leadership and Societal Development, as set out in the forthcoming 7th Annual Kirinyaga University International Conference. This is particularly with regard to the first theme; human resource management, and relevantly so, as practiced in the public universities in Kenya. The objective of this study was to determine the effect of strategic human resource practices (SHRMPs), entailing a bundle of rigorous recruitment, staff training, reward management and performance management, on the performance of public universities in Kenya. The study was philosophically hinged on positivist ontology, mainly based on the resource-based theory, and designed as a cross sectional descriptive survey. Targeting all public universities in Kenya, data was collected from 31 public universities, aided by a self-administered questionnaire. Of the 117 questionnaires distributed, 110 were returned and found to be usable, providing a 71% response rate. Descriptive statistics and linear regression analyses were used to analyze the data. Contrary to the null hypothesis of the study, the findings indicated that there was a statistically significant relationship between the studied SHRMPs and performance of public universities in Kenya. This study, therefore, concluded that, the universities, like all other enterprises, could leverage on the studied bundle of strategic human resource management practices, among practices, for improved performance, in terms of developing and delivering more and better learning programmes, achieving increased student enrolment rates, attainment of enhanced learner graduation rates, generation of more research outcomes, as well as enhancement of the much-sought-after staff career promotion rates. Hence, as the public universities in Kenya seek to surmount operational and financial challenges, embracing strategic human resource management potentially presents a means of attaining and sustaining their competitive levels of performance demanded of all organizations, heading into the future.

Keywords: *Strategic Human Resource Management Practices, Performance of Public Universities*

BABIES AND BOOKS: INFLUENCE OF STUDENT-MOTHERHOOD ON THE CHALLENGES EXPERIENCED BY UNDERGRADUATE STUDENT MOTHERS IN KIRINYAGA UNIVERSITY, KENYA

Ngunyi H., Irungu C., Muiga M.

Kirinyaga University, Kenya
Correspondence: hngunyi@kyu.ac.ke

Abstract

Existing literature underscores the challenges encountered by undergraduate student mothers, experiencing financial constraints, childcare responsibilities, and academic pressures. Notably, counselling records at Kirinyaga University reveal a rising demand for psychotherapy services among student mothers, indicative of mental health strains. This study aimed to develop supportive programs to address the complex balance of motherhood, childcare obligations, academics, and financial obligations among undergraduate student mothers. Employing a phenomenological research design, the study targeted 2950 female students across four schools during the 2023/2024 academic year. Purposeful sampling and snowballing techniques yielded data from 39 student mothers. Data was collected using self-administered semi-structured questionnaires distributed randomly. Analysis was conducted using SPSS version 28, presenting descriptive statistics through frequency tables, pie charts, graphs, cross-tabulations, and correlations. Thematic analysis transcribed descriptive data into discernible themes. 48.7% of student mothers conceived during their second year of study, with 7.7% conceiving before university enrollment. Challenges included 41.03% reporting class absences due to childcare obligations, 20.5% struggling to balance childcare and nighttime studies, and 41.03% facing similar challenges during daytime learning. Moreover, 33.3% brought their babies to lecture rooms, 30.8% carried them during group discussions, and 23% experienced difficulty preparing for exams. The study underscores the need for continuous psycho-education to mitigate stress and depression stemming from the intricate juggle of academic pursuits, motherhood, childcare obligations, and sexual and reproductive health issues among undergraduate student mothers at Kirinyaga University.

Keywords: *Undergraduate Student Mothers, Challenges, Mental Health, Stress, Depression.*

INFLUENCE OF SHARED LEADERSHIP ON STUDENT LEADERS' EFFECTIVENESS IN PUBLIC UNIVERSITIES IN KENYA

Muthoni, M.L.

Karatina University, KENYA

Correspondence: muragelucy77@gmail.com

Abstract

Leadership style is one of the determinants of effective leadership. However, majority of student leaders lean on traditional leadership which is ineffective and this has made most of them not to be re-elected for another term. The purpose of this study was to assess the influence of shared leadership on student leaders' effectiveness in public universities in Kenya. The objectives of the study were to determine student leaders' awareness of shared leadership and examine the extent of student leaders' application of shared leadership style in public universities in Kenya. Descriptive research design was adopted. Target population consisted of public universities in Kenya. Simple random sampling was used to select a sample of 10 public universities using 30% of total population. A sample of 70 student governing councils who were the respondents from 10 public universities was used. Data was collected using a questionnaire and descriptive statistic was used to analyse data. Data was presented using percentages and frequency tables. Result revealed that 67.1% of student leaders were not aware of shared leadership while 32.9% were aware. On the extent of application of shared leadership, 78.5% did not apply shared leadership while 21.5% applied. The study concluded that shared leadership is not commonly used by student leaders in public universities and this could have contributed to one term reign for majority of student leaders. The study recommended for the sensitization and training of student leaders on shared leadership to enhance its application when students were discharging their duties.

Keywords: *Shared Leadership, Student Leaders, Public Universities.*

MCHANGO WA KISWAHILI KATIKA KUZUIA MAENEZI YA MARADHI YA UKIMWI

Muusya J.

Kirinyaga University, Kenya
Correspondence: jmuusya@kyu.ac.ke

Ikisiri

Makala hii ina chunguza jinsi Kiswahili kinavyocheza kutekeleza jukumu muhimu katika juhudzi za kuzuia maambukizi ya virusi vya UKIMWI katika maeneo mengi ya Afrika Mashariki na Kati. Kwa kutumia mifano na tafiti mbalimbali, makala inaonyesha njia kadhaa ambazo Kiswahili kinaweza kutumika kama zana muhimu katika kupambana na UKIMWI. Kwa kufanya matangazo, vijarida, na vifaa vingine vya elimu kuwa katika lugha inayoleweka vizuri na jamii, Kiswahili kinaweza kusaidia katika kueneza habari muhimu kuhusu njia za kujikinga na maambukizi ya virusi vya UKIMWI. Pia, makala itaangazia jinsi Kiswahili kinaweza kupunguza unyanyapaa unaohusiana na UKIMWI kwa kuelimisha jamii na kusaidia katika kubadilisha mitazamo ya kijamii. Kwa kusositiza umuhimu wa kujenga uelewa na mshikamano kuhusu UKIMWI, Kiswahili kinaweza kusaidia katika kupunguza ubaguzi na unyanyapaa dhidi ya watu walioathirika na virusi hivyo. Pamoja na hayo, makala inaonyesha jinsi Kiswahili kinavyoweza kuwa kiunganishi kati ya watoa huduma za afya na jamii. Kwa kutoa maelezo kuhusu matumizi sahihi ya kondomu, upimaji wa virusi vya UKIMWI, na ushauri nasaha kuhusu afya ya kinga ya mwili kuitia Kiswahili, mawasiliano yanaweza kufanyika kwa ufanisi zaidi. Nadharia ya unyanyapaa na ubaguzi ndiyo itaongoza uchunguzi huu. Nadharia hii itatumika kuelewa jinsi unyanyapaa na ubaguzi vinavyo athiri juhudzi za kuzuia UKIMWI. Inaweza kusaidia kufahamu jinsi matumizi ya Kiswahili vinavyoweza kusaidia kupunguza unyanyapaa na ubaguzi dhidi ya watu walioathirika na virusi vya UKIMWI. Malengo ya utafiti hu ni kuchunguza mbinu za kutumia Kiswahili kuzuia maambukizi ya maradhi ya Kiswahili, na kutumia Kiswahili katika kampeni za kuzuia maambukizi ya maradhi haya. Data ya uchunguzi huu itafanywa katika Hospitali ya Rufaa ya Kaunti ya Machakos. Mbinu za mahojiano na utunzaji, pamoja na kutathmini maelezo kuhusu maradhi haya kwa wagonjwa. Usomaji wa machapisho kuhusu mada hii yatazingatiwa pia. Data itachanganuliwa na kuwasilishwa kwa njia ya maelezo.

Istilahi muhimu: *Maradhi ya UKIMWI, unyanyapaa, maambukizi, Kiswahili .*

GOVERNANCE STRUCTURES AND COMPLETION RATE OF GRADUATE STUDENTS IN PUBLIC UNIVERSITIES KENYA

Musasia C.

Masinde Muliro University of Science and Technology, KENYA

Correspondence:clintonmusasia@gmail.com

Abstract

Higher education governance structures play a critical role in shaping the academic achievement of graduate students. The main purpose of the study was to establish Graduate school governance structures and completion rate of students in public universities, Kenya. The specific objectives of the study were to: examine completion rate of graduate students in public universities in Kenya, investigate the role of supervision on completion rates, determine measures that can enhance timely completion rates and establish administrative policies influencing postgraduate studies completion rates. Several research instruments were used: questionnaires, interview schedule and document analysis schedule. The study was guided by Transformational leadership theory (TLT). The target population of the study was 36,220 respondents with a sample size 435 based on Krejce and Morgan formula of 1970. Simple sampling technique was used to select the universities. A pilot study was conducted in Kakamega County to validate the research instruments before the research commences. The study employed Test Retest to establish the reliability and validity of the research instruments. Mixed research design was used where Qualitative data was analyzed using descriptive statistics like frequencies, percentages and means. Quantitative data was summarized to quantify the strength of the relationship between the variables. The researcher used multiple regression analysis to identify relationships between independent and dependent variables. Data was presented in tables, graphs, pie charts and other graphical presentations. The study provided empirical data and insights into the relationship between governance structures and student completion rates. Universities and policymakers used this information to make informed decisions about how to improve governance practices and to enhance student completion rate.

Keywords: *Governance Structures, Completion Rate of Graduate Students, Public Universities, Kenya*

INFLUENCE OF INSTITUTIONAL CAPACITY ON THE COMPETITIVENESS OF TVET INSTITUTIONS IN NYERI COUNTY

Kahiga E.M., Kibaara T., Gichohi, P.M.

Kenya Methodist University, KENYA

Correspondence: mutahi8@gmail.com

Abstract

The contemporary labour market and the growing self-employment sector demand a workforce with diverse skills, prompting changes in the training and education landscape at TVET institutions. Despite significant reforms and a regulatory framework, TVET institutions in Kenya, including those in Nyeri County, need to catch up in developing competitive capability. The research aimed to assess the influence of institutional capacity on the competitiveness of TVET institutions. The theory of dynamic capability and balanced scorecard model informed this research. The study utilized a mixed-methods approach, employing a cross-sectional descriptive survey design. The target population comprised 35 principals, 475 department heads and 315 student leaders from 35 TVET institutions in Nyeri County. A sample size of 11 principals, 11 student leaders, and 176 HODs was drawn from 11 TVET institutions. A systematic sampling technique was utilized to select the number of participating TVETs from Nyeri County, while HODs, principals, and student leaders from each sampled TVET institute were selected purposely. The tools for data collection included questionnaires, interviews, and focus group discussions, the quality of which was assured by checking validity and reliability. Descriptive statistics and inferential techniques were applied to quantitative data, while themes were generated from qualitative data. The study established a clear relationship between institutional capacity and competitiveness, indicating that enhancing internal capabilities is significant for the competitive positioning of TVET institutions. However, findings revealed inadequate workshops, technology infrastructure, computer labs, and libraries. The study underscores the critical need for substantial investment in physical infrastructure, including modernizing seminar rooms, laboratories, computer facilities, and establishing libraries. TVETs should invest in developing these facilities, upgrading technology, and subscribing to e-resources to increase learner engagement and support. Other measures recommended for supporting institutional capacities included up-to-date learning materials, staff training and professional development programs.

Keywords: *Institutional Capacity, Competitiveness, TVET Institutions, Learning Facilities, Nyeri County*

FINANCIAL MANAGEMENT PRACTICES AND THE COMPETITIVENESS OF TVET INSTITUTIONS IN NYERI COUNTY

Kahiga E.M., Kibaara T., Gichohi, P.M.

Kenya Methodist University, KENYA

Correspondence: mutahi8@gmail.com

Abstract

Technical and Vocational Education and Training (TVET) institutions play a crucial role in producing a multi-skilled workforce for the modern labour market. However, their competitiveness has been facing severe financial challenges. As a stop-gap measure, the government of Kenya has developed mechanisms to ensure the competitiveness of TVET institutions by establishing oversight institutions and supporting legal frameworks. Despite these reforms, TVET institutions in Kenya still need to be more competitive, while issues about imprudent financial management are common. Against this backdrop, the current study investigated the relationship between financial management practices and the competitiveness of TVET institutions in Nyeri County to suggest strategies for improvement. The balanced scorecard model informed the study. It employed a mixed-methods approach with a cross-sectional descriptive survey design. The target population comprised principals, department heads and student leaders from 35 TVET institutions in Nyeri County. A sample size of 11 principals, 11 student leaders, and 176 HODs was drawn from 11 TVET institutions. A systematic sampling technique was utilized to select the number of participating TVETs from Nyeri County. The tools for data collection included questionnaires, interviews, and focus group discussions. The quality of tools for collecting data was ensured by checking reliability, content, face, and construct validity. Results showed moderate financial management practices. Moreover, financial accountability and transparency systems were established in most TVET institutions, but adherence levels to the set financial policies needed to be higher. There was a positive and substantial relationship between financial management practices and the competitiveness of TVET institutions in Nyeri County. There is need for TVET institutions to embrace prudent financial planning through diversified income, tightened budget controls, risk mitigation, and staff training in financial management and strive to adhere to the set economic policies.

Keywords: *Financial Management Practices, Competitiveness, TVET Institutions, Financial Accountability, Budget.*

EFFECT OF RESPONDENTS' CHARACTERISTICS ON SCHOOLING AMONG STREET AND NON-STREET CHILDREN IN NAKURU, KENYA.

Muhanga C. M., Wamocha L., Kageha Z.

Masinde Muliro University of Science and Technology, KENYA
Correspondence : muhanga88@gmail.com

Abstract

Street children, like all children, are entitled to protection under both local and international laws. Sustainable Development Goal (SDG) number four emphasizes quality education for all, yet street children worldwide are often excluded from this provision due to various factors, including demographic characteristics, family backgrounds, and origins. This study examined the effects of respondents' characteristics on schooling among street and non-street children in Nakuru, Kenya. Employing a comparative research design, the study focused on Nakuru town, with a population of 1,002 street children. A sample of 278 street children was drawn, and an equal number of non-street children were selected from public schools within the town. Respondents were identified using purposive and snowball sampling techniques, with questionnaires serving as the primary data collection instrument. Data analysis was conducted using STATA software. Findings revealed statistically significant associations between respondents' demographic characteristics and street life in Nakuru. Factors such as gender, age, and education level were predictors of street involvement among children. Family characteristics, including parenthood, number of siblings, and daily meals, significantly influenced the likelihood of children joining the streets. Location of origin also played a pivotal role in determining street involvement among children in Nakuru. The study concluded that age, gender, education level, and family dynamics are critical determinants of schooling among children in Nakuru, with parenthood emerging as a primary influence. There is need to develop and recommend targeted educational support programs for street children, along with investments in school feeding initiatives to address underlying socio-economic challenges.

Keywords: *Street Children, Non-Street Children, Schooling, Family Background, Location of Origin.*

THE ROLE OF UNIVERSITIES IN DIGITAL SKILLS TRAINING FOR THE 21ST CENTURY.

Kerubo J.

Kirinyaga University, KENYA
Correspondence: jkerubo@kyu.ac.ke

Abstract

We are living in a digital era where digital skills are necessary for one to engage in business and access services. The Fourth Industrial Revolution (4IR) characterized by increased use of new technologies such as artificial intelligence, cloud computing, robotics, 3D printing, the Internet of Things and advanced wireless technologies calls for digital skills training. It has been estimated that in the next decade, there will be about 1.5 million new digitized jobs in the world. Previous research shows that 90% of organizations have an IT skills shortage. At the same time over 75% of educators feel that our education institutions do not possess the necessary digital skills needed in the labour market. In order to prepare our students for the 21st century labour market, it is important for Kenya to recognize and capitalize on 4IR opportunities in order to realize her aspirations as contained in her development blueprint the Vision 2030. For Kenya to progress and enhance acquisition of 21st century skills, there is a need to make progress in digital skills training and literacy. This paper reviews literature related to digital skills training in Kenya. The paper starts with definition of terms and moves on to describe the government policy on digital skills training. The progress made in the digital skills training is analyzed with a view to highlighting the successes and the challenges faced. The role universities can play in digital skills training is also examined. The paper concludes by making suggestions on how the role of universities in digital skills training can be enhanced.

Keywords: *Universities, Digital Skills Training, 21st Century.*

AFRICAN LITERATURE AND THE QUESTION OF LEADERSHIP FOR SOCIETAL DEVELOPMENT

Nasambu B.V.

Kirinyaga University, KENYA
Correspondence: vbarasa@kyu.ac.ke

Abstract

Leadership in contemporary society is an area that has gained a lot of scholarly research and debates globally. Postcolonial Africa has in particular grappled with leadership and its implication on societal development and posterity. The 21st century African society is faced with a myriad societal ills and vices, many of them emanating from the type of leadership in place. The omissions and commissions whether conscious or unconscious by those in leadership positions have implications on the future hence if not addressed forebode a dysfunctional society. As such, the need for adaptive leadership is paramount in initiating desirable change through different modes for a better tomorrow. It is on this premise that the present paper argues that African literature can be considered a space within which the desired leadership and change can be realized. This is especially realized in the manner in which African literary texts interrogate leadership and its trappings. The paper in the main limits itself to political leadership and how political leadership has been advanced in African literary productions. In this paper, I interrogate how African Literature advocates for an appropriate political leadership by probing the paradigms and ethical sites in matters that affect society. In order to do this, I will carry out a textual and interpretative analysis of John Ruganda's *Shreds of tenderness* and Francis Imbuga's *Betrayal in the city*. Cognizant of the potential nature of literature to achieve social change that is geared toward societal development, the paper opines that political leadership becomes the foundation of such posterity since it affects different institutions such as education, family, governance among others. Such institutions form key indicators and parameters through which development is gauged.

Keywords: *African Literature, Question of Leadership, Societal Development*

IMPLEMENTATION OF CHILD FRIENDLY SCHOOLS INITIATIVE (CFSI) IN PUBLIC PRIMARY SCHOOLS IN NORTHERN, KENYA: IMPEDIMENTS AND SOLUTIONS

Chemwei B.

Kirinyaga University, KENYA
Correspondence : bchemwei@gmail.com

Abstract

The purpose of this study was to establish the factors that impede implementation of child friendly schools' initiative (CFSI) in primary schools in Northern Kenya. Schools in Northern Kenya face unique challenges due to its geographical, socio-economic, and cultural context. The study sought to establish the implementation of inclusiveness of learners in the schools, find out the implementation of hygienic, safe and protective school environments, determine the extent of participation of parents, pupils and the community in school programmes; and determine the implementation of effectiveness in teaching and learning. The study was informed by the Social Systems theory and the rights-based approach to education. The study used a comprehensive literature review to investigate the impediments of the implementation of child friendly schools' initiative (CFSI). It was performed by reviewing relevant books, articles, and journals. Findings of the study indicate that many schools in Northern Kenya lack basic amenities like clean water, proper sanitation facilities as well as safe playgrounds. There is also lack of community participation in school programmes. Thus, the communities still hold on to cultural beliefs and practices such as FGM and early marriages that do not align with CFSI principles. Notable also is that many parents do not have resources to actively participate in their children's schooling. In addition, many schools lack sufficient teaching and learning materials and have overcrowded classrooms. The study observes that improving access to basic amenities like water, electricity, and roads would create a more conducive learning environment in public schools in the region. There is need for policy-makers to come up with policies on prevention of violence and ensure equity and equality among pupils in primary schools. There is also a need to ensure that safety measures are put in place and that schools identify school age children who are out of school and make an effort to ensure they are enrolled and retained in schools. Lastly, parents should be encouraged to participate in academic meetings and take an interest in and support learners' work with teachers.

Keywords: *Child-Friendly Schools, implementation, Impediments. Northern Kenya.*

UNIVERSITY STUDENTS STRESS PATTERNS IN A KENYAN SOCIO-CULTURAL AND ECONOMIC CONTEXT

Muiru A.

Kirinyaga University, KENYA

Correspondence: amuiru@kyu.ac.ke

Abstract

Undergraduate students face many mental issues. However, the prevalence of some of the health conditions is a bit higher than others. Experts and researchers use terminology like “crisis” and “epidemic” to describe College student's mental health issues today. Mood disruptions are only one of the many mental health problems that College students face. Suicide, addiction, and eating disorders are examples of significant issues. Although mental health specialists emphasize the need to talk about such concerns, students often regard these pressures as a typical livelihood in learning institutions. In other circumstances, individuals may be unable to seek help due to a lack of time, energy, will, or financial resources. It is, therefore, a challenge in coming up with a satisfactory solution to the challenges. Drawing the students' goodwill and desire to have their mental issues fixed is also a challenge as some of them may feel shy or mentally healthy, and that there is no need to go through medication. Similarly, identifying the deserving students and coming up with radical measures to satisfactorily come up with a solution is also challenging since acquiring the required resources is quite expensive. However, solving the problem is arguably easy through addressing some of the major health conditions that most undergraduate students experience. Awareness is a key intervention with the potential to prevent complications arising out of the stressors and/or to minimize the complications of the stressors by better coping skills. Any interventions such as public and individual psychoeducation is a critical first stage intervention to create awareness. Public health interventions should be prioritized to reach critical numbers including those not yet experiencing the stressors or already experiencing the stressors but not quite aware of what is going on in themselves.

Keywords: *Mental disease, Risk factors, Stress, Depression, University students*

**INFLUENCE OF MOTIVATION ON GIRLS' PERFORMANCE IN
MATHEMATICS IN KENYA CERTIFICATE OF SECONDARY EDUCATION
(KCSE) IN BARINGO CENTRAL SUB-COUNTY**

Chemwei B.,¹ Changwony R.²

¹Kirinyaga University, KENYA

²Kapropita Girls' High school, KENYA

Correspondence: [*bchemwei@gmail.com*](mailto:bchemwei@gmail.com)

Abstract

Mathematics is an essential subject in the school curriculum in Kenya. It is a compulsory subject in both primary and secondary schools and plays an important role in the learning of other subjects. The learning of mathematics provides skills in thinking and is crucial for attaining educational qualifications at all levels of learning. Every student aspiring to advance their education in any tertiary institution of learning is expected to pass Mathematics, at least with a credit pass at the KCSE. However, girls' achievement in Mathematics has been poor over the years at secondary school level. The purpose of this study was to examine the influence of motivation on the performance of girls in Mathematics in KCSE in Baringo Central Sub-County. The study was guided by education production function theory developed by Eric Hanushek. The study was conducted in Baringo central sub county and adopted the descriptive survey research design with both quantitative and qualitative research methods being employed. The target population was 763 and it included 18 Mathematics teachers, 6 Mathematics HoDs and 739 Form Four girls from 6 secondary schools in Baringo Central Sub-county. A sample size of 190 respondents comprising of 18 Mathematics teachers, 6 Mathematics HoDs and 166 girls was selected. Purposive sampling was used to select heads of departments and Mathematics teachers while the simple random sampling technique was used to select Form 4 girls. Two questionnaires, one for Mathematics teachers and the other for students and an interview schedule for Mathematics HOD were used in data collection. The research instruments were validated and tested for reliability using the test-retest method. The reliability coefficient for the student questionnaire instrument was 0.7103. The collected data was analyzed using both inferential statistical techniques in which the Chi-square and Karl Pearson correlations were utilized as well as descriptive statistical techniques like standard deviation, percentages, frequency tables and means. The study established that the motivation of girls as an input factor had a significant influence ($r=0.365, p=0.001$) on girls' performance in KCSE Mathematics examinations. Thus the null hypothesis for the study were rejected. This means that there is a significant positive relationship between motivation of girls and their performance in Mathematics. The study concluded that the performance of girls in KCSE Mathematics was influenced by the motivation of the girls. The study recommends that teachers should always apply extrinsic motivation strategies in their classroom teaching in order to motivate the girls.

Keywords: *Influence of Motivation, Girls' Performance, Mathematics, Kenya Certificate of Secondary Education (KCSE), Baringo Central Sub-County.*

EDUCATION FINANCING, MORALITY AND STUDENT ACADEMIC PERFORMANCE IN SELECTED INSTITUTIONS OF HIGHER EDUCATION IN KENYA

Muthara F.W., Kithinji W.K., John C. M., Lagat D. K.

Kirinyaga University, KENYA

Correspondence: dlagat@kyu.ac.ke

Abstract

Concerns about student behaviour and their academic performance in institutions of higher learning are taking centre stage in various societies. This paper examines how education financing influences both morality and student academic performance of those students in Kenya. According to Kaberia (2006), while there exist policies to check curriculum, instruction and other quality of education matters, there exists no policy to check student performance. Secondly, while there exist guidelines to manage student behaviour and morality in secondary schools, there seems to be a sudden relaxation of rules, allowing freedom to students in higher learning, consequently leading to sexual immorality, drug abuse, and gambling. That being the case, it is feared that government funding model and practice does not have morality and academic performance as any of its priorities, which exposes especially vulnerable students to various delinquencies and academic flop, leading to cheating, dwindling performance, and even deregistration. This study adopted both survey and ethnography methodologies. Students from 4 institutions of higher learning were selected, and 220 students were interviewed. Data was collected through interviews, in-depth interviews, document study, and focus group discussions. Purposive sampling was used to select what was observed and 20 key participants who had quality information needed for this study. Data from participants were analyzed using SPSS and inductive thematic analysis and presented in descriptive and narrative form, and further juxtaposed with figures.

Keywords: *Education Financing, Morality, Student Performance, Higher Education, Discipline.*

A PROBE INTO THE CHALLENGES FACED BY CHILDREN IN LEARNING ENGLISH AS A SECOND LANGUAGE: THE CASE OF A SIX-YEAR-OLD.

Ntalala S.

Kirinyaga University, KENYA
Correspondence: sntalala@sntalala@kyu.ac.ke

Abstract

Learning English as a second language is a valuable endeavor, offering cognitive, academic, and social benefits. In Kenya, English is not only one of the official languages, but also a compulsory subject and the language of instruction in the Kenyan education system. However, most children are expected to acquire it as a second language in early years of learning. Nevertheless, children often encounter numerous hurdles when acquiring a second language. This study analyzes the challenges faced by children in acquiring English as a second language and the coping strategies that they employ. It is anticipated that the findings will offer insights on these hurdles and illuminate on how educators and parents can support children in their language development. The framework for the survey is based on Selinker (1972) interlanguage theory, which refers to the language of second language learners which is seen as a dynamic system moving in the direction of the target language. Data was collected through informal interaction with a six year old grade one girl at home. Findings from the study indicate that diverse obstacles at various levels of language are encountered by children learning English as a second language. Consequently, children employ varied strategies in their communication including avoidance of problematic items, borrowing words, constructing entirely new expressions, overgeneralization, switching to the first language, and asking for clarification. Therefore, it is hoped that understanding the difficulties they encounter and the strategies they employ will ensure that parents and educators are patient with the children, offering them proper support, exposure, and motivation to unlock the lifelong benefits of learning English as a second language.

Keywords: *Interlanguage, Second Language Acquisition, Target Language.*

**INFLUENCE OF CORPORATE GOVERNANCE PRACTICES ON
ACHIEVEMENT OF EDUCATIONAL GOALS IN PUBLIC SECONDARY
SCHOOLS IN KIRINYAGA COUNTY, KENYA**

Nderitu N.

Kirinyaga University, KENYA
Correspondence: mndiritu@kyu.ac.ke

Abstract

Corporate governance practices adopted by principals play a key role in achievement of educational and curriculum objectives. However, in many public secondary schools in Kirinyaga County, realization of educational goals has not been smooth since learner participation is yet to be fully achieved characterized by low academic performance in examinations. Thus, the study sought to examine the influence of corporate governance practices on achievement of educational goals in public secondary schools in Kirinyaga County, Kenya. The study adopted mixed methodology and thus, applied concurrent triangulation research design. Target population was 2234 respondents comprising 125 principals, 2099 teachers and 10 sub-county directors of education (TSC & MoE) from which a sample of 234 respondents was determined using Yamane's Formula. Qualitative data were analyzed thematically along the objectives and presented in narrative forms. Quantitative data were analyzed descriptively using frequencies and percentages and inferentially using Pearson's Product Moment Correlation Analysis in Statistical Packages for Social Science (SPSS 26) and presented using tables. The study established that, despite the government's efforts to realize 100.0% transition policy for primary school cohorts, their retention has been low, characterized by a high number of dropout cases. Academic performance of students in KCSE has also been low for the last five years. This is attributed to principals' governance practices. Thus, the study recommends that principals should often involve all stakeholders in governance whose views are crucial in improving academic undertakings in secondary schools. The Ministry of Education should modify the management training manual for school heads to incorporate aspects of corporate governance.

Keywords: *Educational Goals, Corporate Governance, Public Secondary Schools.*

EFFECTS OF PROLONGED CLIMATE CHANGE (20-30 YEARS): EMPLOYING GESI AND OTHER RESILIENCE MEASURES

Ngumbi E¹, Thuo S², Wasike J.³

Skyrockers Training Institute, KENYA

Resilience Center, KENYA

Kirinyaga University, KENYA

Correspondence: elizabeth.ngumbi6@gmail.com

Abstract

The effects of prolonged climate change in arid and semi-arid regions (ASAL) of Kenya are of significant concern at both national and global levels. Over the span of 20-30 years, these changes present profound challenges to ecosystems, societies, and economies, including rising temperatures, environmental shifts, biodiversity loss, extreme weather events, sea level rise, food and water insecurity, natural disasters, health risks, displacement, economic disruptions, geopolitical instability, and cultural loss. Despite these challenges, many population groups lack the adaptive capacity to cope effectively with climate-related impacts. This paper employs a literature review methodology to underscore the challenges posed by prolonged climate change effects in Kenya's ASAL regions and proposes resilience measures that communities can adopt to mitigate these effects. Urgent and ambitious action is essential to reduce greenhouse gas emissions, enhance resilience, and adapt to climate change, thereby minimizing its severity and safeguarding the well-being of present and future generations. The authors advocate for the implementation of Gender Equality and Social Inclusion (GESI) measures as a crucial step in addressing climate change. GESI-responsive climate interventions aim to meet the specific needs of community members in a contextual manner. These considerations are vital for ensuring that climate policies, programs, and projects are equitable, effective, and sustainable. Discriminatory practices in climate governance often marginalize women, children, the elderly, persons with disabilities, indigenous peoples, and other marginalized communities, despite their heightened vulnerability to climate impacts due to existing gender disparities and social inequalities.

Keywords: Prolonged Effects of Climate Change, ASAL Regions in Kenya, Gender Equality and Social Inclusion (GESI), Vulnerable Groups, Resilience Measures.

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Kirinyaga University

P.O. Box: 143-10300 Kerugoya.

Mobile: +254 0709 742000, +254 728499650

Email: info@kyu.ac.ke

Web: www.kyu.ac.ke