



PROGRAMME AND BOOK OF ABSTRACTS

THEME

**INNOVATION, DIGITAL TRANSFORMATION AND INDUSTRY RESILIENCE
FOR GLOBAL SUSTAINABILITY**

VENUE

VIRTUAL PLATFORM OF KIRINYAGA UNIVERSITY

Email: conference2026@kyu.ac.ke



KIRINYAGA UNIVERSITY

9TH ANNUAL INTERNATIONAL CONFERENCE, 2026

MARCH 25TH - 26TH, 2026

SUB-THEMES

1. Green Innovation, Smart Cities, Renewable Energy, and Eco-Innovation.
2. Computing, Information/Knowledge Management, Cybersecurity, and Digital Policy Frameworks.
3. Human Capital, Entrepreneurship, Economic Growth, Empowerment, Poverty Reduction, and Transformative Governance.
4. Education, Competency-Based Education, Open, Distance, and Digital Learning.
5. Gender, Equity, Cultural Heritage Preservation, and Social Inclusion.
6. Health Systems, Well-Being, and Digital Health Innovations.
7. Agriculture, Food Security, and AgriTech Innovations.
8. Environmental Conservation, Climate Change, and Biodiversity Protection.
9. Interdisciplinary Research and Collaborations.

GUEST SPEAKER

Prof. Franklin Wabwoba, Ph.D



Prof. Franklin Wabwoba is a Professor of Information Technology and currently serves as Deputy Vice Chancellor (Academic, Research and Student Affairs) at Karatina University, Kenya. He is a seasoned university leader, academic, and quality assurance expert with more than three decades of experience spanning university administration, teaching, research, and institutional development.

Prof. Wabwoba holds a Ph.D in Information Technology from Masinde Muliro University of Science and Technology, MSc in Computer Applications from Kenyatta University, and a Bachelor of Education (Science) from Egerton University. He is widely recognized for his transformative leadership in higher education, having previously served as Acting Deputy Vice Chancellor (Academics and Students' Affairs) at Kibabii University, Director of Technical and Vocational Education and Training, Dean of the School of Computing and Informatics, and Acting Director of Quality Assurance at Kibabii University.

He has led major institutional reforms including digital transformation initiatives, automation of academic processes, curriculum development and harmonization, quality assurance systems strengthening, and establishment of specialized computing laboratories and research centres. Prof. Wabwoba has also served as a national and regional curriculum and institutional reviewer for the Commission for University Education (Kenya), the Inter-University Council for East Africa, and the National Council for Higher Education (Namibia).

An accomplished, he has published extensively in peer-reviewed journals and conference proceedings and has supervised numerous Master's and Ph.D degree candidates in computing and information technology disciplines. His research interests include digital transformation in higher education, quality assurance systems, artificial intelligence in education, cybersecurity, and computing innovation ecosystems.

Prof. Wabwoba is a member of several professional bodies and remains actively engaged in advancing technology-enabled learning and research excellence in Africa.

PROGRAMME AND BOOK OF ABSTRACTS

Reviewers and Editors

Prof. Charles, O. A. Omwandho, PhD

Dr. Jotham M. Wasike, PhD

Dr. Paul Njenga, PhD

Dr. Grace Kiiru, PhD

TABLE OF CONTENTS

THEME 1

PREFACE..... 10

PROGRAMME..... 11

MID MORNING SESSION 12

AFTERNOON SESSION 16

DAY TWO: THURSDAY, MARCH 26, 2026 22

PROGRAMME..... 22

MORNING SESSION..... 23

MID MORNING SESSION 28

AFTERNOON SESSION 33

ABSTRACTS 36

SUB THEME : ENGINEERING AND TECHNOLOGY 36

UTILIZATION OF ANTHROPOMETRIC DATA IN ENGINEERING SIZE CHARTS FOR KENYAN PREGNANT WOMEN 36

EFFECT OF DESIGN PROCESS ON USABILITY, FUNCTIONALITY, AND COMFORT IN ADAPTIVE CLOTHING FOR PERSONS WITH MOBILITY CHALLENGES IN NYERI COUNTY, KENYA 37

FACTORS INFLUENCING SUSTAINABLE SMART TEXTILES INTEGRATING BIO-BASED NANOFIBERS AND WEARABLE SENSOR TECHNOLOGIES FOR CIRCULAR FASHION SYSTEMS 38

FORENSIC STRUCTURAL AUDITS AND REMEDIAL INTERVENTIONS FOR BUILDING FAILURE RESOLUTION: COMPARATIVE EVIDENCE FROM TWO REINFORCED CONCRETE STRUCTURES IN KENYA..... 39

TRIBO-PHYSICAL AND THERMAL PROPERTIES OF HYBRID POLYMER COMPOSITES: INFLUENCE OF SISAL AND COCONUT SHELL NANOPARTICLES 40

CONSTRUCTION INDUSTRY OUTPUT TREND IN KENYA: 1977-2024 41

EVALUATING THE IMPACT OF A ROBOTIC REHABILITATION HAND GLOVE ON FINE MOTOR SKILL RECOVERY USING EMG-BASED MONITORING 42

ASSESSMENT AND INTEGRATION OF RENEWABLE ENERGY SYSTEMS (RES) IN SUSTAINABLE ENERGY SYSTEMS 43

INSTITUTIONAL AND PROFESSIONAL OVERSIGHT GAPS IN THE PREVENTION OF BUILDING COLLAPSES IN KENYA: EVIDENCE FROM A MIXED-METHODS ANALYSIS..... 44

SUB- THEME : ICT AND DIGITAL TRANSFORMATION 45

A COMPARATIVE ANALYSIS OF LIGHTWEIGHT DEEP LEARNING MODELS FOR SPECTRAL-BASED DETECTION OF CROP DISEASES 45

A SYSTEMATIC LITERATURE REVIEW ON PHISHING EMAIL ATTACK DETECTION USING CNN AND BI-LSTM TECHNIQUES 46

PHISHING VULNERABILITIES AND AI-BASED DEFENSE IN DIGITAL MICROFINANCE INSTITUTIONS: A SYSTEMATIC REVIEW..... 47

GRADIENT BOOSTING-NEURAL NETWORK HYBRIDS FOR EARLY DETECTION OF DROPOUT RISK IN ONLINE LEARNING ENVIRONMENTS..... 48

HYBRID DEEP LEARNING WITH HONEYPOT INTEGRATION FOR ENHANCED CYBERSECURITY: A PROACTIVE DEFENSE FRAMEWORK 49

A SYSTEMATIC LITERATURE REVIEW OF DEOBFUSCATION FRAMEWORKS 50

THE NEXUS BETWEEN ARTIFICIAL INTELLIGENCE AND ENTREPRENEURSHIP EDUCATION: A COMPARATIVE ANALYSIS OF THE UNIVERSITY OF IOWA (USA) AND SELECTED KENYAN UNIVERSITIES 51

THE SHRINKING MIND: ARTIFICIAL INTELLIGENCE, CORTICAL THINNING, AND THE RE-ENGINEERING OF KENYA'S DIGITAL NATIVES 52

ARTIFICIAL INTELLIGENCE IN CYBERSECURITY; ASSESSING KENYA’S PREPAREDNESS FOR AI-DRIVEN CYBER DEFENSE..... 53

ARTIFICIAL INTELLIGENCE, CYBER SECURITY, AND DATA SCIENCE IN PROPELLING INDUSTRY RESILIENCY AND SUSTAINABILITY 54

SUB-THEMES: HEALTH AND WELLNESS55

DEVELOPING A STRATEGIC MODEL TO ENHANCE UPTAKE AND EFFECTIVENESS OF CPD IN CLINICAL PRACTICE AMONG NURSES AND MIDWIVES IN KENYA.....55

EFFECT OF DIABETES FOOT CARE EDUCATION ON SELF-EFFICACY AMONG PATIENTS WITH DIABETES MELLITUS ATTENDING EMBU AND KERUGOYA LEVEL FIVE HOSPITALS, KENYA56

COPING AFTER PERINATAL LOSS: A QUALITATIVE STUDY OF PSYCHOLOGICAL WELLBEING AMONG POSTPARTUM MOTHERS IN THARAKA-NITHI COUNTY, KENYA57

CAREGIVER SOCIODEMOGRAPHIC FACTORS ASSOCIATED WITH ADHERENCE TO ZINC TREATMENT OF CHILDHOOD DIARRHEA IN KIRINYAGA COUNTY, KENYA58

KANGAROO MOTHER CARE: UNLOCKING CHALLENGES AND OPPORTUNITIES IN POST-DISCHARGE UTILIZATION IN KIRINYAGA COUNTY, KENYA59

DETERMINANTS OF EARLY ANTENATAL CARE BOOKING AMONG PREGNANT WOMEN ATTENDING EMBU TEACHING AND REFERRAL HOSPITAL, KENYA: A CROSS-SECTIONAL SURVEY60

COMPLEMENTARY FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN AGED 6-23 MONTHS IN MUMONI WARD, KITUI COUNTY, KENYA61

GAPS IN PAEDIATRIC TUBERCULOSIS CASE DETECTION AND ASSOCIATION WITH TIMELY TREATMENT AT KERUGOYA COUNTY REFERRAL HOSPITAL, KIRINYAGA COUNTY, KENYA62

SCOPING REVIEW; BRIDGING THE GAP IN ADHERENCE TO COMPREHENSIVE NEWBORN CARE PROTOCOLS FOR PRETERM INFANTS IN KENYA63

SCOPING REVIEW; PATIENT RIGHTS AND CAREGIVER ENGAGEMENT IN PAEDIATRIC FOLLOW-UP CARE IN KENYA64

ROLE OF HEALTHCARE PROVIDERS' BELIEFS AND ATTITUDES IN ADHERING TO COMPREHENSIVE NEWBORN CARE PROTOCOLS FOR PRETERM INFANTS AT KERUGOYA COUNTY REFERRAL HOSPITAL, KENYA.....65

EFFECTIVENESS OF COMMUNITY-BASED NURSE-LED SCREENING PROGRAMS AMONG FINANCIALLY UNSTABLE RESIDENTS IN KANJATA VILLAGE.....66

SUB-THEME: MATHEMATICS FOR SUSTAINABLE DEVELOPMENT67

GEOMETRIC PROPERTIES AND ESTIMATION OF RADII OF REGIONS OF STARLIKENESS AND SPIRALLIKENESS FOR ANALYTIC MAPPINGS ON THE UNIT DISK67

ACTION OF SPECIAL LINEAR GROUPS OF DEGREE TWO AND THREE ON NON-ZERO VECTORS OVER FINITE FIELDS.....69

AUTOMORPHISMS OF ZERO-DIVISOR GRAPHS OF NILRADICALS IN MIXED-EXPONENT SEMILOCAL RINGS70

ON CERTAIN RELATION OF SUMS OF SQUARES AND QUARTIC.....71

NORM OF GENERAL DERIVATION ON TENSOR PRODUCT OF C^* -ALGEBRAS.....72

STUDY OF RICCI CURVATURE TENSOR UNDER CONFORMAL TRANSFORMATION73

THE ONTOLOGY AND DISSOLUTION OF TIME: EXPLORING THE CONSEQUENCES OF ITS NON-EXISTENCE ON THE FABRIC OF REALITY.....74

SUB- THEME: NATURAL AND PHYSICAL SCIENCES75

DETERMINATION OF ANTIBIOTIC PRODUCTION BY SELECTED ACTINOMYCETES FROM MENENGA CRATER IN KENYA USING LIQUID AND SOLID FERMENTATION.....75

BOX-BEHNKEN DESIGN-GUIDED ENHANCEMENT OF BIOGAS PRODUCTION THROUGH CaCO_3 BUFFERING IN CO-DIGESTION OF WATER HYACINTH AND FISH OFFAL76

INNOVATIVE FRACTIONAL-ORDER MODELLING OF ESCHERICHIA COLI DYNAMICS FOR SUSTAINABLE WASTEWATER MANAGEMENT IN EMERGING ECONOMIES77

ADVECTION-DIFFUSION-REACTION MODELING OF HEAVY METAL CONTAMINATION IN RIVER SEDIMENTS USING COMPUTATIONAL METHODS78

COMPARATIVE FIRST-PRINCIPLES STUDY OF LEAD-FREE $\text{CS}_2\text{AGB}'\text{BR}_6$ ($\text{B}' = \text{Bi, Sb, In}$) DOUBLE PEROVSKITES FOR PHOTOVOLTAIC APPLICATIONS79

PERFORMANCE DATA TRANSPARENCY AND MEASUREMENT RELIABILITY IN ACCREDITED TESTING AND CALIBRATION LABORATORIES80

FBG MAGNETIC SENSORS: PRINCIPLES, DESIGN, AND APPLICATIONS81

SUB THEME: BUSINESS AND ECONOMIC TRANSFORMATION82

AN EVALUATION OF INFRASTRUCTURE REFORMS AND TECHNOLOGICAL INNOVATIONS IN WATER SERVICE DELIVERY: A CASE OF KIRINYAGA COUNTY WATER AND SANITATION PLC82

INTEGRATING AGILITY INTO UNIVERSITY ACADEMIC PROCESSES: RESPONDING TO EVOLVING GLOBAL LABOUR MARKET NEEDS.....83

TRANSFORMING RURAL COTTON COMMUNITIES THROUGH LOCAL.....84

FARM-BASED INNOVATION84

DIGITAL TRANSPORT MANAGEMENT SYSTEMS AND PERFORMANCE OF AGRO-PROCESSING FIRMS IN UASIN GISHU COUNTY, KENYA.....85

A COMPARATIVE ANALYSIS OF THE VASICEK AND COX-INGERSOLL-ROSS INTEREST RATE MODELS IN INSURANCE VALUATION86

KNOWLEDGE GENERATION AND STRATEGY IMPLEMENTATION IN PUBLIC SECTOR ORGANIZATIONS IN KENYA: A CASE OF THE KENYA BUREAU OF STANDARDS.....87

INFLUENCE OF KNOWLEDGE UTILIZATION ON STRATEGY IMPLEMENTATION IN THE PUBLIC SECTOR IN KENYA88

GOVERNANCE CHALLENGES AND SOCIOECONOMIC EMPOWERMENT IN KENYAN PARA ATHLETICS89

SOCIO-ECONOMIC FACTORS AND WOMEN’S EMPOWERMENT IN KENYA90

INFLUENCE OF STRUCTURAL CONSTRAINTS ON BUDGET UTILIZATION IN GOVERNMENT ENTREPRENEURIAL PROGRAMMES IN KENYA91

TOWARDS CHURCH-BASED INTERVENTIONS FOR ADOLESCENT SEXUAL AND REPRODUCTIVE HEALTH RIGHTS92

AI-ENABLED RESKILLING FOR INNOVATION, INDUSTRY RESILIENCE, AND GLOBAL SUSTAINABILITY.....93

LEADERSHIP COMMITMENT AND ORGANIZATIONAL CULTURE AS DETERMINANTS OF WORKPLACE GENDER-BASED VIOLENCE IN KENYAN COMMERCIAL BANKS.....97

GENDER, EQUITY, AND INCLUSIVITY AS DETERMINANTS OF EDUCATIONAL SUSTAINABILITY IN MARGINALIZED COMMUNITIES OF NORTH EASTERN KENYA.....98

THE ROLE OF SOCIAL MEDIA IN THE DE-AFRICANIZATION OF GENDER-BASED VIOLENCE DISCOURSE IN AFRICA99

THE NEXUS BETWEEN ECONOMIC ACTIVITIES IN BUFFER ZONES AND FOREST COVER CHANGE: A CASE OF ENDAU FOREST, KENYA.....100

SOCIAL INCLUSION AS A PREDICTOR OF QUALITY OF LIFE AMONG PERSONS RECOVERING FROM SUBSTANCE USE DISORDER IN CENTRAL KENYA.....101

INCORPORATION OF GENDER, EQUITY, AND INCLUSION IN PRIVATE ORGANIZATIONS : A STUDY OF SMALL AND MEDIUM ENTERPRISES IN NYERI COUNTY, KENYA102

INSTITUTIONAL TYPOLOGIES AND GOVERNANCE STRUCTURES IN INFORMAL LENDING GROUPS: EVIDENCE FROM RURAL KENYA.....103

BANK LENDING ACTIVITIES, ENVIRONMENTAL TAXES, AND CLIMATE OUTCOMES: EVIDENCE FROM CROSS-COUNTRY PANEL DATA104

INFLUENCING THE PLATE: MEDIA NARRATIVES AND GLOBAL FOOD SYSTEM SUSTAINABILITY.....105

INVESTIGATING THE IMPACT OF PROFESSIONAL DEVELOPMENT ON IMPLEMENTATION OF INQUIRY-BASED LEARNING IN KENYA.....106

GENDER, LAND, AND POWER: HISTORICAL LAND USE PATTERNS IN THE MWEA PLAINS OF KIRINYAGA COUNTY, KENYA (PRE-COLONIAL PERIOD TO 1963)107

INNOVATION, DIGITAL TRANSFORMATION, AND GOVERNANCE AS CATALYSTS FOR ENTREPRENEURSHIP AND SOCIAL EMPOWERMENT108

EFFECT OF AGENCY BANKING ON THE GROWTH OF COMMERCIAL BANKS IN KIRINYAGA COUNTY; A CASE STUDY OF FOUR SELECTED COMMERCIAL BANKS109

THE DIGITAL PARADOX; ASSESSING THE IMPACT OF HEALTH INFORMATION SYSTEMS ON COGNITIVE LOAD, PATIENT INTERACTION, AND WORK-LIFE INTEGRATION AMONG MEDICAL PRACTITIONERS IN KIRINYAGA COUNTY110

INTERNET BANKING AND SUSTAINABILITY OF REGISTERED COMMERCIAL BANKS IN KENYA111

MODERATING EFFECT OF GOVERNMENT REGULATIONS ON THE RELATIONSHIP BETWEEN CREDIT RISK MANAGEMENT AND LOAN PERFORMANCE IN CREDIT-ONLY MICROFINANCE INSTITUTIONS112

ASSESSING THE EFFECT OF CREDIT RISK IDENTIFICATION ON LOAN PERFORMANCE IN CREDIT-ONLY MICROFINANCE INSTITUTIONS IN CENTRAL KENYA113

EMPLOYEE RESILIENCE AND WELL-BEING IN THE ERA OF DIGITAL TRANSFORMATION...114

TOURISM INVESTMENT IN RWANDA.....115

THE STEWARD FRAMEWORK: FORMALIZING THE INFORMAL ECONOMY THROUGH TRUST-BASED ECONOMIC ARCHITECTURES116

DIGITAL INNOVATION AND GENDER INCLUSION: PATHWAYS TO GLOBAL SUSTAINABILITY AND RESILIENCE118

INNOVATION, DIGITAL TRANSFORMATION AND GOVERNANCE AS CATALYSTS FOR ENTREPRENEURSHIP AND SOCIAL EMPOWERMENT: PATHWAYS TO INDUSTRY RESILIENCE FOR GLOBAL SUSTAINABILITY.....119

EFFECT OF CREDIT ACCESS ON FINANCIAL PERFORMANCE OF DEPOSIT-TAKING SACCOs IN KENYA119

SUB-THEME: EDUCATION FOR SOCIETAL DEVELOPMENT123

HOW CAN DIGITAL EQUITY INITIATIVES ADDRESS GENDERED DISPARITIES IN ACCESS TO TECHNOLOGY AND KNOWLEDGE?123

TEACHING EXPERIENCES AND PSYCHOLOGICAL WELL-BEING OF TEACHERS IN SPECIAL SCHOOLS AND UNITS IN ZOMBA DISTRICT, MALAWI.....124

ASSESSMENT OF BoM COMMUNITY INVOLVEMENT PRACTICES ON EFFECTIVE GOVERNANCE OF PUBLIC PRIMARY SCHOOLS IN NYERI COUNTY, KENYA125

DIGITAL REBIRTH OF ORAL TRADITIONS : KAMBA POPULAR MUSIC AND CINEMATIC ADAPTATION IN KENYA’S ICT REVOLUTION135

UNIVERSITY-INDUSTRY LINKAGES AS A STRUCTURAL CATALYST FOR COMPETENCY-BASED CURRICULUM REFORM IN KENYAN HIGHER EDUCATION137

PREVALENCE AND CORRELATES OF POST-TRAUMATIC STRESS DISORDER AMONG TEACHERS IN BANDIT-PRONE AREAS OF BARINGO COUNTY, KENYA138

LITERATURE AS A SHAPER OF CONTEMPORARY KENYAN POLITICAL DISCOURSES: A CLOSE STUDY OF GEN Z’S LITERARY LANGUAGE139

INTERROGATING EQUITY, EQUALITY AND SOCIAL INCLUSION IN COMPETENCE-BASED ASSESSMENT IN KENYA140

EFFECTIVENESS OF SOLID WASTE MANAGEMENT STRATEGIES IN KISUMU CITY, KENYA..141

INFLUENCE OF COST-BENEFIT ANALYSIS OF DIGITAL INVESTMENTS ON STUDENTS’ COMPLETION RATES IN PUBLIC UNIVERSITIES IN KENYA.....142

A STUDY ON THE LEXICAL TRANSLATION PROBLEMS IN THE KIKAMBA BIBLE.....144

UNIVERSITY LECTURERS’ READINESS TO IMPLEMENT MODULARIZED CBET CURRICULUM IN KENYAN HIGHER EDUCATION INSTITUTIONS146

FACTORS INFLUENCING THE IMPLEMENTATION OF THE COMPETENCY-BASED CURRICULUM: A CASE STUDY OF IVECHE PRIMARY SCHOOL, EMBU COUNTY, KENYA.....147

INFLUENCE OF EXAMINATION VENUE ON EXAMINATION MALPRACTICES AMONG BACHELOR OF EDUCATION STUDENTS IN KENYA148

CHALLENGES FACING THE IMPLEMENTATION OF COMPETENCY-BASED EDUCATION IN SENIOR SECONDARY SCHOOLS IN NAKURU COUNTY, KENYA149

FOSTERING STEM EDUCATION THROUGH ENHANCED DIGITAL LITERACY IN KENYAN SENIOR SCHOOLS: PROSPECTS, CHALLENGES AND POSSIBLE SOLUTIONS.....150

TEXT MINING AND TOPIC MODELLING FOR KNOWLEDGE DISCOVERY IN DIGITAL COLLECTIONS151

LEVERAGING ARTIFICIAL INTELLIGENCE TO FOSTER INTERDISCIPLINARY COLLABORATION IN RESEARCH AND PRACTICE152

ENHANCING THE CYBER RESILIENCE OF INFORMATION SYSTEMS THROUGH MACHINE LEARNING.....154

SEMANTIC WEB AND LINKED DATA TECHNOLOGIES FOR NEXT-GENERATION LIBRARY KNOWLEDGE MANAGEMENT156

ASSESSING INSTITUTIONAL REPOSITORIES' EFFECTIVENESS IN ADVANCING OPEN ACCESS SCHOLARLY OUTPUTS IN KENYAN UNIVERSITIES163

ASSESSING TECHNOLOGICAL INFRASTRUCTURE AND ITS IMPACT ON OPEN ACCESS TO IMPLEMENTATION AMONG SELECTED UNIVERSITIES IN CENTRAL KENYA.....164

ACCESS TO CLIMATE INFORMATION AND ITS ROLE IN BUILDING CLIMATE-RESILIENT COMMUNITIES IN KITUI COUNTY, KENYA.....165

SOCIAL MEDIA AS A MECHANISM FOR COMMUNICATING CLIMATE CHANGE AND SUSTAINABILITY TO THE YOUTH IN KENYA : A SYSTEMATIC LITERATURE REVIEW166

ASSESSING THE EFFECTS OF AI ADOPTION ON KNOWLEDGE MANAGEMENT EVALUATION PRACTICES IN ACADEMIC LIBRARIES; A CASE STUDY OF KIRINYAGA UNIVERSITY LIBRARY167

ARTIFICIAL INTELLIGENCE AS A CATALYST FOR DIGITAL INCLUSION AND KNOWLEDGE ACCESS IN KENYA: REIMAGINING THE KENYA NATIONAL LIBRARY SERVICE.....168

FROM PAPER TO PLATFORM; EVALUATING THE EFFECT OF DIGITIZATION GAPS ON RECORDS ACCESSIBILITY AND INSTITUTIONAL EFFICIENCY IN LAIKIPIA COUNTY REFERRAL HOSPITALS169

ARTIFICIAL INTELLIGENCE INTEGRATION AT THE KENYA TVET INSTITUTIONS: A HUMAN-CENTERED FRAMEWORK FOR INCLUSIVE SKILLS DEVELOPMENT.....170

IMPACT OF AI IN LIBRARIES AND MANAGEMENT PRACTICES ON INFORMATION RESOURCES AND SERVICE QUALITY171

KNOWLEDGE SHARING MECHANISMS DRIVING INNOVATIVE HEALTH INSURANCE SERVICES IN SELECTED KENYAN REGIONS.....174

SUB-THEME: AGRICULTURE & FOOD SECURITY 176

AUGMENTING FOOD SECURITY IN THE DRYLANDS OF KENYA : A CASE FOR NATIONAL FOOD POLICY REFORM176

BARRIERS TO THE ADOPTION OF INDIGENOUS AGRICULTURAL PRACTICES FOR CLIMATE CHANGE RESILIENCE AMONG SMALLHOLDER FARMERS IN MOGOTIO SUB-COUNTY, KENYA177

MITIGATION OF ANTIMICROBIAL RESISTANCE IN DORPER SHEEP MANURE USING BLACK SOLDIER FLY LARVAE: INSIGHTS FROM SHOTGUN METAGENOMIC PROFILING178

CONFERENCE ORGANIZING COMMITTEE MEMBERS..... 179

PREFACE

The 9th Annual International Conference of Kirinyaga University, held on March 25th–26th, 2026, brings together scholars, practitioners, and innovators from diverse disciplines to engage in critical dialogue under the theme “*Innovation, Digital Transformation and Industry Resilience for Global Sustainability.*”

This conference reflects the growing imperative for interdisciplinary collaboration in addressing complex global and local challenges. The programme and abstracts showcase a rich blend of research across engineering and technology, computing and digital transformation, health and wellness, business and economic development, education, agriculture, and information and knowledge management. Collectively, these contributions underscore the central role of innovation and digitalization in fostering resilient systems, sustainable development, and inclusive growth.

The diversity of sub-themes highlights the interconnectedness of knowledge domains and the need for integrated approaches in advancing solutions for climate change, food security, digital inclusion, governance, and socio-economic transformation. The inclusion of emerging areas such as artificial intelligence, cybersecurity, and digital health further demonstrates the conference’s commitment to forward-looking scholarship and practical impact.

We extend our sincere appreciation to all contributors, reviewers, and the organizing committee for their dedication and scholarly excellence. Special recognition is accorded to the keynote speaker and session chairs for enriching the intellectual discourse.

As participants engage in this virtual forum, it is our hope that the conference will inspire meaningful collaborations, stimulate innovative thinking, and contribute to shaping sustainable futures in Kenya and beyond.

Dr. Jotham M. Wasike

Chairperson

DAY ONE: WEDNESDAY, MARCH 25TH, 2026

Dr. Jotham M. Wasike (Coordinator): Email: jwasike@kyu.ac.ke

Dr. Paul W. Njenga (Co-Coordinator): Email: pnjenga@kyu.ac.ke

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PROGRAMME

TIME: 8.30AM - 4.30PM

TIME	ACTIVITY
8.00am- 8.30 am	Conference Registration Familiarization with the Conference Programme
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- 10.30 am	Guest Speaker Prof. Franklin Wabwoba,PhD Presentation: <i>Artificial Intelligence in Research: Transforming Knowledge Creation, Discovery, and Scholarly Communication.</i>
10.30 am-11am	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

MID MORNING SESSION

11.00PM - 1.00PM

PARALLEL SESSIONS/ PLENARY

SUB-THEME	ENGINEERING AND TECHNOLOGY
Chairperson	Dr. Emmanuel Mbusi
Rapporteur	Mr. Job Kobia

1. **Barasa, Z. N¹. & Kinuthia, L. N².** (¹University of Arkansas, USA; ²Kirinyaga University, Kenya). Utilization of Anthropometric Data to Generate Size Charts for Kenyan Pregnant Women.
2. **Kago, J., Kimemia, M. & Njeru, S.** (Kirinyaga University, Kenya). Effect of the Design Process on Usability, Functionality, and Comfort in Adaptive Clothing for Persons with Mobility Challenges in Nyeri County, Kenya.

SUB-THEME	ICT AND DIGITAL TRANSFORMATION
Chairperson	Dr. James Mwikya
Rapporteur	Ms. Grace Kimani

1. **Mutiso, G., Mariga, G. & Oirere, A.** (Murang'a University of Technology, Kenya). A Comparative Analysis of Lightweight Deep Learning Models for Spectral-Based Detection of Crop Diseases.
2. **Muriithi, N. M¹., Mwangi, E¹. & Malanga, K³.** (¹Kirinyaga University; ³Karatina University, Kenya). A Systematic Literature Review on Phishing Email Attack Detection Using CNN and Bi-LSTM Techniques.

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

1. **Wairimu, B. M¹., Mburu, S¹., Munde, E. O². & Ngigi, D. M³.** (¹Kirinyaga University; ²Tom Mboya University; ³National Commission for Science, Technology and Innovation, Kenya). Role of Healthcare Providers' Beliefs and Attitudes in Adhering to Comprehensive Newborn Care Protocols for Preterm

- Infants at Kerugoya County Referral Hospital, Kenya.
2. **Odhiambo, R.** (Kirinyaga University, Kenya). Developing a Strategic Model to Enhance Uptake And Effectiveness of CPD in Clinical Practice among Nurses and Midwives in Kenya.
 3. **Nyamwega, N.D., Okari, E.M., Kariri, E.M., Ongwenyi, C.P., Momanyi, H. & Wairimu, B.M.** (Kirinyaga University, Kenya). Effectiveness of Community-Based Nurse-Led Screening Programs among Financially Unstable Residents in Kanjata Village.

SUB-THEME	MATHEMATICS FOR SUSTAINABLE DEVELOPMENT
Chairperson	Dr. Peter Gachoki
Rapporteur	Mr. Samuel Oburu

1. **Okelo, B., Nyawalo, M., & Titus, A.** (Jaramogi Oginga Odinga University of Science and Technology, Kenya). Geometric Properties and Estimation of Radii of Regions of Starlikeness and Spirallikeness for Analytic Mappings on the Unit Disk.
2. **Wanyonyi, M., Akelo, J. G., Njenga, V. N., Keraro, F. O. & Kioko, T. M.** (University of Embu, Kenya). Integrating Bayesian Inference and Supervised Learning for Predictive Modeling of Coffee Rust Incidence among Kenyan Smallholder Farmers.

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

1. **Waithaka, P. N¹. & Githaiga, B. M².** (¹Kirinyaga University; ²Egerton University, Kenya). Determination of Antibiotic Production by Selected Actinomycetes from Menengai Crater in Kenya Using Liquid and Solid Fermentation.
2. **Bosire, F. & Ntabo, M.** (Rongo University, Kenya). Box-Behnken Design-Guided Enhancement of Biogas Production through CaCO₃ Buffering in Co-Digestion of Water Hyacinth and Fish Offal.

SUB- THEME	BUSINESS AND ECONOMIC TRANSFORMATION
Chairperson	Dr. Stephen Kamau
Rapporteur	Mr. Dennis Kanyingi

1. **Munyua, C. M.** (Kirinyaga County Water and Sanitation Company PLC, Kenya). An Evaluation of Infrastructure Reforms and Technological Innovations in Water Service Delivery: A Case of Kirinyaga County Water and Sanitation PLC.
2. **Mburu, D. K.** (Dedan Kimathi University of Technology, Kenya). Integrating Agility into University Academic Processes: Responding to Evolving Global Labour Market Needs.
3. **Kiiru, G.; Muchangi, D., Mutiso, A. & Kabata, D.** (Kirinyaga University, Kenya). Transforming Rural Cotton Communities Through Local Farm-Based Innovation
4. **Aliata, V.L. & Mbiriri, M.** (Mama Ngina University College, Kenya). Innovation, Digital Transformation and Governance as Catalysts for Entrepreneurship and Social Empowerment: Pathways to Industry Resilience for Global Sustainability.

SUB - THEME	EDUCATION FOR SOCIETAL DEVELOPMENT
Chairperson	Prof. Jane Kerubo
Rapporteur	Ms. Jane Muya

1. **Nyamundundu, A. V.** (University of South Africa). How Can Digital Equity Initiatives Address Gendered Disparities in Access to Technology and Knowledge?
2. **Piliyesi, E.** (Catholic University of Eastern Africa, Kenya). Teaching Experiences and Psychological Well-Being of Teachers in Special Schools and Units in Zomba District, Malawi.
3. **Njuki, M. J. & Murage, L. M.** (Karatina University, Kenya). Assessment of BoM Community Involvement Practices on Effective Governance of Public Primary Schools in Nyeri County, Kenya.

4. **Recha, R.O. & Kinuthia, L.N.** (Egerton University; Kirinyaga University, Kenya). Fostering STEM Education through Enhanced Digital Literacy in Kenyan Senior Schools: Prospects, Challenges and Strategic Interventions.
5. **Mutiiria, N. & Musyoka, C.** (Kirinyaga University, Kenya). Factors Influencing the Implementation of the Competency-Based Curriculum: A Case Study of Iveche Primary School, Embu County, Kenya.

SUB-THEME	INFORMATION AND KNOWLEDGE MANAGEMENT
Chairperson	Dr. Mutua Kilai
Rapporteur	Ms. Faith Ndirangu

1. **Wasike, J¹., Wafubwa, R². & Kimote, Z¹.** (¹Kirinyaga University; ²Population Council, Kenya). Artificial Intelligence-Driven Librarianship for Educational Transformation
2. **Munyao, V. W¹, Ndung'u, H¹., Wasike, J¹. & Tsinale, H².** (¹Kirinyaga University, ²Karatina University, Kenya). Text Mining and Topic Modelling for Knowledge Discovery in Digital Collections.
3. **Ndung'u, H¹., Munyao, V. W¹., Wasike, J¹. & Karani, J².** (¹Kirinyaga University; ²Karatina University, Kenya). Leveraging Artificial Intelligence to Foster Interdisciplinary Collaboration in Research and Practice.
4. **Kamau, B. M. & Maina, S.** (Kirinyaga University, Kenya). Assessing Institutional Repositories' Effectiveness in Advancing Open Access in Kenyan Universities.
5. **Kamau, B. M. & Maina, S.** (Kirinyaga University, Kenya). Assessing Technological Infrastructure and Its Impact on Open Access Implementation Among Selected Universities in Central Kenya.

SUB-THEME	AGRICULTURE AND FOOD SECURITY
Chairperson	Dr. Dickson Kinyua
Rapporteur	Ms. Ndirangu Faith

1. **Mwenzwa, E. M.** (Karatina University, Kenya). Augmenting Food Security in the Drylands of Kenya: A Case for National Food Policy Reform.
2. **Mwendwa, P. K.** (Egerton University, Kenya). Barriers to the Adoption of Indigenous Agricultural Practices for Climate Change Resilience among Smallholder Farmers in Mogotio Sub-County, Kenya.

AFTERNOON SESSION

2PM -4.30PM

PARALLEL SESSIONS/ PLENARY

SUB-THEME	ENGINEERING AND TECHNOLOGY
Chairperson	Dr. Dennis Bichang'a
Rapporteur	Mr. Simon Cheptumo

1. **Kimemia, M.** (Kirinyaga University, Kenya). Factors Influencing Sustainable Smart Textiles Integrating Bio-Based Nanofibers and Wearable Sensor Technologies for Circular Fashion Systems.
2. **Murianka, S. O¹, Ileri, J². & Njuguna, M³.** (¹Kirinyaga University, ; ²Civikraft Engineering, ; ³Jomo Kenyatta University of Agriculture and Technology, Kenya). Forensic Structural Audits and Remedial Interventions for Building Failure Resolution: Comparative Evidence from Two Reinforced Concrete Structures in Kenya.

SUB-THEME	ICT AND DIGITAL TRANSFORMATION
Chairperson	Dr. Stanley Mogaka
Rapporteur	Mr. Harrison Karani

1. **Mathenge, R., Mukunga, C. & Mwangi, E.** (Kirinyaga University, Kenya). Vulnerabilities and AI-Based Defense in Digital Microfinance Institutions: A Systematic Review.
2. **Munga, S., Mwikya, J. & Mageto, V.** (Kirinyaga University, Kenya). Gradient Boosting-Neural Network Hybrids for Early Detection of Dropout Risk in Online Learning Environments.
3. **Mugo, D. M.** (University of Embu, Kenya). The Shrinking Mind: Artificial Intelligence, Cortical Thinning, and the Re-Engineering of Kenya's Digital Natives.

SUB-THEME	HEALTH AND WELLNESS
Chairperson	Dr. Samuel Mburu
Rapporteur	Ms. Lucy Kamau

1. **Mbae, D¹, Gitonga, L². & Gichuru, B³.** (¹Kirinyaga University; ²Chuka University, ; ³Karatina University, Kenya). Coping After Perinatal Loss: a Qualitative Study of Psychological Wellbeing among Postpartum Mothers in Tharaka Nithi County, Kenya.
2. **Mwangi, L. W., Munyekenye, G. & Nderu, D.** (Kirinyaga University, Kenya). Caregiver Sociodemographic Factors Associated with Adherence to Zinc Treatment of Childhood Diarrhea in Kirinyaga County, Kenya.

SUB-THEME	MATHEMATICS FOR SUSTAINABLE DEVELOPMENT
Chairperson	Dr. Zachary Kayiita
Rapporteur	Mr. Samuel Oburu

1. **Justine, N., Nyaluke, K. W., & Rose, G.** (University of Embu, Kenya). Action of Special Linear Groups of Degree Two and Three on Non-Zero Vectors Over Finite Fields.
2. **Kiplagat, P., Lao, H. & Kayiita, Z.** (Kirinyaga University, Kenya). Automorphisms of Zero-Divisor Graphs of Nilradicals in Mixed-Exponent Semilocal Rings.
3. **Njori, P. W.** (Kirinyaga University, Kenya) The Ontology and Dissolution of Time: Exploring The Consequences of Its Non-Existence on the Fabric of Reality.

SUB-THEME	NATURAL AND PHYSICAL SCIENCES
Chairperson	Dr Agatha Wagutu
Rapporteur	Mr. Urbanus Ndambuki

1. **Karunditu, J. W., Ngari, C. G., & Wanjohi, P. N.** (Kirinyaga University, Kenya). Innovative Fractional-order Modelling of *Escherichia coli* Dynamics for Sustainable Wastewater Management in Emerging Economies.
2. **Njiru, S. N¹. & Irungu, M. K².** (¹Kenyatta University, ²Murang'a University, Kenya). Advection–diffusion–reaction modeling of heavy metal contamination in river sediments using computational methods.
3. **Karanja, J.M.** (Kirinyaga University, Kenya). FBG Magnetic Sensors: Principles, Design, and Applications.
4. **Dembede, S.^{1,2}, Kiarii, E.M.^{2,3}, Bett, R.¹ & Kibegwa, F.¹**(¹University of Nairobi, ²Daystar University & ³University of Embu, Kenya). Mitigation of Antimicrobial Resistance in Dorper Sheep Manure Using Black Soldier Fly Larvae: Insights from Shotgun Metagenomic Profiling.

SUB-THEME	BUSINESS AND ECONOMIC TRANSFORMATION (PANEL A)
Chairperson	Dr. David Njoroge
Rapporteur	Mr. Bonface Kamau

1. **Kang'iri, N. J., Muchangi, D., & Odunga, P.** (Kirinyaga University, Kenya). Knowledge Generation and Strategy Implementation in Public Sector Organizations in Kenya: A Case of the Kenya Bureau of Standards.
2. **Kiptembur, J. K.** (University of Eldoret, Kenya). Governance Challenges and Socioeconomic Empowerment in Kenyan Para Athletics.
3. **Wanjiru, J.** (Independent Researcher, Kenya). Socio-Economic Factors and Women's Empowerment in Kenya.
4. **Mwangi, G. & Muigai, R.G.** (Kirinyaga University, Kenya). Effect of Credit Access on Financial Performance of Deposit-Taking SACCOs in Kenya.
5. **Muhandale, A. A.** (Masinde Muliro University of Science and Technology, Kenya). The Role of Social Media in the De-Africanization of Gender-Based Violence Discourse in Africa.

SUB-THEME	BUSINESS AND ECONOMIC TRANSFORMATION (PANEL B)
Chairperson	Dr. Mary Maina
Rapporteur	Mr Collins Musyoka

1. **Vundi, N.** (St. Paul's University, Kenya). Towards Church-Based Interventions for Adolescent Sexual and Reproductive Health Rights.
2. **Atamba, C., & Mosonik, J. K.** (Kenya Highlands University, Kenya). AI-Enabled Reskilling for Innovation, Industry Resilience, and Global Sustainability.
3. **Omondi, C.** (Kirinyaga University, Kenya). The Steward Framework: Formalizing the Informal Economy through Perpetual Trust Architectures.
4. **Njoroge, D., Kabata, D. & Kamathi, N.** (Kirinyaga University, Kenya). Work-Related Stress and Performance of Police Officers in Nairobi County, Kenya.

SUB-THEME	EDUCATION FOR SOCIETAL DEVELOPMENT
Chairperson	Dr. Ann Muiuru
Rapporteur	Mr. James Kamau

1. **Kimonye, N. N¹. & Mwangi, S. K².** (¹Umma University, Kenya, ²Light Academy, Kenya). Effects of Reduced Exposure to Fasihi (Literature) in Kenyan Senior Secondary Schools.
2. **Mayende, G. B.** (Kirinyaga University, Kenya). Gen Z Revolution in Kenya: A Paradigm Shift in Redefining the Meaning of Good Governance.
3. **Muiru, A. W.** (Kirinyaga University, Kenya). The Interplay of Self-Efficacy and Emotional Resilience: A Path Analysis of Psychological Flourishing in Kenyan Universities.

SUB-THEME	INFORMATION AND KNOWLEDGE MANAGEMENT
Chairperson	Dr. Ephantus Mwangi
Rapporteur	Ms . Valentine Tarus

1. **Mauti, N.** (Adventist University of Africa, Kenya). Evaluating Diversity, Equity, and Inclusion (DEI) Practices in Academic Libraries in Kenya: Challenges, Strategies, and Impact.
2. **Ndung'u, H¹., Munyao, V. W¹., Wasike, J¹. & Karani, J².** (¹Kirinyaga University; ²Karatina University, Kenya). Enhancing the Cyber Resilience of Information Systems Through Machine Learning.
3. **Kimote, Z¹., Wasike, J¹., Mageto, V¹., Mutunga, D². & Kyallo, J³.** (¹Kirinyaga University; ²Daystar University; ³AIC Health Ministries, Kenya). Integrating Knowledge-Sharing Ecosystems and Financial Support for Agricultural Value Addition: An Assessment of the Nyota Fund among Young Mango Farmers in Kenya.

4. **Kitula, S. M¹. & Ubaga, E. M².** (¹Standard Media Group, Kenya; ²Daystar University, Kenya). Social Media as a Mechanism for Communicating Climate Change and Sustainability to the Youth in Kenya: A Systematic Literature Review.
5. **Kamau, F. M. & Karambu, L.** (Kirinyaga University, Kenya). Assessing the Effects of AI Adoption on Knowledge Management Evaluation Practices in Academic Libraries: A Case Study of Kirinyaga University Library.

DAY TWO: THURSDAY, MARCH 26, 2026

Dr. Grace Kiiru (Coordinator)

Dr. Wanjiku Njoroge (Co-Coordinator)

PROGRAMME

TIME	ACTIVITY
9.00 am - 10.30 am	Parallel Sessions/Plenary
10.30am-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 by the Coordinator
4.30 pm	End of the Conference

MORNING SESSION

9:00 AM- 10:30 AM

PARALLEL SESSIONS/ PLENARY

SUB-THEME	ENGINEERING AND TECHNOLOGY
Chairperson	Dr. Millicent Kimemia
Rapporteur	Mr Simon Cheptumo

1. **Bichang'a, D. O¹, Oladele, I. O². & Mwasiagi, J³.** (¹Kirinyaga University, Kenya; ²Federal University of Technology, Nigeria; ³Moi University, Kenya). Tribo-Physical and Thermal Properties of Hybrid Polymer Composites: Influence of Sisal and Coconut Shell Nanoparticles.
2. **Mbusi, E. T.** (Kirinyaga University, Kenya). Construction Industry Output Trend in Kenya: 1977–2024.

SUB-THEME	ICT AND DIGITAL TRANSFORMATION
Chairperson	Dr. Stephen Mageto
Rapporteur	M. Peter Kariuki

1. **Okello, F. O. , Kipkebut, K. A. & Oginga, A. O.** (Kabarak University, Kenya). Hybrid Deep Learning with Honeypot Integration for Enhanced Cybersecurity: A Proactive Defense Framework.
2. **Kimani, G. W., Langat, G., & Mageto, S.** (Kirinyaga University, Kenya). A Systematic Literature Review of Deobfuscation Frameworks.
3. **Maingi, W.J.** (Kabarak University, Kenya). Artificial Intelligence, Cyber Security, and Data Science in Propelling Industry Resiliency and Sustainability.

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

1. **Kamau, R.; Butto, D. & Nderu, D.** (Kirinyaga University, Kenya). Kangaroo Mother Care: Unlocking Challenges and Opportunities in Post-Discharge Utilization in Kirinyaga County, Kenya.
2. **Impwii, D. K. & Jemutai, F.** (Chuka University, Kenya). Determinants of Early Antenatal Care Booking among Pregnant Women Attending Embu Teaching And Referral Hospital, Kenya: A Cross-Sectional Survey.

SUB-THEME	MATHEMATICS FOR SUSTAINABLE DEVELOPMENT
Chairperson	Dr. Martin Kithinji
Rapporteur	Mr. Samuel Oburu

1. **Mude, L. H¹., Kayiita, Z. K¹., Ndung'u, K. J¹. & Kimani, P. M.².** (¹Kirinyaga University, Kenya, ²University of Embu, Kenya). On Certain Relation of Sums of Squares and Quartic.
2. **Daniel, B. K., Ndungu, K. J. & Kayiita, Z. K.**(Kirinyaga University, Kenya). Norm of General Derivation on Tensor Product of C-Algebras.
3. **Muriuki, C. M., Njori, P. W., & Gitonga, C. N.** (Kirinyaga University, Kenya). Study of Ricci Curvature Tensor Under Conformal Transformation.

SUB-THEME	NATURAL AND PHYSICAL SCIENCES
Chairperson	Dr. Joseph Muna
Rapporteur	Ms. Faith Ndirangu

1. **Kahura, I. M., Njoki, S. N. & Kiprotich, S.** (Murang'a University of Technology, Kenya). Comparative First-Principles Study of Lead-Free Cs₂AgB'Br₆ (B' = Bi, Sb, In) Double Perovskites for Photovoltaic Applications.

2. **Orwa-Ahuya, T.** (Kenya Bureau of Standards, Kenya). Performance Data Transparency and Measurement Reliability in Accredited Testing and Calibration Laboratories.
3. **Francis, J. K¹. & Malala, A. O.²** (¹Kirinyaga University; ²Mount Kenya University, Kenya). Effectiveness of Solid Waste Management Strategies in Kisumu City, Kenya.

SUB-THEME	BUSINESS AND ECONOMIC TRANSFORMATION (PANEL A)
Chairperson	Dr. David Kabata
Rapporteur	Ms. Winnie Wacera

1. **Wanjiku, Z. M. & Kyenze, M. B.** (Kirinyaga University, Kenya). Influence of Socio-Cultural and Economic Factors on Women’s Sexual Autonomy and Decision-Making Power at Kirinyaga University.
2. **Njoni, B. K., Okeyo, W., & Tsuma, D.** (Management University of Africa, Kenya). Leadership Commitment and Organizational Culture as Determinants of Workplace Gender-Based Violence in Kenyan Commercial Banks.
3. **Muhindi, C. & Ayora, J.** (Garissa University, Kenya). Gender, Equity, and Inclusivity as Determinants of Educational Sustainability in Marginalized Communities of North Eastern Kenya.
4. **Kang’iri, N. J., Muchangi, D. & Odunga, P.** (Kirinyaga University, Kenya). Influence of Knowledge Utilization on Strategy Implementation in the Public Sector in Kenya.

SUB- THEME	BUSINESS AND ECONOMIC TRANSFORMATION (PANEL B)
Chairperson	Dr. Evelyne Maina
Rapporteur	Ms Joyce Mugo

1. **Mungai, D. K.** (¹Kirinyaga University, Kenya). The Effect of Agency Banking on the Growth of Commercial Banks in Kirinyaga County: A Case Study of Four Selected Commercial Banks.

2. **Njoroge, D¹. & Wairia, G².** (¹Kirinyaga University; ²Independent Researcher, Kenya). The Digital Paradox: Assessing the Impact of Health Information Systems on Cognitive Load, Patient Interaction, and Work-Life Integration Among Medical Practitioners in Kirinyaga County.
3. **Wanjiru, P. M.** (Kirinyaga University, Kenya). Internet Banking and Sustainability of Registered Commercial Banks in Kenya.
4. **Maina, J. R.** (Kirinyaga University, Kenya). Moderating Effect of Government Regulations on the Relationship Between Credit Risk Management and Loan Performance in Credit-Only Microfinance Institutions.

SUB-THEME	EDUCATION FOR SOCIETAL DEVELOPMENT-(PANEL A)
Chairperson	Dr. Justus Muuasya
Rapporteur	Ms Ruth Kiboi

1. **Zigama, J. C¹. & Mutuku, D. M².** (¹Kabarak University, Kenya; ²Kirinyaga University, Kenya). Smart Universities and Digital Ecosystems in Sub-Saharan Africa: Building Resilient Higher Education Systems for the Fourth Industrial Revolution.
2. **Abdi, A. I.** (Garissa University, Kenya). Syllabus Coverage, Academic Integrity, and Examination Malpractices in Secondary Schools of Garissa County, Kenya.
3. **Owino, W. O¹. & Kimaru, G. W².** (¹KCA University, Kenya; ²Kabete National Polytechnic, Kenya). Extracurricular Activity Participation and School Belonging Among Secondary School Students in Kiambu County, Kenya.
4. **Nderitu, N.** (Kirinyaga University, Kenya). Influence of Cost-Benefit Analysis of Digital Investments on Students' Completion Rates in Public Universities in Kenya.

5. **Chemwei, B.** (Kirinyaga University, Kenya). University Lecturers' Readiness to Implement Modularized CBET Curriculum in Kenyan Higher Education Institutions.

SUB-THEME	EDUCATION FOR SOCIETAL DEVELOPMENT- (PANEL B)
Chairperson	Dr. Violet Barasa
Rapporteur	Ms. Collins Musyoka

1. **Ojwang, C. W.** (Kirinyaga University, Kenya). Graduate Students' Lived Experiences and Perceptions of Using Weblogs for Reflective Learning.
2. **Kerubo, J.** (Kirinyaga University, Kenya). Research Funding in Africa: Navigating Limited Resources and Building Partnerships.
3. **Karibe, K. D., Muchangi, D. & Maina, M.** (Kirinyaga University, Kenya). The Influence of Competency-Based Education on Teacher Professional Development in Kirinyaga County, Kenya.
4. **Muusya, J. K.** (Chuo Kikuu cha Kirinyaga, Kenya). Fasihi Kama Mikakati wa Kukuza Maadili Miongoni Mwa Wanafunzi Katika Mtaala wa Umilisi.
5. **Muriuki, J.N.** (University of Nairobi, Kenya). Influence of Examination Venue on Examination Malpractices among Bachelor of Education Students in Kenya.

SUB-THEME	INFORMATION AND KNOWLEDGE MANAGEMENT
Chairperson	Dr. Stephen Mageto
Rapporteur	Mr. Urbanus Ndambuki

1. **Ubaga, E. M., & Kimote, Z. K.** (Daystar University, Kenya). Access to Climate Information and Its Role in Building Climate-Resilient Communities in Kitui County, Kenya.
2. **Munyao, V. W^{1.}, Ndung'u, H^{1.}, Wasike, J^{1.} & Tsinale, H^{2.}** (¹Kirinyaga University, Kenya; ²Karatina University, Kenya). Semantic Web and Linked Data Technologies for Next-Generation Library Knowledge Management.

3. **Karambu, L. K¹, Gichohi, P. M². & Tsenga, S. M.³.** (¹Laikipia County Library, Nanyuki, Kenya; ²University of Eldoret, Kenya; ³Kenya Methodist University, Kenya). An Assessment of Librarian–Teacher Collaboration in the Implementation of Competency-Based Education in Primary Schools in Laikipia East Constituency, Kenya.
4. **Otuoma, P., & Njogu, E. W.** (Karatina University, Kenya;). The “Publish or Perish” Trap: Factors Influencing Postgraduate Students’ Engagement With Predatory Journals.
5. **Kaburu, L & Gitonga, F.** (Kirinyaga University, Kenya). Artificial Intelligence as a Catalyst for Digital Inclusion and Knowledge Access in Kenya: Reimagining the Kenya National Library Service.

MID MORNING SESSION

11.00PM - 1.00PM

PARALLEL SESSIONS/ PLENARY

SUB-THEME	ENGINEERING AND TECHNOLOGY
Chairperson	Dr. Lydia Kinuthia
Rapporteur	Mr. Julius Wanjohi

1. **Ndegwa, I., & Mwai, M.** (Kirinyaga University , Kenya). Evaluating the Impact of a Robotic Rehabilitation Hand Glove on Fine Motor Skill Recovery Using EMG-Based Monitoring.
2. **Wainaina, P., Nyakundi, A., & Kiwiri, F.** (Kirinyaga University, Kenya). Assessment and Integration of Renewable Energy Systems (RES) in Sustainable Energy Systems.
3. **Bosire, R. N.; & Chepkoech, J.** (Jomo Kenyatta University of Agriculture and Technology, Kenya). Institutional and Professional Oversight Gaps in the Prevention of Building Collapses in Kenya: Evidence from a Mixed-Methods Analysis.

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

1. **Okeyo, W¹., Dimy, D²., Johanns, P²., Njuguna, A³., Maingi, D⁴., Muathe, S⁵., Kosimbei, G⁵., Mwikya, J⁶., Mwangi, E³., Nambiri, J⁴., Muindi, B³. & Ephantus, K.⁴** (¹Management University of Africa, Kenya; ²The University of Iowa, USA; ³Zetech University, Kenya; ⁴Catholic University of Eastern Africa ⁵Kenyatta University, Kenya; ⁶Kirinyaga University, Kenya). The Nexus Between Artificial Intelligence and Entrepreneurship Education: A Comparative Analysis of the University of Iowa (USA) and Selected Kenyan Universities.
2. **Karani, H.** (Kirinyaga University, Kenya). Artificial Intelligence in Cybersecurity: Assessing Kenya’s Preparedness for AI-Driven Cyber Defense.

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

1. **Mutua, E. M.** (Kabarak University, Kenya). Complementary Feeding Practices and Nutritional Status of Children Aged 6–23 Months in Mumoni Ward, Kitui County, Kenya
2. **Njeru, K. N., Mburu, S. & Nderu, D.** (Kirinyaga University, Kenya). Gaps in Paediatric Tuberculosis Case Detection and Association With Timely Treatment at Kerugoya County Referral Hospital, Kirinyaga County, Kenya.
3. **Wairimu, B. M¹., Mwangi, E. M². & Mutwiri, T³.** (^{1,3}Kenya Methodist University, ²The Aga Khan University, Kenya). Scoping Review: Patient Rights and Caregiver Engagement in Paediatric Follow-Up Care in Kenya.

SUB-THEME	BUSINESS AND ECONOMIC TRANSFORMATION (PANEL A)
Chairperson	Dr. Robert Gitau
Rapporteur	Ms. Winnie Wacera

1. **Thuku, P.** (Karatina University, Kenya). Social Inclusion as a Predictor of Quality of Life among Persons Recovering from Substance Use Disorder in Central Kenya.
2. **Mathenge, G., & Kendagor, R.** (Karatina University, Kenya). Incorporation of Gender, Equity, and Inclusion in Private Organizations: A Study of Small and Medium Enterprises in Nyeri County, Kenya.
3. **Mwirigi, D.** (Hungarian University of Agriculture and Life Sciences, Hungary). Institutional Typologies and Governance Structures in Informal Lending Groups: Evidence from Rural Kenya.
4. **Muchiri, M. K¹, Erdei-Gally, S². & Fekete-Farkas, M².** (¹Kirinyaga University, Kenya; ²Hungarian University of Agriculture and Life Sciences, Hungary). Bank Lending Activities, Environmental Taxes, and Climate Outcomes: Evidence from Cross-Country Panel Data.
5. **Gichobi, T. N. & Kungu, J. N.** (Maasai Mara University, Kenya). Gender, Land, And Power: Historical Land Use Patterns In The Mwea Plains Of Kirinyaga County, Kenya (Pre-Colonial Period To 1963).

SUB- THEME	BUSINESS AND ECONOMIC TRANSFORMATION (PANEL B)
Chairperson	Dr. Agnes Mutiso
Rapporteur	Mr. Dennis Kanyingi

1. **Maina, J.** (Kirinyaga University, Kenya). Assessing the Effect of Credit Risk Identification on Loan Performance in Credit-Only Microfinance Institutions in Central Kenya.
2. **Mbiriri, M., Aliata, V. & Musau, J.** (Mama Ngina University College, Kenya). Employee Resilience and Well-Being in the Era of Digital Transformation.
3. **Odunga, P. O.** (Kirinyaga University, Kenya). Tourism Investment in Rwanda.

4. **Kinini, D.M¹, Ocharo, K.N², Kariuki, P.W³. & Maket, I.J⁴** . (¹University of Embu, ²KCA University, Kenya). Income Diversification, Digital Transformation, and Bank Liquidity Creation: Evidence from Kenyan Commercial Banks.

SUB-THEME	EDUCATION FOR SOCIETAL DEVELOPMENT- (PANEL A)
Chairperson	Dr. Bernard Chemwei
Rapporteur	Ms Millycent Machwenu

1. **Kachi, J. W.** (University of Eldoret, Kenya). Influence of Digital Simulations and Virtual Laboratories on Conceptual Understanding, Engagement, and Achievement in Secondary School Biology in Kakamega County, Kenya.
2. **Munyao, D. M¹. & Mutei, V. M.²** (¹Kirinyaga University, Kenya; ²University of Eldoret, Kenya). Digital Rebirth of Oral Traditions: Kamba Popular Music and Cinematic Adaptation in Kenya’s ICT Revolution.
3. **Chemwei, B.** (Kirinyaga University, Kenya). University-Industry Linkages as a Structural Catalyst for Competency-Based Curriculum Reform in Kenyan Higher Education.
4. **Musyoka, E.** (Kirinyaga University, Kenya). A Study on the Lexical Translation Problems in the Kikamba Bible.

SUB-THEME	EDUCATION FOR SOCIETAL DEVELOPMENT- PANEL B)
Chairperson	Dr. Daniel Lagat
Rapporteur	Ms Nancy Gacheri

1. **Cherui, R. & Waiyaki, W.** (Daystar University, Kenya). Prevalence and Correlates of Post-Traumatic Stress Disorder Among Teachers in Bandit-Prone Areas of Baringo County, Kenya.
2. **Mutuku, D. M. & Ntalala, S.** (Kirinyaga University, Kenya). Literature as a Shaper of Contemporary Kenyan Political Discourses: A Close Study of Gen Z’s Literary Language.

3. **Barasa, V. N.** (Kirinyaga University, Kenya). Interrogating Equity, Equality and Social Inclusion in Competence-Based Assessment in Kenya.
4. **Muoki, J.; Kinuthia, L.** (¹Egerton University, ²Kirinyaga University, Kenya). Inclusive Innovation for Gender Equity.

SUB-THEME	INFORMATION AND KNOWLEDGE MANAGEMENT
Chairperson	Dr. Victor Mageto
Rapporteur	Ms. Francis Kamau

1. **Maina, S¹., Masinde, J². & Mwikya, J¹.** (¹Kirinyaga University, Kenya; ²University of Embu, Kenya). Co-Designing Ergonomic Information Environments for Students with Physical Disabilities: Evidence from Kenyan Universities.
2. **Esonga, S. K. & Ngaira, M. I.** (Kirinyaga University, Kenya). Artificial intelligence-driven digital transformation: A Conceptual Framework for Industrial Resilience and Sustainable Development.
3. **Tsenga, S. M.** (Kenya Methodist University, Kenya). Assessment of Institutional Culture in Promoting Collaborative Research Between Librarians and Information Science Faculty at Universities in Meru County, Kenya.
4. **Kaburu, L. K.** (Kirinyaga University, Kenya). From Paper to Platform: Evaluating the Effect of Digitization Gaps on Records Accessibility and Institutional Efficiency in Laikipia County Referral Hospitals.

AFTERNOON SESSION

2:00 PM -3.30 PM

PARALLEL SESSIONS/ PLENARY

SUB-THEME	HEALTH AND WELLNESS
Chairperson	Dr. Immaculate Marwa
Rapporteur	Mr. Brian Murigi

1. **Wairimu, B. M¹., Kimatu, J. N²., Njoroge, W¹. & Wangai, L. N¹.** (¹Kirinyaga University; ²South Eastern Kenya University, Kenya) Scoping Review: Bridging the Gap in Adherence to Comprehensive Newborn Care Protocols for Preterm Infants in Kenya.
2. **Mbisi, A. M., Gitonga, L. & Gichobi, B.** (Chuka University, Kenya). Effect of Diabetes Foot Care Education on Self-Efficacy among Patients with Diabetes Mellitus Attending Embu and Kerugoya Level Five Hospitals, Kenya.

SUB-THEME	BUSINESS AND ECONOMIC TRANSFORMATION (PANEL A)
Chairperson	Dr. Evelyne Maina
Rapporteur	Mr. Simon Gacheru

1. **Munene, M.** (Kabarak University, Kenya). Influencing the Plate: Media Narratives and Global Food System Sustainability.
2. **Wafula, I.** (University of Embu, Kenya). A Comparative Analysis of the Vasicek and Cox–Ingersoll–Ross Interest Rate Models in Insurance.
3. **Njue, N. G. & Kinyua, J. M.** (University of Embu, Kenya). Influence of Structural Constraints on Budget Utilization in Government Entrepreneurial Programmes in Kenya.
4. **Wanjohi, M.W.** (Kirinyaga University, Kenya). A Comparative Study of Garch Models and the Nadaraya–Watson Kernel Regression Estimator in Modelling the Volatility of the USD/KES Exchange Rate.

5. **Maina, J., Muigai, G. & Waita, G.** (Kirinyaga University, Kenya). Moderating Effect of Government Regulations on the Relationship Between Credit Risk Management and Loan Performance in Credit-Only Microfinance Institutions.

SUB- THEME	BUSINESS AND ECONOMIC TRANSFORMATION (PANEL B)	
Chairperson	Dr. Mark Waita	
Rapporteur	Ms. Grace Kimani	

1. **Mugambi, J. M.** (Chuka University, Kenya). The Nexus Between Economic Activities in Buffer Zones and Forest Cover Change: A Case of Endau Forest, Kenya.
2. **Kangethe, K. W.** (Open University of Kenya). An Early Evaluation of Behavioral Change Resulting from an Emotional Intelligence Training Intervention at South Eastern Kenya University.
3. **Odhiambo, H. H.** (Masinde Muliro University of Science and Technology, Kenya). Digital Transport Management Systems and Performance of Agro-Processing Firms in Uasin Gishu County, Kenya.
4. **Maingi, W.J.** (Kabarak University, Kenya). Digital Innovation and Gender Inclusion: Pathways to Global Sustainability and Resilience.

SUB-THEME	EDUCATION FOR SOCIETAL DEVELOPMENT
Chairperson	Dr. Nene Nderitu
Rapporteur	Ms. Ndirangu Faith

1. **Muiru, A.** (Kirinyaga University, Kenya). Personality and Psychopathology on Academic Achievement of University Students in Kenya.
2. **Nyamundundu, A. V¹. & Biningu, H².** (¹TTC Gacuba II, ²TTC Zaza, Rwanda). Educational Technology is Not a Luxury in The 21st Century, it is a Necessity.
3. **Kerubo, J.** (Kirinyaga University, Kenya). The Effect of the Use of ChatGPT On Teaching and Learning in Universities in Kenya.

4. **Barasa, V. N. & Munyao, D.** (Kirinyaga University, Kenya). Women’s Quest for Equity And Social Inclusion in the Invisible Weevil.
5. **Muriuki, J.N.** (University of Nairobi, Kenya). Challenges Facing the Implementation of Competency-Based Education in Senior Secondary Schools in Nakuru County, Kenya.

SUB-THEME	INFORMATION AND KNOWLEDGE MANAGEMENT
Chairperson	Dr. Gilbert Langat
Rapporteur	Mr. Bonface Kamau

1. **Guchacha, J. T¹., Mulati, N. N². & Tarus, V. T³.** (¹Mama Ngina University College, Kenya; ²Kibabii University, Kenya; ³Kirinyaga University, Kenya). Digital Transformation Strategies for Sustainability of Information Science Consultancy Firms: A Systematic Literature Review.
2. **Kaburu, L. K. & Makori, S.** (Kirinyaga University, Kenya). Artificial Intelligence Integration at the Kenya School of TVET: A Human-Centered Framework for Inclusive Skills Development.
3. **Tarus, V. & Mauti, N.** (Kirinyaga University, Kenya). Impact of AI in Libraries and Management Practices on Information Resources and Service Quality.
4. **Kimote, Z.K., Wasike, J., Mageto, V. & Ubagu, E.** (Kirinyaga University, Kenya).The Future of Open Science: Enhancing Transparency, Accessibility, and Collaboration in Global Research.
5. **Matasio, J.F., Wasike, J.M., & Mokaya, V.** (Kirinyaga University, Kenya). Knowledge Sharing Mechanisms Driving Innovative Health Insurance Services in Selected Kenyan Regions.

END OF THE CONFERENCE, 2026

ABSTRACTS

SUB THEME : ENGINEERING AND TECHNOLOGY

UTILIZATION OF ANTHROPOMETRIC DATA IN ENGINEERING SIZE CHARTS FOR KENYAN PREGNANT WOMEN

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Abstract

Production of well-fitting maternity wear is contingent upon accurate anthropometric data. However, empirical evidence on population-specific sizing systems for Kenyan pregnant women remains limited. Physiological changes during pregnancy vary significantly across trimesters, regions, and ethnic groups, rendering generalized or imported sizing standards inadequate. This study focused on developing trimester-specific maternity size charts based on systematically collected local anthropometric data to enhance garment fit, pattern accuracy, and production efficiency. A longitudinal research design was employed in Nairobi County, involving 600 pregnant women recruited from public health facilities across eight constituencies. Standardized anthropometric measurements – including weight, bust, waist, hip, and maximum abdominal girth – were collected at different stages of pregnancy. Statistical analyses revealed significant inter-individual and trimester-based variations, confirming the limitations of conventional sizing systems. Based on the analyzed dataset, trimester-specific size charts were developed and applied in prototype garment construction. Structured fitting trials demonstrated high fit satisfaction across diverse body categories, validating reliability and applicability of the proposed sizing framework. The study underscores the value of integrating systematic body measurement, quantitative analysis, and garment engineering in developing evidence-based maternity apparel. It was concluded that locally generated anthropometric data provides a robust foundation for context-responsive maternity wear, improving user comfort, reducing material waste, and enhancing sustainability and competitiveness in the apparel sector.

Keywords: Anthropometric data; Maternity wear; Size charts; Kenyan pregnant women; Pregnancy apparel.

EFFECT OF DESIGN PROCESS ON USABILITY, FUNCTIONALITY, AND COMFORT IN ADAPTIVE CLOTHING FOR PERSONS WITH MOBILITY CHALLENGES IN NYERI COUNTY, KENYA

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Abstract

Globally, approximately 15% of the population lives with disabilities, with higher prevalence in developing regions due to socioeconomic and healthcare disparities. In Kenya, mobility impairments constitute a significant proportion of disabilities, often limiting independence, comfort, and dignity in daily activities such as dressing. Adaptive clothing—garments designed to accommodate functional and ergonomic needs—plays a critical role in enhancing autonomy and well-being for persons with mobility challenges. This study examined the influence of design process on usability, functionality, and comfort in adaptive clothing for persons with mobility impairments in Nyeri County, Kenya. Anchored in Universal Design Theory and Human-Centered Design principles, a convergent parallel mixed-methods approach was adopted. A total of 100 participants were selected using purposive and stratified sampling techniques. Data was collected using questionnaires (n = 100), in-depth interviews (n = 12), and focus group discussions (n = 4). Quantitative data was analysed using descriptive statistics, Pearson correlation, and regression analysis, while qualitative data was analysed thematically. Results showed that comfort, functionality, ease of dressing, affordability, aesthetics, and compatibility with assistive devices significantly influenced adaptive clothing selection. The design process demonstrated strong positive relationships with usability ($r = .79$), functionality ($r = .74$), and comfort ($r = .77$), explaining 67% of the variance in garment effectiveness. Participatory design practices—including iterative feedback, prototype testing, and ergonomic refinement—were significantly enhanced garment performance and user satisfaction. The study provides empirical evidence to inform designers, healthcare practitioners, and policymakers on the development of inclusive, user-centered adaptive clothing that promotes independence and quality of life.

Keywords: Adaptive clothing; Design process; Usability; Functionality; Mobility impairment; Inclusive design.

FACTORS INFLUENCING SUSTAINABLE SMART TEXTILES INTEGRATING BIO-BASED NANOFIBERS AND WEARABLE SENSOR TECHNOLOGIES FOR CIRCULAR FASHION SYSTEMS

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Abstract

Convergence of sustainability imperatives and digital innovation is transforming the global fashion and textile industry amid rising environmental concerns, regulatory demands, and evolving consumer expectations. This study investigates the key factors influencing the development and adoption of sustainable smart textiles that integrate bio-based nanofibers with wearable sensor technologies within circular fashion systems. Employing a mixed-methods research design, the study combines material performance evaluation, lifecycle assessment (LCA), stakeholder surveys, and case-based analysis to examine material selection, technological compatibility, lifecycle performance, economic feasibility, consumer acceptance, and policy frameworks. Results demonstrate that bio-based nanofibers derived from renewable resources can enhance biodegradability, mechanical integrity, and sensor integration when supported by scalable manufacturing processes and eco-compatible conductive materials. However, challenges related to durability, recyclability, energy efficiency, and end-of-life recovery remain significant barriers to large-scale adoption. Consumer perceptions of comfort, functionality, and environmental value were found to be critical determinants of market uptake. A conceptual framework linking material innovation, digital functionality, and circular design strategies – such as modular electronics, repairability, and material recovery pathways is desirable. By aligning smart textile innovation with circular economy principles. This study offers strategic insights for advancing environmentally responsible, high-performance smart textile systems.

Keywords: Sustainable smart textiles; Bio-based nanofibers; Wearable sensors; Circular fashion; End-of-life recovery; Consumer acceptance.

FORENSIC STRUCTURAL AUDITS AND REMEDIAL INTERVENTIONS FOR BUILDING FAILURE RESOLUTION: COMPARATIVE EVIDENCE FROM TWO REINFORCED CONCRETE STRUCTURES IN KENYA

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Abstract

Building failures present critical safety, economic, and governance challenges in rapidly urbanising regions, particularly within developing economies where construction oversight systems are often inconsistent. Although design deficiencies, construction errors, and inadequate geotechnical investigation are frequently cited as causal factors, empirically grounded comparative forensic evidence remains limited in Sub-Saharan Africa. This study presents a convergent mixed-methods forensic structural investigation of two reinforced concrete buildings subjected to regulatory suspension in Kenya: a completed multi-storey commercial residential building exhibiting extensive cracking, and a partially constructed institutional classroom block experiencing excessive slab deflection. Quantitative data was obtained using calibrated non-destructive concrete strength testing, geotechnical investigations, reinforcement verification, and finite-element structural simulations, complemented by qualitative visual inspections and construction documentation review. The first case experienced serviceability failure primarily due to soil–foundation incompatibility, while the second case exhibited compounded serviceability and ultimate limit state failures resulting from under-strength concrete, inadequate reinforcement, and incomplete detailing. Analytically verified remedial interventions – including foundation underpinning and independent load-path augmentation – were proposed and validated through simulation. It was observed that building failure risk extends beyond material quality to include geotechnical verification, execution governance, and professional supervision. These findings provide actionable guidance for forensic audits, remedial engineering decision-making and regulatory reform in developing construction contexts.

Keywords: Forensic structural audit; Reinforced concrete failure; Soil–structure interaction; Non-destructive testing; Structural remediation; Construction governance.

**TRIBO-PHYSICAL AND THERMAL PROPERTIES OF HYBRID POLYMER COMPOSITES:
INFLUENCE OF SISAL AND COCONUT SHELL NANOPARTICLES****Bichang'a, D.O.¹, Oladele, I.O.². & Mwasiagi, J.³**¹Kirinyaga University, KENYA²Federal University of Technology, NIGERIA³Moi University, KENYA**Correspondence:** dbichang'a@kyu.ac.ke***Abstract***

The global pursuit of sustainable materials has accelerated the development of eco-friendly polymer composites. This study investigates the influence of sisal fibre and coconut shell-derived nanoparticles on the tribo-physical and thermal properties of hybrid polymer composites. Alkali-treated sisal fibres (15–20 wt.%) and coconut shell nanoparticles (1–5 wt.%) were embedded in a polypropylene matrix and processed using compression moulding at 180°C under 5 MPa for 5 minutes. The composites were systematically characterized for hardness, wear resistance, water absorption, and thermal stability. Results revealed that incorporation of 3 wt.% coconut shell nanoparticles maximized hardness (68.8 HS) and significantly enhanced abrasive wear resistance. Water absorption increased proportionally with nanofiller content, while thermal analysis indicated improved heat stability of hybrid composites. These findings demonstrate that coconut shell-derived nanofillers effectively enhance composite performance, presenting a sustainable alternative for diverse engineering and industrial applications.

Keywords: Sisal fiber; Coconut shell; Agricultural waste; Polypropylene composite; Hardness; Wear behavior; Thermal properties; Water absorption.

CONSTRUCTION INDUSTRY OUTPUT TREND IN KENYA: 1977-2024

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Abstract

Construction industry is a cornerstone of economic growth, yet longitudinal analyses of its output in Kenya remain limited. This study examines the sector's output trends from 1977 to 2024 using data from the Kenya National Bureau of Statistics (KNBS), employing graphical visualization and exponential trend analysis. Results show a persistent decline in industry output over the 48-year period, despite rising demand for construction and government interventions, such as affordable housing programs. The study underscores the necessity for evidence-based policies to reinvigorate the sector, aligning growth trajectories with national infrastructure expansion and economic development objectives.

Keywords: Construction industry output; Trend analysis; Constructed facilities; Demand; Policy recommendations.

EVALUATING THE IMPACT OF A ROBOTIC REHABILITATION HAND GLOVE ON FINE MOTOR SKILL RECOVERY USING EMG-BASED MONITORING

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Abstract

Hand impairments resulting from stroke, nerve injuries, or musculoskeletal disorders significantly limit fine motor function and independence. Conventional rehabilitation approaches are labor-intensive and often inaccessible in low-resource settings. This study presents the design and evaluation of a cost-effective robotic rehabilitation hand glove that facilitates assisted finger movement while monitoring muscle activity through surface electromyography (EMG). The system employs potentiometer-based position control actuating MG90S servo motors for finger flexion and extension, with real-time EMG visualized via LabVIEW. Controlled trials assessed range of motion, response time, and movement consistency pre- and post-intervention. Results indicate enhanced finger mobility, improved movement precision, and increased muscle activation over repeated sessions. The device offers stable actuation, responsive control, and reliable quantitative monitoring, highlighting the potential of low-cost, digitally monitored robotic devices to improve rehabilitation outcomes in resource-constrained environments.

Keywords: Robotic rehabilitation; Hand glove; Fine motor skills; EMG monitoring; Assistive technology; Digital health.

ASSESSMENT AND INTEGRATION OF RENEWABLE ENERGY SYSTEMS (RES) IN SUSTAINABLE ENERGY SYSTEMS

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Abstract

The global urgency to mitigate climate change and expand reliable energy access necessitates integration of sustainable energy solutions. This study assesses the status and integration of Renewable Energy Systems (RES) within Kenya's energy infrastructure, focusing on compliance with national renewable energy policies, decarbonization objectives, and the energy needs of local populations. Case studies were conducted on existing wind, hydro, solar, geothermal, and biofuel systems, with data obtained from secondary sources and analyzed using statistical techniques. Results provide insights into Kenya's alignment with Nationally Determined Contributions under the Paris Agreement, highlighting gaps in efficiency, reliability, and policy compliance. The study offers evidence-based recommendations to enhance sustainable energy deployment, improve energy access, and support national decarbonization targets.

Keywords: Renewable energy systems; Sustainable energy; Energy policy; decarbonization; Solar energy; Wind energy; Geothermal energy; Energy access; Biofuels.

INSTITUTIONAL AND PROFESSIONAL OVERSIGHT GAPS IN THE PREVENTION OF BUILDING COLLAPSES IN KENYA: EVIDENCE FROM A MIXED-METHODS ANALYSIS

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Abstract

The increasing incidence of building and infrastructure collapses in Kenya has raised significant concerns regarding the effectiveness of institutional and professional regulatory frameworks within the construction sector. This study investigates the legal, institutional, and professional oversight gaps contributing to structural failures, situating the analysis within the broader context of rapid urbanization and infrastructure expansion under Kenya Vision 2030. A mixed-methods research design was employed, integrating quantitative data from structured surveys of construction stakeholders with qualitative insights derived from key informant interviews involving engineers, technologists, regulatory authorities, and county planning officials. The study further incorporates document analysis of existing regulatory frameworks and enforcement mechanisms. Findings reveal systemic weaknesses characterized by inadequate enforcement of construction regulations, limited capacity and staffing of qualified professionals within planning and inspection authorities, and fragmented institutional coordination. Additional contributing factors include the widespread use of substandard construction materials, poor workmanship, non-compliance with approved designs, and deficiencies in site supervision. The study also identifies the compounding effects of natural hazards, such as land subsidence, which exacerbate structural vulnerabilities in poorly regulated environments. The study concludes that current regulatory and professional oversight mechanisms are insufficient to ensure structural integrity and public safety. It recommends strengthening legislative frameworks, enhancing enforcement capacity, institutionalizing rigorous quality assurance systems, and promoting safety-centered engineering design approaches, including collapse-resistant and collapse-isolation strategies. Furthermore, improving governance through transparent procurement processes and continuous professional development is essential. Addressing these systemic gaps is critical for safeguarding human life, protecting economic investments, and fostering resilient and sustainable infrastructure development in Kenya and comparable emerging economies.

Keywords: Building collapse, Construction safety, Engineering regulation, Professional oversight, Regulatory enforcement, Infrastructure resilience.

SUB- THEME : ICT AND DIGITAL TRANSFORMATION

A COMPARATIVE ANALYSIS OF LIGHTWEIGHT DEEP LEARNING MODELS FOR SPECTRAL-BASED DETECTION OF CROP DISEASES

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Abstract

Huanglongbing (HLB) remains one of the most destructive citrus diseases globally, with effective control highly dependent on early detection during pre-symptomatic stages when visual inspection and laboratory diagnostics are impractical for large-scale deployment. Spectral imaging techniques offer promise for early disease detection but generate high-dimensional data that constrain real-time, field-based applications. This study presents a systematic literature review and comparative evaluation of lightweight deep learning models for spectral-based crop disease detection, with specific emphasis on HLB. Following PRISMA guidelines, 100 peer-reviewed studies published between 2018 and 2025 were screened, with 29 high-quality studies selected for detailed analysis. Model architectures, efficiency-accuracy trade-offs, attention mechanisms, and deployment feasibility were critically examined. Complementing the review, representative lightweight models were empirically evaluated using a standardized citrus spectral dataset. It was observed that while lightweight architectures achieve notable computational efficiency, most exhibit limitations in preserving fine-grained spectral-spatial features essential for robust pre-symptomatic detection. The study highlights key architectural gaps and outlines directions for developing enhanced lightweight models suitable for scalable agricultural disease monitoring.

Keywords: Crop disease detection; Lightweight deep learning; Spectral imaging; Precision agriculture; Early diagnosis.

A SYSTEMATIC LITERATURE REVIEW ON PHISHING EMAIL ATTACK DETECTION USING CNN AND BI-LSTM TECHNIQUES

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Abstract

Phishing attacks have evolved into sophisticated, multilingual, and context-aware cyber threats that challenge traditional detection approaches. Existing machine learning techniques rely heavily on handcrafted features, limiting adaptability and real-time detection performance. This study conducts a systematic literature review of phishing email detection methods based on Convolutional Neural Networks (CNN) and Bidirectional Long Short-Term Memory (Bi-LSTM) models. Thirty-six peer-reviewed studies were initially identified, with 28 meeting inclusion criteria for in-depth analysis. The review evaluates algorithmic effectiveness, feature representation strategies, and hybrid architectures across diverse phishing scenarios. Results indicate that hybrid CNN-Bi-LSTM models consistently outperform standalone classifiers by effectively capturing both spatial and sequential linguistic patterns in phishing content. The study demonstrates that deep learning-based approaches significantly enhance detection accuracy and adaptability, making them suitable for real-world deployment in email and messaging platforms. The review contributes consolidated evidence to guide development of robust, context-aware phishing detection systems.

Keywords: Phishing detection; Deep learning; Cybersecurity; Neural networks; Email security.

PHISHING VULNERABILITIES AND AI-BASED DEFENSE IN DIGITAL MICROFINANCE INSTITUTIONS: A SYSTEMATIC REVIEW

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Abstract

Digitalization of microfinance institutions (MFIs) has accelerated financial inclusion while simultaneously increasing exposure to cyber threats, particularly phishing attacks. This systematic review synthesizes evidence on cybersecurity vulnerabilities in digital MFIs and evaluates artificial intelligence-based mitigation strategies, with a focus on gated recurrent unit (GRU) neural networks. Guided by socio-technical systems theory and the PRISMA 2020 framework, 32 empirical studies published between 2012 and 2025 were reviewed and assessed using the Mixed Methods Appraisal Tool. It was observed that organizational weaknesses, limited staff awareness, and outdated infrastructure account for a significant proportion of cybersecurity incidents. GRU-based models demonstrated high phishing detection accuracy with lower computational complexity compared to LSTM and Transformer architectures, making them suitable for resource-constrained environments. This study proposes an AI deployment roadmap integrating ethical governance, explainable AI, and institutional capacity building. Results of this study contribute to strengthening digital resilience and sustainable innovation in microfinance ecosystems.

Keywords: Cybersecurity; Phishing detection; Artificial intelligence; Financial inclusion; Digital resilience.

GRADIENT BOOSTING-NEURAL NETWORK HYBRIDS FOR EARLY DETECTION OF DROPOUT RISK IN ONLINE LEARNING ENVIRONMENTS

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Abstract

Learner dropout remains a critical challenge in online education, undermining student success and institutional efficiency. This study develops and evaluates an ensemble machine learning model integrating gradient boosting and neural network architectures for early prediction of learner attrition in Kenyan online learning environments. Secondary data from learning management systems of six universities were analysed, incorporating demographic, academic, and engagement variables. Model performance was evaluated using accuracy, precision, recall, F1-score, and AUC-ROC metrics. The proposed ensemble achieved an accuracy of 97.2%, outperforming individual classifiers. Results demonstrate the model's strong predictive capability and potential to support early intervention strategies. The study provides evidence-based insights for institutions and policymakers to enhance learner retention through data-driven decision-making.

Keywords: Learning analytics; Dropout prediction; Machine learning; Online education; Student retention.

HYBRID DEEP LEARNING WITH HONEYPOT INTEGRATION FOR ENHANCED CYBERSECURITY: A PROACTIVE DEFENSE FRAMEWORK

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Abstract

The increasing sophistication of cyber threats has exposed limitations in traditional intrusion detection systems, particularly in detecting zero-day attacks and reducing false positives. This study proposes and evaluates a proactive cybersecurity framework integrating hybrid deep learning models with honeypot technology. The framework combines Convolutional Neural Networks and Bidirectional Long Short-Term Memory networks to capture spatial and temporal attack patterns, while honeypots provide enriched real-time threat intelligence. Using the CICIDS2017 dataset, the model achieved a detection accuracy of 98.5%, outperforming conventional machine learning approaches. Honeypot integration significantly improved contextual threat analysis and reduced false alarm rates. The study demonstrates that hybrid deep learning-honeypot architectures offer a robust, scalable solution for proactive cyber defense and industry resilience.

Keywords: Cybersecurity; Intrusion detection; Deep learning; Honeypots; Digital resilience.

A SYSTEMATIC LITERATURE REVIEW OF DEOBFUSCATION FRAMEWORKS

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Abstract

Software obfuscation is extensively employed to protect intellectual property and evade detection, particularly within malicious software, thereby significantly complicating reverse engineering, malware analysis, and digital forensic investigations. Deobfuscation frameworks have consequently emerged as critical tools for recovering obscured program logic and enhancing software security. This study presents a systematic literature review of existing deobfuscation frameworks, with the objective of synthesizing prevailing techniques, evaluating their effectiveness, and identifying emerging methodological and technological trends. Guided by established systematic review protocols, peer-reviewed journal articles, conference proceedings, and authoritative technical reports on software deobfuscation and malware analysis were analyzed. The review categorizes deobfuscation approaches into static, dynamic, and hybrid analysis frameworks, examining their respective strengths, limitations, and application contexts. Particular emphasis is placed on recent advances integrating artificial intelligence, including machine learning, deep learning, multi-modal learning, and transformer-based architectures, to enhance automated deobfuscation. Results indicate that hybrid frameworks combining static and dynamic analysis consistently outperform single-mode approaches, especially when augmented with deep learning models capable of leveraging heterogeneous data such as syntax trees, execution traces, and control-flow graphs. Transformer architectures demonstrate superior capability in modeling complex code dependencies inherent in sophisticated obfuscation techniques. However, challenges related to computational overhead, scalability, and interpretability persist. It is concluded that deobfuscation frameworks are transitioning from conventional reverse engineering tools toward intelligent, AI-driven systems. Future research should focus on scalable, interpretable, and fully automated solutions capable of addressing evolving obfuscation strategies.

Keywords: Deobfuscation frameworks; Software security; Static analysis; Dynamic analysis; Hybrid analysis; Deep learning; Transformer architectures.

THE NEXUS BETWEEN ARTIFICIAL INTELLIGENCE AND ENTREPRENEURSHIP EDUCATION: A COMPARATIVE ANALYSIS OF THE UNIVERSITY OF IOWA (USA) AND SELECTED KENYAN UNIVERSITIES

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Abstract

Artificial Intelligence (AI) is increasingly transforming higher education through adaptive learning systems, intelligent content delivery, and data-driven instructional decision-making, with particular relevance for entrepreneurship education that emphasizes innovation, opportunity recognition, and venture creation. Despite these advances, AI adoption remains uneven across global higher education systems, with developing economies facing structural, technological, and capacity-related constraints that threaten graduate competitiveness. This study examines the nexus between AI integration and entrepreneurship education through a comparative analysis of the University of Iowa (USA) and selected Kenyan universities – Kenyatta University, Zetech University, Catholic University of Eastern Africa, and Kirinyaga University. Anchored in Constructivist Learning Theory and the Technology Acceptance Model (TAM), the study develops a conceptual framework in which AI integration influences entrepreneurial learning outcomes, mediated by faculty readiness, digital literacy, and institutional infrastructure. Employing a mixed-methods comparative case study design, quantitative data were collected from business students in Kenyan universities (N = 2,847; n = 351) using stratified proportionate random sampling, while faculty and administrators were purposively selected to provide contextual and policy-level insights. Data collection methods included structured questionnaires, semi-structured interviews, and document analysis, administered via secure digital platforms in compliance with ethical and data protection standards. Quantitative data was analyzed using descriptive and inferential statistics following reliability and validity testing, while qualitative data was subjected to thematic analysis using NVivo. The study aims to identify best practices, contextual challenges, and policy-relevant strategies for strengthening AI-supported entrepreneurship education and narrowing the digital divide between African and U.S. higher education ecosystems.

Keywords: Artificial intelligence; Entrepreneurship education; Comparative analysis; Higher education; AI integration; Technology Acceptance Model; Constructivist learning.

THE SHRINKING MIND: ARTIFICIAL INTELLIGENCE, CORTICAL THINNING, AND THE RE-ENGINEERING OF KENYA'S DIGITAL NATIVES

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Abstract

The rapid integration of Artificial Intelligence (AI) technologies into the daily lives of Kenyan youth represents a significant transformation in the digital landscape of the Global South. This review examines whether AI-driven digital environments are associated with altered neurodevelopmental patterns, particularly cortical thinning, among university-age digital natives in Kenya. Moving beyond a purely neurobiological perspective, the study synthesizes insights from neuroscience, educational theory, critical technology studies, and African digital humanities to develop a multidimensional analytical framework. The paper argues that the notion of a “shrinking mind” extends beyond metaphorical interpretations of fragmented attention and may represent measurable neural restructuring associated with algorithmic engagement, sleep disruption, and displacement of culturally grounded cognitive practices. The analysis reveals a critical paradox: thus, while AI offers transformative opportunities for learning, innovation, and knowledge access, its unregulated and excessive consumption may contribute to widening global cognitive inequalities and weakening the socio-cognitive foundations required for critical thinking, creativity, and empathy. There is need for development of cognitive justice framework for Kenya’s emerging AI governance policies and establishment of a National Cognitive Development Observatory to safeguard the cognitive well-being of a generation navigating accelerated digital transformation.

Keywords: Artificial intelligence; Cognitive justice; Cortical thinning; Digital colonialism; Digital natives; Neuroplasticity.

ARTIFICIAL INTELLIGENCE IN CYBERSECURITY; ASSESSING KENYA'S PREPAREDNESS FOR AI-DRIVEN CYBER DEFENSE

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Abstract

Kenya has experienced rapid expansion in digital services, including mobile money platforms, e-government systems, online commerce, and cloud-based infrastructure. While this digital transformation has accelerated economic and social development, it has also increased the vulnerability of government institutions, financial systems, and private organizations to cyber threats. The growing sophistication and frequency of cyberattacks have heightened the need for advanced cybersecurity mechanisms capable of detecting, predicting, and responding to threats in real time. Artificial Intelligence (AI) has emerged as a promising technological solution due to its capabilities in automated threat detection, predictive analytics, and intelligent cyber defense. Despite global advancements in AI-driven cybersecurity, the level of preparedness for adopting such technologies in Kenya remains uncertain. This study assesses Kenya's readiness for AI-based cybersecurity using a desk-based research design grounded in secondary data from national ICT reports, cybersecurity strategy documents, and international cybersecurity assessment datasets. Descriptive and comparative analytical approaches were used to evaluate institutional capacity, policy frameworks, and technological infrastructure supporting AI adoption in cybersecurity. Results show that Kenya has established foundational institutional and policy frameworks, with monitoring systems reporting more than 860 million cyber threats in a single year and a Global Cybersecurity Index score of approximately 81, reflecting strong regional commitment. However, adoption of advanced AI-assisted cybersecurity solutions remains limited, particularly among public institutions, due to shortages of skilled cybersecurity professionals and insufficient technological infrastructure. Thus, although Kenya has made notable progress in cybersecurity governance, significant gaps remain in the practical deployment of AI-driven cyber defense systems. There is need for increased investment in AI-enabled cybersecurity infrastructure, development of specialized cybersecurity competencies, and strengthening of national digital policy frameworks to support effective implementation of AI-based cyber defense strategies.

Keywords: Artificial intelligence; Cybersecurity; AI-driven cyber defense; Digital security; Cyber threats; Kenya.

**ARTIFICIAL INTELLIGENCE, CYBER SECURITY, AND DATA SCIENCE IN PROPELLING
INDUSTRY RESILIENCY AND SUSTAINABILITY****Maingi, W.J.**

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Correspondence: johnmaingi126@gmail.com***Abstract***

The rapid advancement of information technologies, particularly artificial intelligence (AI), machine learning, and data science, is transforming industrial operations, decision-making, and competitive strategies. In an era of global uncertainty and increasing digital dependence, organizations are compelled to adopt data-driven innovations to enhance resilience and sustainability. However, the integration of AI and advanced data systems introduces cyber security vulnerabilities, ethical concerns, and governance challenges that may undermine sustainable development. This study examines the role of AI, cyber security, and data science in strengthening industry resilience and sustainability. Specifically, it evaluates the integration of AI-driven technologies in digital transformation strategies, assesses the effectiveness of cyber security frameworks in safeguarding digital innovation, and analyses the relationship between AI-enabled innovation and organizational resilience. A mixed-methods research design was adopted, combining structured surveys administered to IT managers and digital transformation specialists with in-depth interviews involving data scientists and cyber security experts. Quantitative data were analysed using statistical techniques, while qualitative data were subjected to thematic analysis. Findings indicate that organizations integrating AI, machine learning, and predictive analytics demonstrate improved operational efficiency, adaptability, and competitive advantage. However, the resilience benefits of digital innovation are significantly enhanced when supported by robust cyber security frameworks and ethical data governance systems. The study concludes that sustainable industry resilience in the digital era depends not only on technological adoption but also on secure, ethical, and well-governed digital ecosystems.

Keywords: Artificial intelligence; Cyber security; Data science; Digital transformation; Industry resilience; Sustainability.

SUB-THEMES: HEALTH AND WELLNESS

DEVELOPING A STRATEGIC MODEL TO ENHANCE UPTAKE AND EFFECTIVENESS OF CPD IN CLINICAL PRACTICE AMONG NURSES AND MIDWIVES IN KENYA

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Abstract

Maternal mortality remains a pressing global health challenge, with a current rate of 223 per 100,000 live births and postpartum haemorrhage as the leading cause of death. Sub-Saharan Africa bears a disproportionate burden, where a small fraction of the healthcare workforce manages a significant portion of disease cases. In Kenya, the maternal mortality rate exceeds the global average, highlighting an urgent need for competent nursing and midwifery care. Continuous Professional Development (CPD) is mandated by the Nursing Council of Kenya at 20 hours per year for all nurses and midwives; however, heavy clinical workloads, limited structured training, and poor adherence mechanisms hinder effective uptake. This study focused on developing a strategic model to enhance CPD uptake and clinical effectiveness among nurses and midwives in Kenyan institutions. A mixed-methods approach using a randomized clinical trial design was employed with a sample of 78 participants from a target population of 98. Quantitative data was collected using structured questionnaires and patograph case study completion, analyzed using SPSS version 26 to generate descriptive statistics and assess relationships between knowledge and CPD uptake (Pearson's chi-square, $p = 0.00$, 95% CI), while paired t-tests compared pre- and post-intervention means ($t = 1.000$). Qualitative data from interviews and observation checklists was analyzed thematically. There was persistent gaps in clinical competence, particularly in active management of the third stage of labor (17.9%) and patograph completion (mean = 1.7), despite access to BEmONC guidelines. There is need for a structured CPD uptake model that integrates tailored training, monitoring, and support mechanisms to strengthen competency and clinical practice outcomes for nurses and midwives in Kenya.

Keywords: Continuous professional development; Nurses and Midwives; Clinical competence; Strategic model; Maternal health; Kenya.

EFFECT OF DIABETES FOOT CARE EDUCATION ON SELF-EFFICACY AMONG PATIENTS WITH DIABETES MELLITUS ATTENDING EMBU AND KERUGOYA LEVEL FIVE HOSPITALS, KENYA**Mbisi, A. M¹, Gitonga, ².; &Gichobi, B².**¹Kirinyaga University, KENYA²Chuka University, KENYA**Correspondence:** annahmbisi@gmail.com***Abstract***

Diabetic foot complications remain a major cause of preventable disability, lower-limb amputations, and premature mortality among people living with diabetes, particularly in low- and middle-income countries. Effective prevention extends beyond clinical knowledge to the strengthening of patients' self-efficacy in sustaining protective foot-care behaviors. Guided by Bandura's Self-Efficacy Theory, this study examined the effect of structured diabetes foot-care education on self-efficacy among patients with diabetes mellitus attending Embu and Kerugoya Level Five Hospitals in Kenya. A quasi-experimental design was employed, enrolling 230 participants randomly assigned to intervention (n=115) and control (n=115) groups. The intervention group received monthly interactive diabetes foot-care education sessions over three months, reinforced through follow-up phone calls, while the control group continued with routine care. Self-efficacy was measured at baseline and post-intervention using the Diabetes Foot Care Self-Efficacy Scale, assessing magnitude, strength, and generality. At baseline, both groups demonstrated low to moderate self-efficacy levels. Post-intervention findings revealed statistically significant improvements in the intervention group across all domains: magnitude (2.85→4.23, $p<0.001$), strength (2.54→4.33, $p<0.001$), and generality (2.05→4.27, $p<0.001$), while changes in the control group were minimal. The study concludes that structured, theory-driven foot-care education substantially enhances patients' confidence and capacity to sustain preventive behaviors. Integrating structured education with community and digital follow-up strategies within routine diabetes care could significantly reduce diabetic foot complications in resource-constrained settings.

Keywords: Diabetes mellitus; Diabetic foot; Self-efficacy; Foot-care education; Chronic disease management.

COPING AFTER PERINATAL LOSS: A QUALITATIVE STUDY OF PSYCHOLOGICAL WELLBEING AMONG POSTPARTUM MOTHERS IN THARAKA-NITHI COUNTY, KENYA
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Abstract

Perinatal loss remains a profound public health and psychosocial challenge, disproportionately affecting women in low- and middle-income countries and contributing significantly to maternal psychological morbidity. This study explored post-loss coping mechanisms and their influence on psychological wellbeing among postpartum mothers following perinatal loss in Tharaka-Nithi County, Kenya. Guided by Kübler-Ross's Stages of Grief Theory, the study adopted a qualitative longitudinal design. A census sampling approach was used to recruit 53 postpartum mothers from participating health facilities. Individualized grief counseling was provided and data collected through in-depth interviews conducted six months after the loss. Thematic analysis revealed pervasive psychological effects including intense grief, guilt, emotional numbness, identity disruption, intrusive memories, and anxiety regarding subsequent pregnancies. Coping strategies ranged from spiritual and religious practices, journaling, therapy, and peer support to engagement in routine and memorial activities. Adaptive coping was strongly associated with environments that validated grief and provided safe spaces for emotional expression, whereas stigma, cultural silence, blame, and limited access to mental health services exacerbated distress and prolonged grief. Mothers who received individualized grief counseling demonstrated improved emotional processing and reduced psychological distress compared to those receiving routine care alone. The study underscores the importance of integrating culturally sensitive, compassionate, and confidential bereavement support within maternal health services to strengthen coping capacity and psychological recovery following perinatal loss.

Keywords: Perinatal loss; Grief counseling; Coping mechanisms; Psychological wellbeing; Postpartum mothers.

CAREGIVER SOCIODEMOGRAPHIC FACTORS ASSOCIATED WITH ADHERENCE TO ZINC TREATMENT OF CHILDHOOD DIARRHEA IN KIRINYAGA COUNTY, KENYA

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Abstract

Childhood diarrhea remains a leading cause of morbidity and mortality in low- and middle-income countries, despite the proven effectiveness of zinc supplementation in reducing disease severity and recurrence. This study examined caregiver sociodemographic factors influencing adherence to zinc treatment among children under five years of age in Kirinyaga County, Kenya, and assessed health-system barriers related to healthcare worker training on the Integrated Management of Neonatal and Childhood Illnesses (IMNCI) protocol. A mixed-methods cross-sectional design was employed, enrolling 230 caregivers of children with diarrhea and 25 healthcare workers involved in diarrhea management. Data was collected using structured Likert-scale questionnaires and follow-up assessments conducted two weeks post-hospital visit. Quantitative data was analyzed using descriptive statistics and regression analysis. There was low zinc adherence (20%), significantly associated with caregivers' age, education level, and occupation ($p < 0.05$). Sociodemographic factors accounted for 47.8% of the variation in zinc adherence, with caregiver education emerging as the strongest predictor ($\beta = 0.784$, $p < 0.001$). Additionally, 96% of healthcare workers reported no formal training on the IMNCI protocol. Inadequate caregiver knowledge and insufficient provider training substantially undermined optimal zinc utilization. Strengthening caregiver education, enhancing post-discharge follow-up, and institutionalizing IMNCI training are critical to improving childhood diarrhea outcomes and advancing progress toward Sustainable Development Goal 3.2 and Universal Health Coverage in Kenya.

Keywords: Childhood diarrhea; Zinc adherence; Sociodemographic factors; IMNCI; Child health.

KANGAROO MOTHER CARE: UNLOCKING CHALLENGES AND OPPORTUNITIES IN POST-DISCHARGE UTILIZATION IN KIRINYAGA COUNTY, KENYA

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Abstract

Kangaroo Mother Care (KMC) is a cost-effective, evidence-based intervention for reducing neonatal morbidity and mortality among preterm and low birth weight infants. Despite its proven benefits and endorsement by the World Health Organization, utilization remains suboptimal in many low- and middle-income countries, including Kenya. This study examined the determinants of KMC utilization among post-discharge mothers at Kerugoya County Referral Hospital in Kirinyaga County, Kenya, with particular emphasis on individual, socio-cultural, family, and health system factors. The study adopted a descriptive and analytical cross-sectional design employing a mixed-methods approach. Data was collected from 152 post-discharge mothers practicing KMC using structured questionnaires, key informant interviews, and focus group discussions. Quantitative data was analyzed using descriptive statistics, chi-square tests to determine associations, and linear regression analysis to examine the moderating effect of health system factors on KMC uptake. Qualitative data was thematically analyzed to contextualize quantitative findings. Only 11.8% of mothers practiced KMC for the recommended duration of eight or more hours per day. Demographic factors (maternal age, education level, and employment status) and family support factors (emotional and physical support, assistance with infant positioning) were significantly associated with KMC utilization ($p < 0.05$). Sociocultural barriers, including stigma, traditional beliefs, and cultural norms, significantly hindered sustained KMC practice. Health system factors – including post-discharge follow-up, provider support, and continuity of care – were found to moderate the relationship between these determinants and KMC utilization, amplifying positive influences in well-supported settings.

It was concluded that low KMC uptake in Kirinyaga County is driven by an interplay of demographic, socio-cultural, family, and health system factors. There is need for development of structured KMC follow-up protocols, integration of community- and facility-based monitoring systems, and establishment of peer support mechanisms to enhance sustained post-discharge KMC practice and improve neonatal outcomes.

Keywords: Kangaroo mother care; Neonatal health; Preterm infants; Post-discharge care; Health system factors; Kenya.

DETERMINANTS OF EARLY ANTENATAL CARE BOOKING AMONG PREGNANT WOMEN ATTENDING EMBU TEACHING AND REFERRAL HOSPITAL, KENYA: A CROSS-SECTIONAL SURVEY

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Abstract

Early initiation of antenatal care (ANC) is a cornerstone of positive maternal and fetal health outcomes. Despite the World Health Organization recommendations for the first ANC visit to occur within the first trimester, uptake remains suboptimal in many low- and middle-income settings. This study examined the determinants of early ANC booking among pregnant women attending Embu Teaching and Referral Hospital, Kenya. An institution-based descriptive cross-sectional design was employed, involving 87 pregnant women recruited between February and April 2023. Data was collected using researcher-administered semi-structured questionnaires and analyzed using SPSS version 28. Descriptive statistics summarized participant characteristics, while chi-square tests and multivariate logistic regression identified predictors of early ANC initiation at a 95% confidence interval. Only 35.0% of respondents initiated ANC within the recommended 12 weeks of gestation. Significant positive determinants of early ANC booking included maternal age 20–24 years (AOR = 5.25; 95% CI: 1.29–21.35), marital status (AOR = 4.60; 95% CI: 1.52–13.95), secondary-level education (AOR = 3.20; 95% CI: 1.17–8.74), and formal employment (AOR = 2.81; 95% CI: 1.01–7.80). It was observed that early ANC uptake remains low and is strongly influenced by socio-demographic factors. Strengthening targeted health education, community outreach, and mass media campaigns is recommended to improve timely ANC initiation among pregnant women.

Keywords: Antenatal care; Early booking; Determinants; Maternal health; First ANC visit; Kenya.

COMPLEMENTARY FEEDING PRACTICES AND NUTRITIONAL STATUS OF CHILDREN AGED 6-23 MONTHS IN MUMONI WARD, KITUI COUNTY, KENYA

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Abstract

Complementary feeding period between six and twenty-three months is critical for optimal child growth and development, yet inappropriate feeding practices during this stage contribute significantly to childhood undernutrition. This study assessed complementary feeding practices and nutritional status of children aged 6–23 months in Mumoni Ward, Kitui County, Kenya. A community-based descriptive cross-sectional design was employed, involving 305 mother–child pairs selected through multistage sampling across three randomly selected sub-locations. Quantitative data on socio-demographic characteristics, feeding practices, morbidity, and nutritional status was collected using structured face-to-face interviews and analyzed using SPSS version 26 and ENA for SMART (2011). Associations were examined using chi-square tests and logistic regression at $p < 0.05$. Results showed that while 60.3% of mothers initiated complementary feeding at six months, dietary quality remained suboptimal. Minimum acceptable diet prevalence was markedly low among non-breastfed children (3.5%) compared to breastfed children (82.7%). Although minimum meal frequency (60.9%) and dietary diversity (77.4%) were relatively high, consumption of animal-source foods was limited (19.4%). The prevalence of wasting, stunting, and underweight was 8.2%, 8.9%, and 8.2%, respectively. Household income was significantly associated with wasting and underweight, while stunting was associated with maternal marital status. It was concluded that socioeconomic constraints and inadequate dietary diversity undermine child nutrition. Strengthening community-based nutrition interventions, promoting women’s economic empowerment, and improving dietary diversity are recommended to reduce undernutrition.

Keywords: Complementary feeding; Child nutrition; Dietary diversity; Undernutrition; Children 6–23 months; Kenya.

GAPS IN PAEDIATRIC TUBERCULOSIS CASE DETECTION AND ASSOCIATION WITH TIMELY TREATMENT AT KERUGOYA COUNTY REFERRAL HOSPITAL, KIRINYAGA COUNTY, KENYA

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Abstract

Delayed diagnosis of paediatric tuberculosis (TB) remains a major contributor to ongoing transmission, morbidity, and mortality in resource-limited settings. This study investigated gaps in paediatric TB case detection and their association with timely treatment initiation at Kerugoya County Referral Hospital in Kirinyaga County, Kenya. A facility-based cross-sectional study employing a mixed-methods approach was conducted. Quantitative data was obtained using retrospective review of 123 paediatric TB case records and structured questionnaires, while qualitative data was collected through interviews with 10 key informants. Quantitative data was analyzed using descriptive and inferential statistics and qualitative data thematically analyzed. There was substantial delays along the TB care pathway. The median time from symptom onset to first hospital visit was 35 days, with caregiver-related delays affecting 43.1% of cases. Diagnostic delays were observed in 82.9% of children, with a median of 69 days from symptom onset to diagnosis. Although 95.9% of diagnosed children were initiated on treatment promptly, nearly half experienced delays from first hospital contact to treatment initiation. Key barriers included referral challenges, limited diagnostic infrastructure, inadequate healthcare worker training, caregiver self-medication practices, and TB-related stigma. There is need to strengthen provider training, diagnostic capacity, caregiver awareness, and referral systems in order to improve paediatric TB outcomes.

Keywords: Paediatric tuberculosis; Case detection; Diagnostic delay; TB treatment initiation; Child health; Kenya.

SCOPING REVIEW; BRIDGING THE GAP IN ADHERENCE TO COMPREHENSIVE NEWBORN CARE PROTOCOLS FOR PRETERM INFANTS IN KENYA

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Abstract

Preterm birth is a leading cause of neonatal morbidity and mortality globally, disproportionately affecting sub-Saharan Africa. In Kenya, complications of premature births remain a major contributor to neonatal deaths despite national and international newborn care protocols. This scoping review synthesized Kenyan evidence (January 2024–February 2026) on healthcare providers' adherence to comprehensive newborn care protocols for preterm infants. Following the Arksey and O'Malley framework, 31,550 records were screened, with five studies meeting inclusion criteria. Data was synthesized thematically across knowledge, infection prevention and control (IPC), checklist use, simulation training, mentorship, and teamwork. Results showed gaps in knowledge and IPC compliance, inadequate mentorship, limited refresher training, and weak interprofessional collaboration. Simulation-based training enhanced confidence, communication, and teamwork, while checklist use improved adherence when integrated with structured orientation and competency-based training. There is urgent need for structured, multi-component training interventions to strengthen protocol adherence and improve neonatal outcomes in Kenyan health facilities.

Keywords: Preterm newborns; Protocol adherence; Neonatal care, mentorship, Checklist training; Simulation-based learning; Kenya

SCOPING REVIEW; PATIENT RIGHTS AND CAREGIVER ENGAGEMENT IN PAEDIATRIC FOLLOW-UP CARE IN KENYA

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Abstract

Primary caregivers play a pivotal role in paediatric follow-up care, ensuring treatment adherence, continuity of care, and timely clinic attendance. Despite existing patient rights frameworks, evidence indicates gaps in caregivers' awareness and exercise of these rights, potentially compromising child health outcomes. This scoping review mapped Kenyan studies (2023–February 2026) on caregiver engagement in paediatric outpatient and follow-up care. Systematic searches yielded five studies, highlighting inconsistent communication, limited understanding of rights, structural barriers, and socio-cultural challenges. Caregivers managing asthma, pneumonia, disabilities, or chronic conditions reported reliance on provider guidance with minimal active participation. Supportive communication and trust facilitated engagement, whereas referral bottlenecks, limited consultation time, and geographic constraints hindered it. Results emphasize the need for structured rights-based training interventions to empower caregivers, enhance communication, and strengthen adherence to follow-up care.

Keywords: Primary caregivers; Paediatric follow-up care; Patient rights; Caregiver engagement; Kenya

ROLE OF HEALTHCARE PROVIDERS' BELIEFS AND ATTITUDES IN ADHERING TO
COMPREHENSIVE NEWBORN CARE PROTOCOLS FOR PRETERM INFANTS AT KERUGOYA
COUNTY REFERRAL HOSPITAL, KENYA

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Abstract

Preterm birth is a leading contributor to neonatal mortality, with the highest burden in low- and middle-income countries such as Kenya. Comprehensive Newborn Care Protocols (CNCP) provide evidence-based guidelines to improve outcomes. However, adherence is often inconsistent. This study examined how healthcare providers' beliefs and attitudes influence adherence to CNCP at Kerugoya County Referral Hospital. A cross-sectional mixed-methods design recruited 144 healthcare providers from a target population of 224 using simple random sampling. Quantitative data was analyzed using SPSS, and qualitative data was thematically synthesized. Results showed a strong positive correlation between provider beliefs and attitudes and protocol adherence (Spearman's rho = 0.78, p < 0.001). Positive perceptions of CNCP efficacy enhanced compliance, highlighting the role of cognitive and motivational factors in clinical practice. There is need for supportive work environments, structured mentorship, and peer-led reflective learning sessions to align individual beliefs with evidence-based practices, thereby improving care for preterm infants.

Keywords: Preterm infants; Comprehensive newborn care protocols; Healthcare providers; Beliefs and attitudes; Adherence; Kenya.

EFFECTIVENESS OF COMMUNITY-BASED NURSE-LED SCREENING PROGRAMS AMONG FINANCIALLY UNSTABLE RESIDENTS IN KANJATA VILLAGE

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Abstract

Community-based nurse-led screening programs represent a critical intervention for enhancing preventive healthcare access among socioeconomically vulnerable populations. This study evaluates the effectiveness of such programs among financially unstable residents of Kanjata Village. A descriptive cross-sectional quantitative design was employed, with data collected from 140 respondents and analyzed using descriptive statistical techniques. Financial instability was measured using a validated Financial Instability Index. Findings reveal a high prevalence of financial vulnerability (94.5%) and low awareness of screening programs, despite moderate trust in healthcare providers. Participation is significantly influenced by social determinants, including cultural beliefs, financial constraints, and peer networks, with peer influence emerging as a strong predictor of engagement. The study highlights a critical gap between latent willingness to participate and actual uptake of preventive services. It concludes that targeted community sensitization, trust-building interventions, and socially embedded mobilization strategies are essential for enhancing screening participation and reducing health inequities in resource-constrained settings.

Keywords: Nurse-led screening; Preventive healthcare; Financial instability; Community health; Health equity; Kenya.

SUB-THEME: MATHEMATICS FOR SUSTAINABLE DEVELOPMENT**GEOMETRIC PROPERTIES AND ESTIMATION OF RADII OF REGIONS OF STARLIKENESS
AND SPIRALLIKENESS FOR ANALYTIC MAPPINGS ON THE UNIT DISK****Okelo, B., Nyawalo, M. & Titus, A.**

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Analytic mappings on the unit disk exhibit complex geometric behaviors, particularly starlikeness and spirallikeness, which are fundamental in geometric function theory and its applications in engineering, fluid dynamics, and signal processing. Determining exact radii for the starlike and spirallike regions is challenging due to irregularity of these domains. This study develops precise estimations of radii within which analytic mappings remain starlike or spirallike, providing sharp bounds and constructing extremal functions that achieve these limits. The methodology integrates differential subordination, coefficient bounds, distortion theorems, and subordination principles, complemented by algorithmic and numerical techniques to visualize the geometric regions. Results provide enhanced theoretical insights into the behavior of analytic functions on the unit disk, extending classical geometric function theory and supporting practical modeling applications requiring conformal mapping and structural stability analyses. These findings contribute both to theoretical advancement of complex analysis and to applied mathematical modeling in multidisciplinary contexts.

Keywords: Starlikeness; Spirallikeness; Analytic mappings; Unit disk; Geometric function theory; Radius estimation.

INTEGRATING BAYESIAN INFERENCE AND SUPERVISED LEARNING FOR PREDICTIVE MODELING OF COFFEE RUST INCIDENCE AMONG KENYAN SMALLHOLDER FARMERS

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Abstract

Coffee leaf rust (*Hemileia vastatrix*) significantly undermines Arabica coffee productivity in Kenya, particularly for smallholder farmers who lack access to timely and effective disease management tools. This study develops a hybrid predictive modeling framework that integrates Bayesian hierarchical inference with supervised machine learning to quantify the probability and uncertainty of coffee rust occurrence. Longitudinal data from 9,850 plots across six primary coffee-producing counties was used, with microclimatic factors—particularly leaf wetness duration and relative humidity—serving as primary predictors. Partial dependence and SHAP analyses revealed nonlinear threshold effects, demonstrating that high humidity, extended leaf wetness, and proximity to infected farms substantially increased infection risk. Logistic Regression emerged as the most accurate and interpretable predictive algorithm (AUC ROC = 0.867), while the Bayesian hierarchical model accounted for county-level heterogeneity and provided robust uncertainty quantification. The results establish a scalable, data-driven framework for early warning and precision disease management, enhancing resilience and sustainability in smallholder coffee growing systems across Kenya and similar tropical environments.

Keywords: Coffee leaf rust; Bayesian inference; Supervised learning; Predictive modeling; Smallholder farmers; Kenya.

ACTION OF SPECIAL LINEAR GROUPS OF DEGREE TWO AND THREE ON NON-ZERO VECTORS OVER FINITE FIELDS

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Abstract

Action of linear groups on vector spaces over finite fields underpins important applications in cryptography, coding theory, and combinatorial algebra. While $GL_2(q)$ has been extensively studied, less attention has been paid to the special linear groups $SL_2(q)$ and $SL_3(q)$. This study investigates the transitivity, rank, and subdegrees of $SL_2(q)$ acting on non-zero vectors in F_q^2 and $SL_3(q)$ acting on non-zero vectors in F_q^3 . Results show that both actions are transitive. Specifically, the rank and subdegrees for $SL_2(q)$ are $2(q-1)$ with subdegrees $[1]^{(q-1)}$ and $[q]^{(q-1)}$, whereas for $SL_3(q)$ they are q with subdegrees $[1]^{(q-1)}$ and $[q^2-1]^1$. These findings extend understanding of linear group actions and provide a theoretical basis for cryptographic protocols and error-correcting code designs that rely on vector space symmetry properties.

Keywords: Special linear groups; Transitivity; Ranks; Subdegrees; Finite fields; Vector spaces.

AUTOMORPHISMS OF ZERO-DIVISOR GRAPHS OF NILRADICALS IN MIXED-EXPONENT SEMILOCAL RINGS

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Abstract

Zero-divisor graphs link the algebraic structure of commutative rings to graph-theoretic symmetry, yet automorphism groups arising from nilradicals of semilocal rings with multiple maximal ideals remain underexplored. This study investigates zero-divisor graphs of nonzero nilradicals in mixed-exponent semilocal rings of the form $Z_{p^m} \times Z_{q^n}$, where p and q are distinct primes, and $m, n \geq 2$. Using valuation-theoretic approaches, the vertex set is decomposed into invariant layers indexed by generator valuations. Adjacency relations are determined solely by valuation inequalities, leading to a complete characterization of the automorphism group as a direct product of symmetric groups. The findings extend classical results on local rings to a higher-dimensional valuation context, providing insights into structural symmetries and graph-theoretic behavior in algebraic systems, with potential applications in cryptography and computational algebra.

Keywords: Zero-divisor graph; Nilradical; Semilocal rings; Graph automorphism; Mixed-exponent rings.

ON CERTAIN RELATION OF SUMS OF SQUARES AND QUARTIC

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Abstract

Diophantine identities involving higher powers of integers remain an active area of research in number theory due to their structural complexity and relevance to algebraic and computational mathematics. This study investigates a class of Diophantine identities linking sums of squares and quartic expressions derived from integer sequences. Let k and d be positive integers and $\{a_r\}$ a given integer sequence. The study introduces and analyzes the identity $\sum_{r=1}^{2k} (a_r^4 + k d^4) = \sum_{r=1}^{2k-1} (a_r + 1 + d)^2$, with the primary objective of establishing conditions under which integer solutions (a_r, d) exist. The methodology combines polynomial decomposition, factorization techniques, and structural analysis of solution sets to derive sufficient conditions for solvability. The results contribute new insights into the algebraic relationships between quartic and quadratic forms and enrich the theory of Diophantine equations, with potential implications for symbolic computation and discrete mathematical modeling.

Keywords: Diophantine equations; Sums of squares; Quartic identities; Integer sequences; Polynomial factorization; Number theory.

NORM OF GENERAL DERIVATION ON TENSOR PRODUCT OF C*-ALGEBRAS

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The norm of general derivations in C*-algebras is a fundamental concept in operator theory, underpinning the structural analysis and behavior of derivations within functional analysis and quantum mechanics. Precise determination of these norms is challenging due to the complex interactions within tensor product spaces of C*-algebras. This study investigates the norm of general derivations by leveraging finite rank operators in the tensor product of C*-algebras, employing a rigorous mathematical framework that examines bounded linear operators on Hilbert spaces and C*-algebras. Analytical techniques, including operator inequalities, spectral analysis, and tensor product properties, are combined with constructive examples to estimate and characterize the norms. Results demonstrate that finite rank operators provide an effective and refined approach for approximating the norms of general derivations, offering sharper insights than previously established methods. This study advances theoretical understanding in operator theory and provides a robust methodology applicable to functional analysis, quantum computation, and mathematical physics.

Keywords: Norm estimation; General derivation; C*-algebras; Tensor product; Finite rank operators; Operator theory.

STUDY OF RICCI CURVATURE TENSOR UNDER CONFORMAL TRANSFORMATION

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Abstract

This study examines the transformation properties of the Ricci curvature tensor under conformal changes of the metric in Riemannian manifolds. Conformal transformations, which preserve angles while altering lengths, are central to differential geometry and play a critical role in theoretical physics, particularly in general relativity and conformal field theory. Adopting a rigorous analytical approach, the study derives the mathematical relationships governing the behavior of the Ricci tensor when the metric tensor is rescaled by a smooth conformal factor. The analysis integrates tensor calculus and covariant differentiation to establish how curvature quantities respond to geometric deformation. Results demonstrate that conformal transformations significantly modify the Ricci tensor through terms involving derivatives of the conformal factor, thereby influencing curvature structure and geometric invariants. These transformations have important implications for understanding space time geometry, gravitational field equations, and cosmological models. The study highlights the relevance of conformal geometry in simplifying complex physical systems and provides insights into scale-invariant structures in mathematical physics. It contributes to a deeper understanding of curvature behavior under metric rescaling and its applications in modern geometric analysis and relativity theory.

Keywords: Ricci tensor, Conformal transformation, Riemannian geometry, Curvature, General relativity, Covariant derivatives.

THE ONTOLOGY AND DISSOLUTION OF TIME: EXPLORING THE CONSEQUENCES OF ITS NON-EXISTENCE ON THE FABRIC OF REALITY

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Abstract

This study advances a novel ontological framework that conceptualizes time as a fundamental, real entity possessing both energetic and spatial properties, rather than a purely abstract or relational construct. Building on this premise, the paper investigates the theoretical and philosophical consequences of the hypothetical dissolution or non-existence of time and its implications for the structure of reality. Using a deductive and theoretical methodology, the study formulates and systematically examines thirteen interrelated postulates supported by logical reasoning, principles from theoretical physics, and metaphysical analysis. The framework explores how the cessation of time would affect the continuity of matter, energy, causality, and existence itself. The findings suggest that time is inseparable from all ontological states; its collapse would result in the simultaneous disintegration of matter, energy, spacetime relations, and even conceptual constructs such as nothingness. The study further posits that time functions as a foundational organizing principle—analogue to a “motherboard”—upon which all dimensions of existence depend. This work contributes to ongoing debates in metaphysics and theoretical physics by offering a unified perspective that bridges philosophical ontology and scientific inquiry. It opens new avenues for rethinking the nature of reality, causality, and existence beyond conventional spacetime models.

Keywords: Time ontology, Metaphysics, Spacetime, Causality, Existence, Theoretical physics.

SUB- THEME: NATURAL AND PHYSICAL SCIENCES**DETERMINATION OF ANTIBIOTIC PRODUCTION BY SELECTED ACTINOMYCETES FROM MENENGAI CRATER IN KENYA USING LIQUID AND SOLID FERMENTATION****Waithaka, P. N¹. & Githaiga, B. M².**¹ Kirinyaga University, KENYA² Egerton University, KENYACorrespondence: pnjenga@kyu.ac.ke**Abstract**

The global rise of multidrug-resistant pathogens has diminished the effectiveness of many commercially available antibiotics, highlighting an urgent need for novel antimicrobial agents. This study aimed to isolate actinomycetes from the volcanic soils of Menengai Crater in Kenya and to compare antibiotic production using liquid and solid-state fermentation techniques. Soil samples were randomly collected and actinomycetes were isolated using starch casein, Luria Bertani, and starch nitrate agar media. Antimicrobial activity of selected isolates (PAN 15, PAN 42, PAN 70, PAN 100) was tested against *Staphylococcus aureus* (ATCC 25923), *Streptococcus pneumoniae* (ATCC 49617), *Pseudomonas aeruginosa* (ATCC 27853), *Proteus vulgaris* (ATCC 49990), *Candida albicans* (ATCC 10231), and *Fusarium oxysporum* (ATCC 16608) using the Kirby-Bauer disc diffusion method. Crude antibiotic extracts were obtained via ethyl acetate extraction and cytotoxicity assessed using the brine shrimp lethality assay. Results showed no significant difference in actinomycete isolation across the three media ($P = 0.34$), but crude antibiotic yields differed significantly between fermentation methods ($P = 0.0056$), with solid-state fermentation producing higher antibiotic quantities. LC_{50} values ranged from $2.68 \pm 0.27 \mu\text{g}/\text{mL}$ (PAN 15) to $4.97 \pm 0.11 \mu\text{g}/\text{mL}$ (PAN 100), indicating low cytotoxicity. These findings demonstrate the potential of Menengai Crater actinomycetes as a source of bioactive compounds and suggest that solid-state fermentation may optimize antibiotic production. Further chemical characterization of the produced antibiotics is recommended to assess their therapeutic potential.

Keywords: Actinomycetes; Antibiotic production; Solid-state fermentation; Liquid fermentation; Antimicrobial activity; Menengai Crater.

BOX-BEHNKEN DESIGN-GUIDED ENHANCEMENT OF BIOGAS PRODUCTION THROUGH CaCO_3 BUFFERING IN CO-DIGESTION OF WATER HYACINTH AND FISH OFFAL**Bosire, F. & Ntabo, M.**

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Water hyacinth (*Eichhornia crassipes*) and fish offal from processing plants are major environmental pollutants in Kenya, contributing to eutrophication, odor, and waste accumulation. Anaerobic digestion (AD) presents a sustainable method for biogas production; however, volatile fatty acid (VFA) accumulation often reduces efficiency, destabilizing pH and lowering methane yield. This study applied Box-Behnken Design (BBD) to optimize calcium carbonate (CaCO_3) buffering, substrate ratios, and total solids content for co-digestion of water hyacinth and fish offal. Laboratory-scale AD experiments demonstrated that optimized conditions (CaCO_3 4–6 g/L, 1:2 fish offal to water hyacinth ratio) reduced VFA levels by 45–60%, stabilized pH between 6.8–7.2, and increased methane yields by 20–30%, reaching 0.45–0.62 m^3/kg VS. Digestate quality met fertilizer standards, enabling circular reuse. The study highlights eco-innovative strategies for renewable energy generation, pollution reduction, and sustainable resource management, integrating ethical considerations of intergenerational responsibility and ecosystem stewardship in line with Kenyan environmental policy and circular economy principles.

Keywords: anaerobic digestion; biogas production; water hyacinth; fish offal; calcium carbonate; Box-Behnken Design; VFA reduction; renewable energy; digestate reuse.

INNOVATIVE FRACTIONAL-ORDER MODELLING OF ESCHERICHIA COLI DYNAMICS FOR SUSTAINABLE WASTEWATER MANAGEMENT IN EMERGING ECONOMIES

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Abstract

In Kenya and other emerging economies, wastewater treatment faces increasing challenges due to increasing urbanization, industrial growth, and climate variability, posing risks to potable water security. This study developed a multi-stage fractional-order mathematical model to predict Escherichia coli dynamics across pre-primary, primary, secondary, and tertiary treatment stages. The model incorporates Monod-type growth kinetics, resistance emergence, bacteriophage predation, and memory effects via the Caputo-Fabrizio fractional derivative with constant and variable orders. Fixed-point theory ensures existence and uniqueness of solutions, while numerical simulations demonstrate superior accuracy of fractional-order models over traditional integer-order methods in capturing transient oscillations, bacterial persistence, and system stabilization. Variable fractional orders improve adaptability for real-time treatment optimization. The framework provides a robust digital tool for enhancing wastewater treatment resilience, supporting Kenya's Sustainable Development Goal 6 targets, and advancing evidence-based environmental management strategies.

Keywords: Fractional-order modelling; Escherichia coli; wastewater treatment; Caputo-Fabrizio derivative; microbial dynamics; sustainability; environmental resilience

ADVECTION-DIFFUSION-REACTION MODELING OF HEAVY METAL CONTAMINATION IN RIVER SEDIMENTS USING COMPUTATIONAL METHODS

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Abstract

Rivers are vital water sources, yet heavy metal contamination in sediments presents a persistent environmental challenge due to bioaccumulation and toxicity. This study developed an advection-diffusion-reaction model to predict spatial and temporal heavy metal concentrations in river sediments, accounting for absorption, desorption, resuspension, deposition, and chemical/biological reaction kinetics. The governing equations were discretized using the finite difference method and solved numerically via Python, with results validated against analytical solutions. Sensitivity analysis evaluated the influence of key parameters on contaminant transport. Application to the Rupingazi River demonstrated the model's ability to simulate contaminant dynamics accurately, providing an effective computational framework for assessing environmental risks and informing sediment and water quality management strategies.

Keywords: Heavy metals; River sediments; Advection-diffusion-reaction; computational modeling; Environmental pollution; Bioaccumulation; Sediment-water interaction.

COMPARATIVE FIRST-PRINCIPLES STUDY OF LEAD-FREE $\text{Cs}_2\text{AgB}'\text{Br}_6$ ($\text{B}' = \text{Bi, Sb, In}$) DOUBLE PEROVSKITES FOR PHOTOVOLTAIC APPLICATIONS

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Abstract

Lead-free double perovskites $\text{Cs}_2\text{AgB}'\text{Br}_6$ ($\text{B}' = \text{Bi, Sb, In}$) are promising environmentally sustainable alternatives for photovoltaic and optoelectronic applications. This study presents a first-principles comparative analysis of their structural, electronic, and optical properties using density functional theory (DFT) within the generalized gradient approximation. Structural optimization revealed cubic $\text{Fm}\bar{3}\text{m}$ symmetry with lattice contraction from Bi to In substitution, correlating with trivalent cation radii and increasing bulk modulus, indicating enhanced stability. Electronic structure analysis showed indirect bandgaps of 1.95 eV (Bi), 2.10 eV (Sb), and 2.28 eV (In), with valence bands dominated by Br-4p and Ag-4d orbitals and conduction bands by B' -p orbitals. Optical simulations indicate strong absorption in visible and near-UV regions, with tunable dielectric constants and refractive indices. Results demonstrate the potential of $\text{Cs}_2\text{AgB}'\text{Br}_6$ perovskites as stable, lead-free photovoltaic materials suitable for sustainable energy applications.

Keywords: Lead-free perovskites; $\text{Cs}_2\text{AgB}'\text{Br}_6$; First-principles study; Density functional theory; Electronic properties; Optical properties; Photovoltaics; Material stability.

PERFORMANCE DATA TRANSPARENCY AND MEASUREMENT RELIABILITY IN ACCREDITED TESTING AND CALIBRATION LABORATORIES

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Abstract

Accurate measurement underpins regulatory compliance, quality assurance, and global trade. While traditional laboratory metrology emphasizes technical infrastructures such as traceability chains, calibration hierarchies, and uncertainty estimation, the advent of digital quality management systems and automated analytical platforms has shifted focus toward the generation, transparency, and utilization of performance data to enhance measurement reliability. This study investigates the influence of performance data transparency on stability and consistency of analytical results in ISO/IEC 17025 accredited testing and calibration laboratories. The study introduces the concept of behavioural metrology governance, defined as the management of analyst conduct through visibility of operational performance indicators. A comprehensive review of literature in metrology, laboratory quality management, and performance measurement was conducted, highlighting the role of digital dashboards, laboratory information management systems (LIMS), and reporting frameworks in providing continuous visibility of key metrics, including turnaround time and repeat analysis frequency. Results show that laboratories systematically digitizing and openly reviewing performance metrics demonstrate improved analytical discipline, early detection of anomalies, and consistent adherence to validated procedures. Transparent performance data fosters accountability, enhances self-regulation among analysts, and strengthens operational reliability. Results of this study suggest that integrating digital transparency with conventional metrology frameworks constitutes an emergent governance mechanism that reinforces measurement reliability, laboratory resilience, and institutional credibility. Performance data transparency is thus a strategic enabler of innovation, trust, and sustainable quality infrastructure in modern metrology systems.

Keywords: Metrology; Digital transformation; Performance data transparency; Measurement reliability; Laboratory governance.

FBG MAGNETIC SENSORS: PRINCIPLES, DESIGN, AND APPLICATIONS

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Fiber Bragg Grating (FBG) technology represents a significant advancement in optical sensing due to its high sensitivity, reliability, and immunity to electromagnetic interference. An FBG consists of a periodic modulation of the refractive index along the core of an optical fiber, which enables selective reflection of specific wavelengths of light while transmitting the remaining spectrum. These optical characteristics make FBG sensors particularly suitable for sensing applications in environments where conventional electronic sensors experience operational limitations. This paper examines the fundamental principles, design mechanisms, and emerging applications of Fiber Bragg Grating magnetic sensors. The study explores the optical sensing mechanisms underlying FBG technology and discusses how the integration of magnetostrictive materials enhances magnetic field detection. A review-based analytical approach was adopted to examine existing literature on optical magnetic sensing technologies, sensor fabrication techniques, and application domains. Particular attention is given to the fabrication of FBG structures in single-mode optical fibers using femtosecond laser inscription techniques. Findings indicate that while conventional FBG sensors demonstrate strong performance in strain and temperature measurement, their intrinsic magneto-optical response is relatively weak for direct magnetic field sensing. However, the integration of magnetostrictive materials such as terbium-dysprosium-iron (TbDyFe) significantly enhances magnetic sensitivity and enables practical magnetic sensing applications. FBG magnetic sensors are increasingly applied in biomedical diagnostics, industrial monitoring, geophysical exploration, and defense systems due to their high precision, remote sensing capability, and resistance to electromagnetic interference. The study concludes that ongoing advancements in fiber-optic materials, photonic engineering, and sensor fabrication technologies will further expand the capabilities and practical applications of FBG-based magnetic sensing systems.

Keywords: Fiber bragg grating; Optical sensors; Magnetic sensing; Magnetostrictive materials; Photonics; Fiber-optic technology.

SUB THEME: BUSINESS AND ECONOMIC TRANSFORMATION**AN EVALUATION OF INFRASTRUCTURE REFORMS AND TECHNOLOGICAL INNOVATIONS
IN WATER SERVICE DELIVERY: A CASE OF KIRINYAGA COUNTY WATER AND SANITATION
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Water service delivery in Kenya continues to be constrained by high levels of Non-Revenue Water (NRW), undermining financial sustainability and service reliability. In Kirinyaga County, NRW levels exceeding acceptable thresholds have persisted despite ongoing institutional and infrastructural reforms. This study evaluates the effectiveness of infrastructure reforms and technological innovations—particularly automated prepaid metering systems—in reducing NRW at Kirinyaga County Water and Sanitation Company PLC. Guided by Systems Thinking Theory, the study adopts a mixed-methods research design integrating cost-benefit analysis, water point mapping, structured questionnaires, and in-depth stakeholder interviews. Quantitative data assess efficiency gains and financial implications, while qualitative insights illuminate institutional, technical, and behavioral dimensions influencing reform outcomes. The study identifies aging infrastructure, illegal connections, and implementation capacity gaps as persistent constraints, while digital metering demonstrates measurable operational and billing efficiencies. The findings contribute evidence-based insights for utility managers and policymakers on leveraging technological innovation within integrated system-wide reforms to enhance sustainable water service delivery in devolved governance contexts.

Keywords: Service delivery; Infrastructure reform; Technological innovation; Systems thinking; Public utility governance.

INTEGRATING AGILITY INTO UNIVERSITY ACADEMIC PROCESSES: RESPONDING TO EVOLVING GLOBAL LABOUR MARKET NEEDS

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Abstract

Universities globally face intensifying pressure to align academic outcomes with rapidly evolving labour market demands driven by digitalization, Industry 4.0, and skills disruption. Traditional academic processes – characterized by rigid curricula, protracted approval cycles, and limited industry feedback – struggle to produce graduates with adaptive and transferable competencies. This paper advances the concept of academic agility as a strategic institutional capability for enhancing graduate employability and institutional relevance. Drawing on empirical studies, policy analyses, and illustrative institutional cases, the paper conceptualizes academic agility and examines its integration across curriculum design, pedagogy, assessment, governance, and industry partnerships. A systemic framework and implementation roadmap are proposed, outlining mechanisms for iterative curriculum renewal, responsive assessment models, and feedback-driven decision-making. The paper contributes to higher education scholarship by translating agility principles into actionable institutional strategies that preserve academic integrity while enhancing responsiveness to global labour market dynamics.

Keywords: Higher education; Academic agility; Curriculum innovation; Graduate employability; Institutional governance.

TRANSFORMING RURAL COTTON COMMUNITIES THROUGH LOCAL FARM-BASED INNOVATION

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Abstract

This presentation evaluates the effectiveness of portable micro-ginning innovation in addressing persistent rural inequality and structural disparities within Kenya's cotton sector. Despite significant agricultural potential, rural communities face limited infrastructure and market access, with Kenya losing approximately \$47M annually through raw exports. The review evaluates how locally fabricated portable, multi-power micro-ginneries can shift farmers from raw material sellers to value-creating entrepreneurs. Results from the pilot demonstrated a transformative economic impact, with household incomes increasing from KES 72 to KES 252 per kg and cotton value retention improving from 22% to 68%. The innovation significantly reduces dependency on exploitative intermediaries and promotes inclusive development by integrating the rural cotton farmers, women and youth into the value chain through skills training in weaving and tailoring. Furthermore, the innovation supports a circular economy by utilizing cotton by-products and aligns with the African Continental Free Trade Area (AfCFTA) and global green transition agendas. The study concludes that micro-ginning offers a scalable, eco-friendly pathway to rural industrialization and sustainable development across Africa.

Keywords: Micro-ginning, Cotton Value Addition, Rural Innovation, Economic Empowerment, Kenya, Sustainability, AfCFTA

DIGITAL TRANSPORT MANAGEMENT SYSTEMS AND PERFORMANCE OF AGRO-PROCESSING FIRMS IN UASIN GISHU COUNTY, KENYA

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Abstract

Agro-processing firms play a critical role in value addition, food security, and employment creation, yet operational inefficiencies in transport logistics undermine their competitiveness. This study investigates the influence of Digital Transport Management Systems (DTMS) on organizational performance among agro-processing firms in Uasin Gishu County, Kenya. Anchored in Systems Theory, the study employs a descriptive research design with quantitative analysis of data collected from firm employees. Results reveal a strong and statistically significant relationship between DTMS adoption and firm performance, particularly in delivery efficiency, cost reduction, quality preservation, and market expansion. These findings underscore DTMS as a strategic digital capability that enhances operational resilience and supports sustainable agro-industrial performance in emerging economies.

Keywords: Digital transformation; Logistics management; Firm performance; Agro-processing; Operational resilience.

A COMPARATIVE ANALYSIS OF THE VASICEK AND COX-INGERSOLL-ROSS INTEREST RATE MODELS IN INSURANCE VALUATION

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Abstract

Interest rate volatility poses significant valuation risks for insurance companies, particularly in emerging markets characterized by inflationary instability. This study compares the Vasicek and Cox–Ingersoll–Ross (CIR) stochastic interest rate models in valuing insurance assets, liabilities, and surplus under model risk conditions. Using geometric simulation techniques, the study evaluates differences in valuation outcomes attributable to underlying model assumptions. Results indicate that the CIR model provides a superior fit for volatile interest rate environments, reducing valuation distortions associated with negative rates. The study contributes to actuarial risk management by highlighting the implications of model selection in insurance valuation and regulatory decision-making.

Keywords: Interest rate models; Insurance valuation; Model risk; Stochastic processes; Financial risk management.

KNOWLEDGE GENERATION AND STRATEGY IMPLEMENTATION IN PUBLIC SECTOR ORGANIZATIONS IN KENYA: A CASE OF THE KENYA BUREAU OF STANDARDS

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Abstract

Public sector organizations generate extensive knowledge resources, yet weak institutional frameworks often limit their strategic utilization. This study examines the influence of knowledge generation on strategy implementation at the Kenya Bureau of Standards (KEBS). Guided by the Resource-Based View, the study employs a mixed-methods case study design. Results demonstrate that structured knowledge generation practices significantly and positively influence strategy execution effectiveness. There is need for institutional alignment of institutional knowledge and policies with strategic objectives to enhance public sector performance.

Keywords: Knowledge management; Strategy implementation; Public sector performance; Institutional capability; Governance.

INFLUENCE OF KNOWLEDGE UTILIZATION ON STRATEGY IMPLEMENTATION IN THE PUBLIC SECTOR IN KENYA

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Abstract

Effective knowledge utilization is essential for translating organizational strategies into measurable outcomes. This study investigates the relationship between knowledge utilization and strategy implementation at the Kenya Bureau of Standards. Anchored in Social Capital Theory, the study applies a mixed-methods approach. Results indicate a strong and positive relationship between knowledge utilization and successful strategy implementation. The study underscores the importance of institutionalizing knowledge-sharing cultures and enabling digital decision-support systems within public organizations.

Keywords: Knowledge utilization; Strategy execution; Organizational learning; Public sector management; Performance.

GOVERNANCE CHALLENGES AND SOCIOECONOMIC EMPOWERMENT IN KENYAN PARA ATHLETICS

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Abstract

Para athletics holds significant potential for socioeconomic empowerment of persons with disabilities, yet governance failures undermine its realization in Kenya. This exploratory case study examines governance and communication challenges within the Kenya National Paralympic Committee and their implications for athlete empowerment. Results show systemic leadership weaknesses, exclusionary communication practices, and institutional dependency that limit athlete participation and economic opportunities. The study highlights the need for governance reforms and athlete-led entrepreneurship as pathways to sustainable empowerment and inclusion.

Keywords: Sports governance; Disability inclusion; Socioeconomic empowerment; Institutional leadership; Sustainability.

SOCIO-ECONOMIC FACTORS AND WOMEN'S EMPOWERMENT IN KENYA

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Abstract

Women's empowerment is a critical driver of inclusive development, yet socio-economic disparities continue to constrain gender equity in Kenya. This study examines the influence of socio-economic factors on gender equity and socio-cultural empowerment of women. Using a descriptive survey design, the study identifies economic participation, access to resources, and decision-making inclusion as key determinants of empowerment. Results reinforce the need for integrated policy interventions addressing economic, cultural, and institutional barriers to women's empowerment.

Keywords: Gender equity; Women empowerment; Socioeconomic inclusion; Development policy; Social transformation.

INFLUENCE OF STRUCTURAL CONSTRAINTS ON BUDGET UTILIZATION IN GOVERNMENT ENTREPRENEURIAL PROGRAMMES IN KENYA

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Abstract

Government-led entrepreneurial programmes are central to SME development, yet structural constraints often limit effective budget utilization. This study examines the influence of resource optimization strategies on budget utilization in Nairobi and the Mt. Kenya region. Results show a strong positive relationship between optimized resource allocation and budget efficiency. The study provides policy-relevant insights for improving public entrepreneurship programme performance.

Keywords: Public entrepreneurship; Budget utilization; Resource optimization; Institutional efficiency; Governance.

TOWARDS CHURCH-BASED INTERVENTIONS FOR ADOLESCENT SEXUAL AND REPRODUCTIVE HEALTH RIGHTS

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Abstract

Adolescent sexual and reproductive health remains a contested domain between faith-based values and contemporary public health frameworks. This study explores church-based interventions shaping youth perceptions and access to sexual and reproductive health rights among TVET students in Nairobi. Using a mixed-methods approach, the study identifies the church's potential role in delivering holistic, values-sensitive health education. Results support faith-inclusive models for adolescent health promotion.

Keywords: Adolescent health; Faith-based interventions; Sexual health rights; Youth development; Social inclusion.

AI-ENABLED RESKILLING FOR INNOVATION, INDUSTRY RESILIENCE, AND GLOBAL SUSTAINABILITY

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Abstract

Artificial intelligence is reshaping innovation, labour markets, and governance systems worldwide. This paper proposes an AI-Enabled Reskilling for Innovation, Industry Resilience, and Sustainability (AERRIS) Framework, integrating AI in governance, entrepreneurship, and human capital development. The framework demonstrates how structured reskilling pathways can mitigate workforce displacement, enhance resilience, and promote inclusive growth. The study contributes a strategic model aligning AI adoption with sustainable development objectives.

Keywords: Artificial intelligence; Reskilling; Industry resilience; Digital transformation; Sustainability.

WORK-RELATED STRESS AND PERFORMANCE OF POLICE OFFICERS IN NAIROBI COUNTY, KENYA

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Abstract

Contemporary law enforcement operates within increasingly complex, high-pressure environments where unmanaged occupational stress poses significant risks to individual performance, organizational effectiveness, and public safety. This study critically examined the effect of work-related stress on the performance of police officers in Nairobi County, Kenya. Anchored in Stress Theory, the study employed a descriptive cross-sectional research design. A sample of 341 officers was drawn from a target population of 2,902 officers across 11 police divisions using stratified sampling techniques. Primary data was collected using a structured five-point Likert-scale questionnaire measuring dimensions of organizational culture, workload, burnout, and performance outcomes. Descriptive statistics were generated using frequencies and percentages, while inferential analysis was conducted using multiple regression, ANOVA, and F-tests in SPSS (version 26). Results showed that work-related stress had a statistically significant and substantial effect on police performance, with an adjusted R^2 value of 0.700, indicating that stress-related factors explained 70% of the variance in performance. Organizational culture, excessive workload, and burnout emerged as the most influential predictors. It is concluded that unmanaged occupational stress significantly undermines operational effectiveness within the National Police Service. There is need for institutional reforms focused on cultivating supportive organizational cultures, implementing systematic workload management, embedding early burnout detection mechanisms, and institutionalizing regular psychological assessment and counseling services to enhance officer well-being, productivity, and service delivery.

Keywords: Work-related stress; Police performance; Organizational culture; Burnout; Law enforcement.

AN EARLY EVALUATION OF BEHAVIORAL CHANGE RESULTING FROM AN EMOTIONAL INTELLIGENCE TRAINING INTERVENTION AT SOUTH EASTERN KENYA UNIVERSITY

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Abstract

Emotional intelligence (EI) has gained increasing recognition as a critical competency for effective leadership, collaboration, and stakeholder engagement within higher education institutions. This study presents an early evaluation of behavioral change resulting from an emotional intelligence training intervention conducted at South Eastern Kenya University. Grounded in Darwin's Evolutionary Theory of Emotions, the study adopted a one-group pretest-posttest quasi-experimental design involving academic staff, research administrators, and postgraduate students. Baseline assessment revealed limited conceptual and applied understanding of EI, with approximately 65% of participants demonstrating superficial awareness of key EI constructs. The intervention comprised a structured two-day capacity-building workshop focusing on self-awareness, self-management, empathy, social skills, and stress regulation. Post-intervention evaluation conducted two months later indicated measurable improvements in participants' emotional self-regulation, interpersonal sensitivity, conflict management, and collaborative engagement. Participants reported that applying EI competencies in teaching, supervision, research coordination, and collegial interactions, contributing to improved communication, reduced interpersonal tension, and a more supportive academic climate. However, institutional inertia, limited policy integration, and competing workload demands constrained sustainability of observed behavioral change. It is observed that EI-focused interventions hold significant potential for enhancing professional effectiveness and psychosocial well-being in universities. There is need for institutional mainstreaming of EI development within professional development frameworks, leadership training programs, and university policy structures to embed emotional competence as a core dimension of academic excellence.

Keywords: Emotional intelligence; Higher education; Behavioral change; Capacity building; Academic leadership.

INFLUENCE OF SOCIO-CULTURAL AND ECONOMIC FACTORS ON WOMEN'S SEXUAL AUTONOMY AND DECISION-MAKING POWER AMONG FEMALE STUDENTS AT KIRINYAGA UNIVERSITY

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Abstract

Women's sexual autonomy and decision-making power are fundamental to gender equality, reproductive health, and women's empowerment outcomes within higher education contexts. Despite expanded access to university education in Kenya, entrenched socio-cultural norms and economic vulnerabilities continue to shape women's capacity to exercise independent sexual and reproductive choices. This study investigated the influence of socio-cultural and economic factors on women's sexual autonomy and decision-making power at Kirinyaga University. A descriptive cross-sectional survey design was employed among female students and staff aged 20 years and above. Using stratified random sampling, 91 respondents were selected from a target population of 500. Data was collected using structured questionnaires administered via Kobo Toolbox. Quantitative data was analyzed using descriptive statistics in SPSS, while qualitative responses from open-ended items was analyzed thematically. Results showed that religious beliefs, traditional gender norms, partner power dynamics, and financial dependency significantly constrained women's sexual autonomy. Most respondents reported joint or partner-dominated decision-making regarding condom use, contraception, and timing of sexual activity. Although emerging patterns of assertiveness and negotiation were observed among some respondents, sexual autonomy largely remained embedded within relational and socio-cultural constraints. It was observed that socio-cultural norms and economic dependence remain critical determinants of women's sexual autonomy among female students in the university setting. There is need for strong gender-responsive programs, promoting economic empowerment initiatives, and expanding access to confidential, youth-friendly reproductive health services to enhance women's agency and decision-making power in higher education institutions.

Keywords: Women's sexual autonomy; Socio-cultural factors; Economic vulnerability; Decision-making power; Gender equality.

LEADERSHIP COMMITMENT AND ORGANIZATIONAL CULTURE AS DETERMINANTS OF WORKPLACE GENDER-BASED VIOLENCE IN KENYAN COMMERCIAL BANKS

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Abstract

Workplace gender-based violence (GBV) poses significant challenges to employee well-being, organizational resilience, and sustainable performance within the banking sector. This conceptual study examines leadership commitment and organizational culture as strategic determinants shaping the prevalence of GBV and institutional capacity to foster safe and inclusive work environments in Kenyan commercial banks. Drawing on literature from organizational behavior, strategic management, and gender studies, the paper develops a conceptual framework illustrating how leadership commitment establishes accountability mechanisms for GBV prevention, while organizational culture reinforces or constrains these efforts through shared norms, values, and practices. It was observed that strong ethical leadership, coupled with inclusive and gender-responsive organizational cultures, enhances institutional resilience and supports the effective implementation of anti-GBV interventions. Although empirical validation is ongoing as part of a broader doctoral study, the conceptual insights offer practical guidance for banking institutions seeking to strengthen leadership accountability, institutionalize gender-responsive policies, and promote equitable workplace practices. The study contributes to strategic management and gender discourse by highlighting leadership–culture synergies as critical levers for sustainable organizational transformation.

Keywords: Leadership commitment; Organizational culture; Workplace gender-based violence; Banking sector; Gender equity; Institutional resilience.

GENDER, EQUITY, AND INCLUSIVITY AS DETERMINANTS OF EDUCATIONAL SUSTAINABILITY IN MARGINALIZED COMMUNITIES OF NORTH EASTERN KENYA

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Abstract

Educational sustainability in marginalized regions of North Eastern Kenya remains undermined by entrenched gender disparities, inequitable resource allocation, and weak inclusivity mechanisms. This study investigates the influence of gender, equity, and inclusivity on educational sustainability in Garissa, Wajir, and Mandera Counties of Kenya. Employing a mixed-methods design, the study integrates quantitative surveys and qualitative interviews involving learners, teachers, school administrators, education officers, parents, and community leaders (n = 371). Quantitative data was analyzed using descriptive statistics and multiple regression analysis, while qualitative data was subjected to thematic analysis. Results indicate that gender-related barriers—such as early marriage, domestic labor, and restrictive cultural norms—significantly hinder access and retention, while inequitable distribution of teachers, infrastructure, and learning materials exacerbates educational disparities. Inclusivity practices for learners with disabilities and nomadic populations remain critically limited. Regression analysis shows that gender, equity, and inclusivity collectively explain a substantial proportion of variance in educational sustainability. The study concludes that sustainable education in marginalized contexts requires integrated policy and community-based interventions addressing gender norms, resource equity, and inclusive pedagogical strategies. These results provide actionable insights for policymakers, educators, and development partners seeking to enhance educational resilience and equity in fragile regions.

Keywords: Educational sustainability; Gender equity; Inclusivity; Marginalized communities; North Eastern Kenya.

THE ROLE OF SOCIAL MEDIA IN THE DE-AFRICANIZATION OF GENDER-BASED VIOLENCE DISCOURSE IN AFRICA

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Abstract

Social media platforms have become central arenas for shaping gender-based violence (GBV) discourse across African societies, generating both emancipatory and disruptive effects on gender equity and social inclusion. This study critically examines how globalized digital activism – exemplified by platforms such as X (formerly Twitter), Facebook, and TikTok – reconfigures GBV narratives in Africa, often privileging Eurocentric vocabularies and advocacy models at the expense of indigenous epistemologies. Employing qualitative discourse analysis of digital content, supplemented by secondary literature and selected case studies of localized online activism, the study reveals that social media amplifies survivor voices, enhances visibility, and influences policy debates, while simultaneously marginalizing culturally embedded mechanisms of justice, communal healing, and gender relations. Results further demonstrate the emergence of cyber violence as a novel and under-regulated form of GBV that disproportionately affects women and marginalized groups. Nonetheless, evidence from localized campaigns illustrates the potential for re-Africanization through culturally grounded digital engagement. It is concluded that culturally reflexive and context-sensitive approaches are essential for reconciling global advocacy with African epistemologies to promote inclusive, equitable, and sustainable GBV responses in the digital age.

Keywords: Gender-based violence; Social media; Digital activism; De-Africanization; Indigenous epistemologies; Social inclusion.

THE NEXUS BETWEEN ECONOMIC ACTIVITIES IN BUFFER ZONES AND FOREST COVER CHANGE: A CASE OF ENDAU FOREST, KENYA

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Abstract

Dryland forests constitute critical ecological systems that support biodiversity, livelihoods, and climate regulation, yet they remain among the most threatened ecosystems in Africa. This study examines the relationship between forest-related economic activities and forest cover change in the buffer zones of Endau Forest, Kenya. A mixed-methods approach integrating multi-temporal Landsat satellite imagery (1979–2024), household surveys, and key informant interviews was employed to capture both biophysical and socio-economic dimensions of forest dynamics. Forest cover change was quantified through supervised classification using ArcMap 10.8, while socio-economic data was analyzed using descriptive and inferential statistics. Results indicate that fuelwood collection, charcoal production, livestock grazing, and small-scale forest product trade significantly influence spatial and temporal patterns of forest cover change. A strong positive correlation was observed between livelihood benefits and forest conservation outcomes, underscoring the role of economic incentives in shaping sustainable buffer zone forest resource use. There is need for integration of local livelihood strategies into buffer zone management and conservation planning to enhance forest resilience and sustainability in dryland ecosystems.

Keywords: Forest cover change; Buffer zones; Economic activities; Dryland forests; Remote sensing; Conservation management.

SOCIAL INCLUSION AS A PREDICTOR OF QUALITY OF LIFE AMONG PERSONS RECOVERING FROM SUBSTANCE USE DISORDER IN CENTRAL KENYA

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Abstract

Substance use disorder (SUD) poses significant public health and socio-economic challenges in Kenya, with profound implications for recovery outcomes and quality of life (QoL). This study examines the influence of social inclusion on QoL among persons recovering from SUD in Central Kenya. Using a cross-sectional design and snowball sampling, data was collected from 323 respondents. Validated scales were employed to measure social inclusion and well-being, yielding strong reliability indices. Statistical analysis revealed a significant positive relationship between social inclusion and QoL, with marital status, family support, close social relationships, and educational attainment emerging as key predictors of improved recovery outcomes. Results highlight social inclusion as a critical determinant of sustainable recovery and underscore the importance of family- and community-centered interventions in substance use rehabilitation programs. The study contributes empirical evidence to inform policy and practice aimed at strengthening psychosocial support systems for individuals in recovery.

Keywords: Social inclusion; Quality of life; Substance use disorder; Recovery; Psychosocial support; Central Kenya.

INCORPORATION OF GENDER, EQUITY, AND INCLUSION IN PRIVATE ORGANIZATIONS : A STUDY OF SMALL AND MEDIUM ENTERPRISES IN NYERI COUNTY, KENYA

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Abstract

Integration of Gender, Equity, and Inclusion (GEI) principles in Small and Medium Enterprises (SMEs) remains limited despite growing global emphasis on inclusive organizational practices. This study investigates the extent, patterns, and challenges of GEI incorporation among SMEs in Nyeri County, Kenya. Using a mixed-methods design combining survey data and in-depth interviews with SME owners, managers, and employees, the study assesses organizational commitment, workplace culture, recruitment practices, pay equity, leadership representation, and grievance mechanisms. Results show increasing awareness of GEI principles but limited formalization, with most SMEs relying on informal practices shaped by leadership attitudes and socio-cultural norms. Key barriers include financial constraints, limited human resource capacity, and weak regulatory enforcement. However, emerging inclusive practices demonstrate positive effects on employee satisfaction and organizational performance. The study pitches for context-sensitive and scalable GEI frameworks tailored to SME realities and provides policy-relevant recommendations for inclusive private sector development.

Keywords: Gender equity; Social inclusion; Small and medium enterprises; Organizational culture; Workforce diversity.

INSTITUTIONAL TYPOLOGIES AND GOVERNANCE STRUCTURES IN INFORMAL LENDING GROUPS: EVIDENCE FROM RURAL KENYA

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Abstract

Informal peer-to-peer lending groups (chamas) play a pivotal role in financial inclusion and livelihood resilience in rural Kenya, yet their internal institutional configurations remain underexplored. This study investigates the institutional architecture and governance structures of chamas among small-scale dairy farmers in Kirinyaga County. Using survey data from 53 lending groups, the study applied exploratory and confirmatory factor analysis to validate governance and economic functionality constructs, followed by K-means cluster analysis to identify institutional typologies. ANOVA and MANOVA tests revealed three distinct typologies characterized by varying levels of financial inclusion, governance quality, repayment norms, and economic empowerment. Results demonstrate substantial structural heterogeneity among chamas and highlight strong repayment norms and governance quality as key determinants of high performance. The study advances Social Capital Theory by demonstrating that institutional configuration, rather than participation alone, shapes development outcomes in informal financial systems.

Keywords: Informal lending groups; Governance structures; Institutional typologies; Financial inclusion; Social capital.

**BANK LENDING ACTIVITIES, ENVIRONMENTAL TAXES, AND CLIMATE OUTCOMES:
EVIDENCE FROM CROSS-COUNTRY PANEL DATA****Muchiri, M. K¹., Erdei-Gally, S². & Fekete-Farkas, M.²**¹Kirinyaga University, KENYA²Hungarian University of Agriculture and Life Sciences, HUNGARY**Correspondence:** mmuchiri@kyu.ac.ke***Abstract***

Banks play a critical role in shaping environmental outcomes through their lending and investment activities. This study examines the direct and indirect effects of bank-related carbon emissions on climate outcomes, focusing on the moderating role of environmental taxes. Using panel data from 26 countries, a two-step system GMM estimator was employed to analyze the relationship between the Carbon Footprint of Bank Loans, emissions from financial services, and average surface temperature. Results indicate a statistically significant positive relationship between carbon-intensive lending and surface temperature increases, while environmental taxes significantly moderate this relationship. Results underscore the effectiveness of fiscal policy instruments in steering bank financing toward environmentally sustainable pathways. The study provides policy-relevant insights for promoting green banking and climate-responsive financial regulation.

Keywords: Green banking; Carbon footprint of bank loans; Environmental taxes; Climate change; Financial regulation.

INFLUENCING THE PLATE: MEDIA NARRATIVES AND GLOBAL FOOD SYSTEM SUSTAINABILITY

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Abstract

Global food systems face mounting pressures from climate change, population growth, and unsustainable consumption patterns. This study examines the role of media narratives in shaping food system sustainability by influencing consumer behavior, agricultural practices, and policy agendas. Drawing on literature published between 2022 and 2025, the study demonstrates that media functions as a double-edged sword; thus while it raises awareness and accelerates sustainable transitions, it can also amplify misinformation and individualize systemic challenges. The analysis highlights the need for controlled systemic reporting, rigorous fact-checking, and enhanced media literacy to support equitable and sustainable food systems. The study positions media as a critical intermediary in advancing global food security and sustainability.

Keywords: Food systems; Media narratives; Sustainability; Consumer behavior; Food security.

INVESTIGATING THE IMPACT OF PROFESSIONAL DEVELOPMENT ON IMPLEMENTATION OF INQUIRY-BASED LEARNING IN KENYA

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Abstract

Kenya's Competency-Based Curriculum emphasizes learner-centered pedagogies to enhance practical skills and real-world application. This study examines the design and impact of government-funded professional development (PD) initiatives supporting inquiry-based learning (IBL) implementation in Kenyan schools. Employing a convergent mixed-methods design, data was collected from teachers and students across multiple counties through questionnaires, interviews, classroom observations, and reflective diaries. Results show that well-designed PD enhances teacher confidence and classroom adoption of IBL, while contextual constraints such as resource limitations and assessment pressures hinder consistent implementation. The study provides evidence-based insights to inform national PD frameworks and strengthen pedagogical reform.

Keywords: Inquiry-based learning; Professional development; Competency-based curriculum; Pedagogical reform; Kenya.

GENDER, LAND, AND POWER: HISTORICAL LAND USE PATTERNS IN THE MWEA PLAINS OF KIRINYAGA COUNTY, KENYA (PRE-COLONIAL PERIOD TO 1963)

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Abstract

This historical study examines gendered land use and power relations in the Mwea Plains of Kirinyaga County from the pre-colonial period to 1963. Using archival records, oral histories, and ethnographic literature, the study demonstrates that colonial land policies dismantled complementary gendered land tenure systems and entrenched male-dominated ownership structures. Results show that colonial interventions constructed enduring patterns of gendered landlessness with lasting implications for post-independence agrarian policy and land reform debates. The study contributes to African agrarian history and gender studies by foregrounding women's land rights in historical analysis.

Keywords: Gender; Land tenure; Colonialism; Mwea plains; Agrarian history; Customary land rights.

INNOVATION, DIGITAL TRANSFORMATION, AND GOVERNANCE AS CATALYSTS FOR ENTREPRENEURSHIP AND SOCIAL EMPOWERMENT

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Abstract

This study explores the interconnections between innovation, digital transformation, governance, entrepreneurship, and social empowerment as drivers of industry resilience and global sustainability. Using a systematic desktop review of peer-reviewed literature and policy reports, the study demonstrates that digital transformation expands entrepreneurial opportunities, effective governance fosters inclusive participation, and entrepreneurship enhances social empowerment through employment and income generation. However, digital inequality and governance inefficiencies remain significant constraints, particularly in developing economies. It is concluded that integrated policy frameworks are essential to achieving sustainable and resilient economic systems.

Keywords: Digital transformation; Governance; Entrepreneurship; Social empowerment; Industry resilience; Sustainability.

EFFECT OF AGENCY BANKING ON THE GROWTH OF COMMERCIAL BANKS IN KIRINYAGA COUNTY; A CASE STUDY OF FOUR SELECTED COMMERCIAL BANKS

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Abstract

Agency banking has emerged as a transformative financial innovation aimed at expanding access to banking services among underserved populations. By enabling third-party agents such as retail outlets to deliver basic financial services on behalf of banks, agency banking reduces operational costs while improving financial inclusion. This study examined the effect of agency banking on growth of selected commercial banks in Kirinyaga County. The study was anchored on Bank-Led Model Theory, Agency Theory, Financial Innovation Theory, and Diffusion of Innovation Theory. A descriptive research design was adopted using a mixed-methods approach. Data was collected from 60 respondents drawn from four commercial banks using structured questionnaires, interviews, and document analysis. Descriptive and inferential statistical techniques were applied, including regression analysis to examine the relationship between agency banking metrics and bank growth. Results show that operational cost efficiency, increased transaction volumes, expansion of agent networks, deposit mobilization, and improved loan repayment significantly contribute to growth of commercial banks. It is concluded that agency banking provides a scalable and cost-effective model for expanding financial services and strengthening financial performance of banks. There is need for increased investment in agent network expansion and adoption of agency banking by other financial institutions, including deposit-taking SACCOs.

Keywords: Agency banking, Financial inclusion, Commercial bank growth, Branchless banking, Financial innovation.

THE DIGITAL PARADOX; ASSESSING THE IMPACT OF HEALTH INFORMATION SYSTEMS ON COGNITIVE LOAD, PATIENT INTERACTION, AND WORK-LIFE INTEGRATION AMONG MEDICAL PRACTITIONERS IN KIRINYAGA COUNTY

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Abstract

The increasing integration of Health Information Systems (HIS) within healthcare institutions has significantly transformed clinical workflows and service delivery processes. However, while digital systems enhance efficiency and data management, they also introduce new challenges related to cognitive workload, administrative demands, and work-life integration among healthcare professionals. This study examined the impact of HIS adoption strategies on performance of medical practitioners in Level 4 and Level 5 hospitals in Kirinyaga County, Kenya. Anchored in the Job Demands-Resources (JD-R) Model, the study adopted a descriptive cross-sectional research design involving 272 respondents selected through stratified random sampling from a target population of 990 healthcare professionals. Data was collected using structured questionnaires incorporating the System Usability Scale (SUS). Statistical analysis was conducted using SPSS version 26, employing descriptive statistics, multiple regression analysis, ANOVA, and F-tests. Findings indicate that IT infrastructure stability, system usability, administrative screen-time demands, and digital work-life boundaries significantly influence practitioner performance. Collectively, these variables explained 78.1% of performance variance. It is concluded that improved infrastructure reliability and user-centered system design are critical for optimizing HIS benefits while minimizing digital fatigue among healthcare practitioners.

Keywords: Health information systems; Digital workload; Healthcare performance; Cognitive load; Digital transformation.

INTERNET BANKING AND SUSTAINABILITY OF REGISTERED COMMERCIAL BANKS IN KENYA

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Abstract

The rapid growth of financial technology (FinTech) innovations has accelerated adoption of internet banking across commercial banking systems worldwide. While digital banking platforms enhance convenience and operational efficiency, they also introduce competitive pressures from non-bank financial service providers. This study examined the influence of internet banking on sustainability of registered commercial banks in Kenya. The study employed a quantitative research design using survey data collected from employees working in registered commercial banks. A sample of 120 respondents was selected from a target population of 210 bank officials using random sampling techniques. Data was collected using structured questionnaires and analyzed using statistical methods to examine the relationship between internet banking adoption and institutional sustainability. Results indicate that internet banking significantly enhances operational efficiency, service accessibility, and customer engagement, thereby contributing positively to long-term sustainability of commercial banks. However, increased competition from digital financial platforms poses strategic challenges for traditional banking institutions. There is need for commercial banks to strengthen online banking platforms, expand digital lending services, and invest in secure and efficient digital infrastructure to maintain competitive advantage in the evolving financial ecosystem.

Keywords: Internet banking; FinTech; Banking sustainability; Digital banking; Commercial banks.

MODERATING EFFECT OF GOVERNMENT REGULATIONS ON THE RELATIONSHIP BETWEEN CREDIT RISK MANAGEMENT AND LOAN PERFORMANCE IN CREDIT-ONLY MICROFINANCE INSTITUTIONS

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Abstract

Credit-Only Microfinance Institutions (COMFIs) play a critical role in enhancing financial inclusion by providing credit services to underserved populations, particularly small-scale entrepreneurs and low-income households. However, increasing loan defaults continue to threaten their financial sustainability. This study investigated the moderating effect of government regulations on the relationship between credit risk management practices and loan performance in COMFIs operating in Central Kenya. A mixed-methods research design was adopted, integrating quantitative survey data with qualitative insights from interviews with microfinance managers and credit officers. Regression analysis was used to examine the influence of credit risk management practices – including risk identification, credit policy implementation, and loan monitoring – on loan performance. Results show that effective credit risk management significantly improves loan repayment outcomes and reduces default rates. Furthermore, government regulations play a significant moderating role by strengthening institutional compliance and risk governance frameworks. Strengthening regulatory enforcement and improving credit risk management systems are essential for enhancing financial sustainability of microfinance institutions.

Keywords: Credit risk management; Loan performance; Microfinance institutions; Government regulations; Financial inclusion.

ASSESSING THE EFFECT OF CREDIT RISK IDENTIFICATION ON LOAN PERFORMANCE IN CREDIT-ONLY MICROFINANCE INSTITUTIONS IN CENTRAL KENYA

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Abstract

Credit-Only Microfinance Institutions (COMFIs) play an important role in extending financial services to individuals and small enterprises that lack access to traditional banking systems. However, inadequate credit risk identification mechanisms often result in high loan default rates and financial instability. This study examined the effect of credit risk identification practices on loan performance among COMFIs operating in Central Kenya. A descriptive research design was employed, with data collected using questionnaires and interviews from key stakeholders within microfinance institutions. Regression analysis was conducted to evaluate the relationship between credit risk identification practices and loan performance indicators such as repayment rates and non-performing loans. Results indicate that comprehensive borrower screening, background verification, and use of credit reference bureaus significantly enhance loan performance by reducing default risk. Strengthening credit risk identification processes is essential for improving sustainability of microfinance institutions. There is need for greater utilization of credit information systems and improved borrower assessment mechanisms.

Keywords: Credit risk identification; Loan performance; Microfinance institutions; Credit assessment; Non-performing loans.

EMPLOYEE RESILIENCE AND WELL-BEING IN THE ERA OF DIGITAL TRANSFORMATION

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Digital transformation is rapidly reshaping organizational environments through integration of automation technologies, artificial intelligence, remote collaboration tools, and data-driven systems. While these innovations enhance efficiency and productivity, they also introduce psychological demands such as techno-stress, digital overload, and blurred work-life boundaries. This study explores employee resilience and well-being in the context of digitally transforming workplaces. Using a narrative desk review approach, the study synthesizes scholarly literature published between 2017 and 2025 in the fields of organizational psychology, occupational health, and digital work research. The review identifies major digital-era stressors, individual coping mechanisms, and organizational practices that support employee adaptation to technological change. Results suggest that digital transformation may increase risks of burnout and workplace anxiety when institutional support systems are inadequate. However, resilience can be strengthened through personal resources such as adaptability, emotional intelligence, and self-efficacy, as well as organizational practices including leadership support, skills development initiatives, and work-life balance policies. The study highlights the importance of human-centered digital transformation strategies to sustain employee well-being and workforce productivity.

Keywords: Employee resilience; Digital transformation; Workplace well-being; Technostress; Organizational sustainability.

TOURISM INVESTMENT IN RWANDA

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Tourism has emerged as a central pillar of Rwanda's economic transformation and long-term development strategy. Over the past two decades, sustained public and private investment in tourism infrastructure, conservation initiatives, and hospitality services have significantly expanded the country's tourism capacity and economic value creation. This study examines the scale, structure, and economic implications of tourism investment in Rwanda using an integrated Tourism Satellite Account (TSA) and Social Accounting Matrix (SAM) multiplier framework. Drawing on recent data from the Rwanda Development Board, National Bank of Rwanda, and the World Travel and Tourism Council, the study quantifies tourism-related Gross Fixed Capital Formation and analyzes intersectoral linkages with construction, transportation, financial services, and trade sectors. Results indicate that tourism investment accounts for approximately 8-12% of Rwanda's total capital investment annually. Multiplier analysis demonstrates strong economic spillover effects through employment creation, foreign exchange earnings, and domestic supply chain development. Rwanda's high-value, low-volume tourism investment strategy has notably generated significant macroeconomic benefits. However, sustaining these gains requires careful infrastructure planning, climate-resilient tourism development, and strengthened monitoring of investment efficiency.

Keywords: Tourism investment; Rwanda; Gross fixed capital formation; Tourism satellite account; Sustainable tourism.

THE STEWARD FRAMEWORK: FORMALIZING THE INFORMAL ECONOMY THROUGH TRUST-BASED ECONOMIC ARCHITECTURES

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Abstract

The informal economy accounts for more than 60% of global employment and represents a significant proportion of unrecorded economic activity. Despite numerous policy interventions aimed at formalizing informal economic activities through taxation, licensing, and financial inclusion initiatives, structural exclusion persists. This paper introduces the STEWARD Framework, a trust-based institutional architecture designed to formalize economic activity through contribution-based asset recognition systems. Drawing from institutional economics, governance theory, and socio-technical systems design, the study adopts a design science research methodology to conceptualize and evaluate the proposed framework. The STEWARD model integrates contribution ledgers, algorithmic verification systems, and quorum-based governance mechanisms to transform verified human effort into recognized economic assets. The study further introduces the VERITAS Ledger as a technical implementation mechanism supporting transparent and accountable economic participation. Results suggest that sustainable economic formalization requires institutional innovation rather than regulatory expansion. The proposed framework offers a novel pathway for strengthening economic inclusion, reducing governance failures, and unlocking dormant economic value within informal sectors.

Keywords: Informal economy; Economic formalization; Institutional trust; Governance systems; Contribution ledger.

A COMPARATIVE STUDY OF GARCH MODELS AND THE NADARAYA-WATSON KERNEL REGRESSION ESTIMATOR IN MODELLING THE VOLATILITY OF THE USD/KES EXCHANGE RATE

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Abstract

Exchange rate volatility is a critical concern for macroeconomic stability, investment decisions, and policy formulation in developing economies such as Kenya. Fluctuations in the USD/KES exchange rate significantly influence import costs, external debt servicing, and overall economic performance. Although parametric Generalized Autoregressive Conditional Heteroskedasticity (GARCH) models are widely used in volatility modelling, their reliance on restrictive assumptions may limit their ability to capture nonlinear dynamics in emerging foreign exchange markets. This study compares the performance of selected GARCH-family models—GARCH, EGARCH, GJR-GARCH, and APARCH—with the nonparametric Nadaraya-Watson kernel regression estimator in modelling and forecasting USD/KES exchange rate volatility. Daily indicative exchange rate data from the Central Bank of Kenya covering January 2003 to December 2023 ($n = 4,764$) are utilized. Log-returns are computed, and volatility is modelled under skewed Student-t distributions, while the Nadaraya-Watson estimator employs Silverman's rule-of-thumb bandwidth. Model performance is evaluated using AIC, MSE, RMSE, MAE, MAPE, SMAPE, and QLIKE. Results indicate strong volatility persistence and significant asymmetry across all models, with negative shocks exerting greater effects on volatility. The APARCH (1,1) model demonstrates superior in-sample fit ($AIC = -0.783$) and out-of-sample forecasting performance. The Nadaraya-Watson estimator effectively captures nonlinear relationships and provides useful graphical insights, though with comparatively lower predictive accuracy. The study concludes that while nonparametric methods enhance understanding of volatility dynamics, parametric GARCH models—particularly APARCH—remain more robust for forecasting. These findings offer valuable implications for risk management and exchange rate policy in emerging economies.

Keywords: Exchange rate volatility; USD/KES; GARCH models; APARCH; Nadaraya-Watson estimator; Volatility forecasting; Financial econometrics; Kenya.

DIGITAL INNOVATION AND GENDER INCLUSION: PATHWAYS TO GLOBAL SUSTAINABILITY AND RESILIENCE

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Abstract

Digital innovation is increasingly transforming global industries; however, its benefits remain unevenly distributed across social groups. Persistent gender disparities in access to digital technologies, skills development, and leadership opportunities continue to constrain inclusive participation, particularly in developing economies such as Kenya. This study examines how gender inclusion within digital innovation ecosystems influences sustainability and organizational resilience. Specifically, it assesses the level of digital innovation across key Kenyan industries, evaluates the extent of gender inclusion in digital transformation processes, and analyzes the relationship between inclusive innovation practices and resilience outcomes. A mixed-methods research design was adopted, integrating quantitative survey data (n = 180) from the agriculture, finance, education, and manufacturing sectors with qualitative insights from 18 semi-structured interviews involving female technology leaders, policymakers, and entrepreneurs. Quantitative data were analyzed using regression techniques to establish relationships between gender-inclusive practices and resilience indicators, while qualitative data were subjected to thematic analysis to uncover patterns related to access, leadership, governance, and participation. Findings indicate that digital innovation alone does not guarantee sustainability or resilience. Rather, industries that demonstrate higher levels of gender inclusion – particularly in equitable access to digital skills training, leadership representation, and participatory decision-making – exhibit significantly stronger adaptive capacity and sustainable outcomes. The study further identifies cybersecurity readiness and ethical governance frameworks as critical moderating factors shaping the effectiveness of inclusive digital transformation. The study concludes that gender inclusion is not merely a normative or equity-driven imperative but a strategic determinant of resilience in digitally evolving economies. It recommends the adoption of inclusive digital policies, targeted capacity-building initiatives, gender-responsive leadership development, and secure digital infrastructure to foster sustainable and future-ready industries. The findings contribute to emerging discourse on inclusive innovation by demonstrating that gender-responsive digital ecosystems are more adaptive, equitable, and resilient.

Keywords: Digital innovation; Gender inclusion; Digital transformation; Sustainability; Resilience; Cybersecurity; Inclusive innovation.

INNOVATION, DIGITAL TRANSFORMATION AND GOVERNANCE AS CATALYSTS FOR ENTREPRENEURSHIP AND SOCIAL EMPOWERMENT: PATHWAYS TO INDUSTRY RESILIENCE FOR GLOBAL SUSTAINABILITY

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Abstract

Escalating global economic volatility, rapid technological disruption, and intensifying socio-environmental pressures have amplified the need for integrative pathways toward sustainable development and industrial resilience. This study interrogates the synergistic relationship between innovation, digital transformation, governance quality, entrepreneurship, and social empowerment in shaping resilient economic systems. Adopting a systematic desktop review design, the study synthesizes evidence from peer-reviewed literature, policy frameworks, and institutional reports across both developed and developing contexts. The analysis demonstrates that digital transformation functions as a catalytic enabler of entrepreneurial ecosystems by expanding access to markets, financial services, and knowledge infrastructures, while robust governance architectures enhance institutional trust, regulatory efficiency, and inclusive participation. The findings further reveal that entrepreneurship constitutes a critical mechanism for social empowerment through employment generation, income diversification, and community-level agency, particularly among structurally marginalized populations. Industry resilience is conceptualized as an emergent property of adaptive capacity, underpinned by technological innovation, institutional coherence, and multi-stakeholder collaboration. However, structural constraints—including digital divides, governance deficits, regulatory rigidities, and fragmented innovation systems—continue to undermine sustainability transitions, especially in developing economies. The study advances a holistic policy framework integrating digital infrastructure development, governance reform, entrepreneurial capacity building, and inclusive innovation ecosystems as prerequisites for achieving sustainable and resilient industrial transformation.

Keywords: Digital transformation; Governance; Entrepreneurial ecosystems; Social empowerment; Innovation systems; Industry resilience; Sustainable development.

TAKING SACCOs IN KENYA

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Abstract

Credit intermediation constitutes the core operational mechanism of Deposit-Taking Savings and Credit Cooperative Societies (DT-SACCOs), yet it presents inherent trade-offs between revenue generation and credit risk exposure. This study provides a rigorous empirical examination of the effect of credit access on the financial performance of DT-SACCOs in Kenya. Anchored in financial intermediation and risk-return trade-off theories, the study adopts a quantitative explanatory research design utilizing balanced panel data derived from audited financial statements and regulatory reports spanning 2015–2024. Credit access is operationalized through loan portfolio size, non-performing loan ratio, loan-to-deposit ratio, and credit growth rate, while financial performance is measured using Return on Assets (ROA) and Return on Equity (ROE). Advanced econometric techniques, including panel regression and diagnostic robustness tests, are employed to ensure validity and reliability of results. The study hypothesizes a positive association between credit expansion indicators and financial performance, moderated by the adverse effects of non-performing loans. The expected findings will elucidate the dynamic interplay between credit growth and risk exposure, offering critical insights for optimizing lending strategies. The study contributes to cooperative finance literature by providing evidence-based policy and managerial implications for enhancing financial sustainability in the SACCO sector.

Keywords: Credit access; Financial performance; DT-SACCOs; Credit risk; Panel data analysis; Kenya.

INCOME DIVERSIFICATION, DIGITAL TRANSFORMATION, AND BANK LIQUIDITY CREATION: EVIDENCE FROM KENYAN COMMERCIAL BANKS

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Abstract

This study investigates the joint effects of income diversification and digital transformation on liquidity creation among commercial banks in Kenya. While liquidity creation remains a core banking function underpinning economic growth, evolving business models – characterized by diversified income streams and rapid digitalization – raise critical questions regarding their combined influence on this role. Despite growing global evidence, empirical insights from frontier economies remain limited. The study employs an unbalanced panel dataset of 36 commercial banks over the period 2005–2024, using data sourced from audited financial statements and Central Bank of Kenya reports. Liquidity creation is measured using both the broad (Cat-Fat) and narrow (Cat-Non-Fat) approaches. Income diversification is proxied by the Herfindahl–Hirschman Index and Entropy Index, while digital transformation is captured through indicators reflecting the adoption and expansion of digital banking services. To address endogeneity, unobserved heterogeneity, and simultaneity bias, the study applies a two-step System Generalized Method of Moments (GMM) estimator. The findings reveal that income diversification significantly enhances banks' liquidity creation capacity. Similarly, digital transformation exerts a strong positive effect by improving operational efficiency, expanding outreach, and strengthening intermediation capabilities. The results underscore the complementary role of diversified income structures and digital innovation in reinforcing, rather than displacing, traditional banking functions. This study contributes to the limited body of literature on liquidity creation in developing economies by integrating digital transformation into the analysis framework. Policy implications highlight the need for regulators to promote balanced strategies that support responsible innovation and sustainable income diversification, thereby safeguarding and strengthening the core intermediation role of banks.

Keywords: Income diversification; Digital transformation; Liquidity creation; GMM; Kenya.

MODERATING EFFECT OF GOVERNMENT REGULATIONS ON THE RELATIONSHIP BETWEEN CREDIT RISK MANAGEMENT AND LOAN PERFORMANCE IN CREDIT-ONLY MICROFINANCE INSTITUTIONS

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Abstract

Credit-only Microfinance Institutions (COMFIs) are instrumental in promoting financial inclusion by extending credit to underserved populations, particularly micro-entrepreneurs and low-income households. However, rising loan default rates continue to undermine their financial sustainability. This study examines the moderating effect of government regulations on the relationship between credit risk management practices and loan performance among COMFIs in Central Kenya, focusing on Kirinyaga, Nyeri, Murang'a, and Kiambu counties. The study adopted a mixed-methods research design, integrating quantitative data from structured questionnaires with qualitative insights from semi-structured interviews targeting managerial and credit staff. Multiple regression analysis was used to evaluate the influence of key credit risk management practices—risk identification, risk assessment, credit policy, and monitoring—on loan performance, while moderation analysis assessed the interaction effect of government regulations. Qualitative data were analyzed thematically to contextualize regulatory influence. Findings reveal that robust credit risk management practices have a significant positive effect on loan performance. Moreover, government regulations significantly moderate this relationship by enhancing compliance, standardization, and institutional accountability. Nonetheless, inconsistencies in regulatory enforcement were found to constrain optimal outcomes. The study concludes that an effective and coherent regulatory framework strengthens the impact of credit risk management on loan performance. It recommends harmonization of regulatory policies, enhanced supervisory oversight, and capacity building for COMFIs to improve compliance and risk management efficiency. These measures are critical for enhancing portfolio quality and ensuring institutional sustainability.

Keywords: Credit risk management, Loan performance, Government regulations, Moderation effect, COMFIs, Kenya.

SUB-THEME: EDUCATION FOR SOCIETAL DEVELOPMENT

HOW CAN DIGITAL EQUITY INITIATIVES ADDRESS GENDERED DISPARITIES IN ACCESS TO TECHNOLOGY AND KNOWLEDGE?

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Abstract

Gendered disparities in access to digital technologies and knowledge remain a persistent challenge to inclusive participation in the knowledge society, particularly within post-colonial and resource-constrained contexts. Thus, despite the global commitments to digital inclusion, women and girls continue to experience systemic exclusion driven by intersecting socio-economic, cultural, and institutional factors. This conceptual paper examines how digital equity initiatives can be strategically leveraged to address gender-based disparities in access, use, and agency within digital ecosystems. Anchored in intersectionality theory and informed by critical pedagogy, the study analyses structural barriers such as infrastructure deficits, affordability constraints, and policy gaps, alongside socio-cultural obstacles including gender norms and underrepresentation in digital spaces. The paper synthesizes evidence from global and educational policy discourses to identify transformative strategies, including gender-responsive digital literacy programmes, inclusive curriculum design, and equity-centred leadership practices in educational institutions. The discussion is premised in the Sustainable Development Goals framework, highlighting digital equity as both a social justice and development imperative. The paper contributes to scholarship by reframing digital inclusion beyond access, emphasizing empowerment, knowledge redistribution, and participatory agency as critical outcomes of equitable digital transformation.

Keywords: Digital equity; Gender disparities; Educational leadership; Social inclusion; Policy and sustainability.

TEACHING EXPERIENCES AND PSYCHOLOGICAL WELL-BEING OF TEACHERS IN SPECIAL SCHOOLS AND UNITS IN ZOMBA DISTRICT, MALAWI

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Abstract

Teachers' psychological well-being is increasingly recognized as a critical determinant of instructional quality, learner engagement, and inclusive educational outcomes, particularly in special education settings. However, teachers in special schools often face heightened emotional, instructional, and workload demands that may adversely affect their well-being. This study investigated the influence of teaching experiences, instructional practices, workload, and teacher-student engagement on the psychological well-being of teachers in special schools and units in Zomba District, Malawi. Guided by the Job Demand-Control Model and Ryff's Psychological Well-Being framework, the study adopted a mixed-methods convergent parallel design involving a census of 52 teachers. Quantitative data was analyzed using descriptive and correlational statistics, while qualitative data was thematically analyzed. Results showed a weak but positive relationship between teaching experiences and psychological well-being, with instructional approaches such as assistive technology use, project-based learning, and individualized instruction associated with higher levels of teacher satisfaction. Excessive workload, limited preparation time, and inadequate institutional support emerged as key stressors. Positive teacher-student relationships and supportive classroom environments were identified as protective factors. The study underscores the need for policy-driven interventions that prioritize teacher well-being through workload regulation, continuous professional development, and psychosocial support systems in special education contexts.

Keywords: Teacher well-being; Teaching experiences; Inclusive education; Institutional support; Educational policy.

ASSESSMENT OF BoM COMMUNITY INVOLVEMENT PRACTICES ON EFFECTIVE GOVERNANCE OF PUBLIC PRIMARY SCHOOLS IN NYERI COUNTY, KENYA

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Abstract

Effective school governance is fundamental to provision of quality education and achievement of positive learning outcomes. In Kenya, Boards of Management (BoM) are legally mandated to oversee governance in public primary schools; however, governance challenges persist, often linked to limited stakeholder engagement. This study assessed the influence of BoM community involvement practices on effective governance of public primary schools in Nyeri County, Kenya. Grounded in Agency Theory, the study employed a descriptive research design targeting head teachers and BoM chairpersons. Data was collected using structured questionnaires and analyzed using descriptive and inferential statistical techniques. Results indicate that active community involvement significantly enhances school governance by improving accountability, transparency, resource mobilization, and stakeholder trust. Schools with stronger BoM–community collaboration demonstrated more effective decision-making processes and supportive learning environments. It is concluded that community participation is a critical governance lever and hence a need for policy measures to strengthen BoM capacity, institutionalize stakeholder engagement frameworks, and promote shared responsibility in school governance. These results contribute empirical evidence to governance discourse in basic education within decentralized education systems.

Keywords: School governance; Community involvement; Educational leadership; Accountability; Policy and management.

EFFECTS OF REDUCED EXPOSURE TO FASIHI (LITERATURE) IN KENYAN SENIOR SECONDARY SCHOOLS

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Abstract

The transition of Kenya's education system from the 8-4-4 structure to the Competency-Based Curriculum (CBC) was intended to foster holistic learner development through integration of critical thinking, communication, creativity, and ethical citizenship. However, marginalization of Fasihi (literature) in senior secondary schools presents a growing pedagogical concern. Fasihi, encompassing prose, poetry, and drama, plays a critical role in cultivating empathy, critical consciousness, cultural identity, and aesthetic appreciation. Despite its historical contribution to learner development through prescribed texts such as *Utengano* and *Siku Njema*, Fasihi is no longer a compulsory learning area in senior schools, with enrollment rates falling below 5% in many institutions and some schools registering zero uptake. Guided by Constructivist Learning Theory, this study investigated the factors influencing students' avoidance of Fasihi and examined the educational implications of reduced exposure to literary studies. A qualitative-dominant mixed-methods approach was adopted, employing purposive sampling of Grade 10 students from selected senior schools. Data was collected using semi-structured interviews and questionnaires and analyzed thematically. Results indicate that curriculum overload, assessment-driven subject selection, limited awareness of the cognitive and socio-cultural value of literature, and perceived lack of career relevance contribute to declining enrollment. It is concluded that reduced engagement with Fasihi undermines holistic learner development, critical literacy, and cultural continuity. There is need for curriculum re-alignment, learner sensitization, and pedagogical innovation to reposition literature as a core component of competency-based education in Kenya.

Keywords: Fasihi; Literature education; Competency-based curriculum; Holistic learning; Constructivist theory; Kenyan education.

GEN Z REVOLUTION IN KENYA: A PARADIGM SHIFT IN REDEFINING THE MEANING OF GOOD GOVERNANCE

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Abstract

Youth-led civic activism has emerged as a defining force in contemporary governance discourses, particularly within democratic but socio-economically strained contexts. In Kenya, the nationwide Gen Z-driven protests against the Finance Bill 2024 marked a critical turning point in the public interrogation of governance, accountability, peace, and security. This paper examines how the June–July 2024 Gen Z mobilization constitutes a paradigm shift in redefining the meaning and practice of good governance in Kenya. Anchored in Participatory Democratic Theory and Social Movement Theory, the study premises the protests within the Kenya’s constitutional framework, particularly Article One, which vests sovereign power in the people.

Adopting a qualitative-dominant mixed-methods approach, the study draws on direct observation, systematic analysis of social media discourse, and content analysis of mainstream media reports to examine the organization, narratives, and impact of the Gen Z movement. Results show that the leaderless, decentralized, and digitally coordinated nature of the protests disrupted traditional political mobilization models and compelled the state to rescind the Finance Bill despite initial executive resolve. The movement reframed governance as a participatory, accountable, and citizen-driven process rather than an elite-controlled institutional exercise. It is concluded that the Gen Z protests signal an emergent civic consciousness that challenges conventional notions of political authority and security. It argues that sustainable development in Kenya increasingly depends on inclusive governance structures that recognize youth agency, digital activism, and constitutional accountability as central pillars of democratic resilience.

Keywords: Gen Z activism; Good governance; Youth participation; Digital mobilization; Democratic accountability; Kenya.

THE INTERPLAY OF SELF-EFFICACY AND EMOTIONAL RESILIENCE: A PATH ANALYSIS OF PSYCHOLOGICAL FLOURISHING IN KENYAN UNIVERSITIES

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Abstract

In contemporary higher education environments characterized by academic pressure, digital disruption and socio-economic uncertainty, student success increasingly depends on psychological as well as cognitive capacities. This conceptual study explores the structural relationships between self-efficacy, emotional resilience, and psychological flourishing among university students in Kenya. Guided by Social Cognitive Theory, Positive Psychology, and Emotional Intelligence frameworks, the study employs a desktop research design and narrative synthesis of literature published between 2020 and 2025. A conceptual path model is proposed in which self-efficacy predicts academic engagement and motivation, emotional resilience mediates responses to adversity, and emotional intelligence moderates the relationship between belief systems and well-being outcomes. The synthesis indicates that while self-efficacy initiates academic drive, its positive effects on flourishing are contingent upon students' emotional regulation capacities. The study contributes theoretically by integrating cognitive and affective dimensions of student success and offers practical implications for psychosocial support interventions in Kenyan universities.

Keywords: Self-efficacy; Emotional resilience; Emotional intelligence; Psychological flourishing; Higher education; Path analysis.

SMART UNIVERSITIES AND DIGITAL ECOSYSTEMS IN SUB-SAHARAN AFRICA: BUILDING RESILIENT HIGHER EDUCATION SYSTEMS FOR THE FOURTH INDUSTRIAL REVOLUTION**Zigama, J. C¹. & Mutuku, D. M².**¹Kabarak University, KENYA²Kirinyaga University, KENYA**Correspondence:** jczigama@kabarak.ac.ke***Abstract***

Higher education systems in Sub-Saharan Africa face mounting pressure to adapt to rapid technological changes, expanding enrolments, and increasing demands for innovation-driven economies under the Fourth Industrial Revolution (4IR). This conceptual study examines the role of smart universities and integrated digital ecosystems in enhancing institutional resilience and educational relevance in the region. Guided by systems theory and digital transformation perspectives, the paper synthesizes scholarly literature and regional policy frameworks published between 2015 and 2025. Results indicate that investments in intelligent digital infrastructure, blended and online learning platforms, data-driven governance, and artificial intelligence-supported pedagogy significantly enhance institutional adaptability, continuity, and inclusivity. It is concluded that the development of smart universities within collaborative digital ecosystems offers a viable pathway for building resilient, future-ready higher education systems in Sub-Saharan Africa.

Keywords: Smart universities; Digital ecosystems; Higher education resilience; Fourth Industrial Revolution; Sub-Saharan Africa; Digital transformation.

SYLLABUS COVERAGE, ACADEMIC INTEGRITY, AND EXAMINATION MALPRACTICES IN SECONDARY SCHOOLS OF GARISSA COUNTY, KENYA

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Abstract

Academic integrity remains a cornerstone of quality education, yet examination malpractices persist in many secondary schools in Kenya. This study investigates the relationship between syllabus coverage and academic integrity in secondary schools in Garissa County of Kenya. Employing a descriptive survey design, the study targeted Principals, teachers, and student leaders from 38 public secondary schools. Data was collected using questionnaires and interviews and analyzed using descriptive statistics and Pearson correlation analysis. Results showed a moderate but statistically significant relationship between syllabus coverage and levels of academic integrity and examination malpractice. The study underscores the role of effective curriculum implementation in promoting ethical academic behavior and provides evidence-based insights for strengthening institutional policies and instructional practices.

Keywords: Syllabus coverage; Academic integrity; Examination malpractices; Secondary education; Kenya.

EXTRACURRICULAR ACTIVITY PARTICIPATION AND SCHOOL BELONGING AMONG SECONDARY SCHOOL STUDENTS IN KIAMBU COUNTY, KENYA

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Abstract

School belonging is a critical psychosocial factor associated with positive academic and mental health outcomes among adolescents. This study examines the relationship between participation in extracurricular activities and students' sense of school belonging in public secondary schools in Kiambu County, Kenya. Using a descriptive research design, data was collected from 385 students selected through random sampling. School belonging was measured using an adapted Psychological Sense of School Membership Scale. Results indicate that students who participated in extracurricular activities reported significantly higher levels of school belonging, with participation in clubs and sports emerging as significant predictors. Results suggest that promoting diverse extracurricular opportunities can enhance students' psychosocial well-being and engagement.

Keywords: Extracurricular activities; School belonging; Secondary school students; Psychosocial well-being; Kenya.

GRADUATE STUDENTS' LIVED EXPERIENCES AND PERCEPTIONS OF USING WEBLOGS FOR REFLECTIVE LEARNING

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Abstract

Weblogs have emerged as valuable tools for reflective learning in higher education. This phenomenological study explores graduate students' lived experiences and perceptions of using course-specific weblogs for reflection. Data was collected using in-depth interviews and analyzed thematically. Results indicate that weblogs support critical thinking, community building and knowledge synthesis, while challenges include limited guidance and concerns over privacy. It is concluded that structured integration of weblogs can enhance reflective learning hence the need for clear pedagogical frameworks to maximize effectiveness.

Keywords: Weblogs; Reflective learning; Graduate students; Educational technology; Higher education.

RESEARCH FUNDING IN AFRICA; NAVIGATING LIMITED RESOURCES AND BUILDING PARTNERSHIPS

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Abstract

Research is central to economic development and innovation, yet African scholars face persistent funding constraints. This paper reviews the status of research funding in Africa, sources of funding, and challenges faced by researchers. Drawing on literature, the study highlights partnerships and collaboration as critical strategies for enhancing research capacity and sustainability. The paper offers policy and institutional recommendations for building resilient research ecosystems through strategic partnerships.

Keywords: Research funding; Research partnerships; Capacity building; Africa; Higher education.

THE INFLUENCE OF COMPETENCY-BASED EDUCATION ON TEACHER PROFESSIONAL DEVELOPMENT IN KIRINYAGA COUNTY, KENYA

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Abstract

This study investigates the influence of Competency-Based Education on professional development of public primary and junior secondary school teachers in Kirinyaga County, Kenya. Using a descriptive survey design, data was collected using structured questionnaires and analyzed using descriptive and inferential statistics. Results indicate that learner-centered pedagogies and formative assessment practices under CBE significantly enhance teachers' instructional competence, creativity, and professional engagement. However, challenges related to training adequacy and resource availability persist. The study underscores the need for sustained institutional support to maximize the professional development benefits of CBE.

Keywords: Competency-based education; Teacher professional development; Learner-centered pedagogy; Kenya.

INFLUENCE OF DIGITAL SIMULATIONS AND VIRTUAL LABORATORIES ON CONCEPTUAL UNDERSTANDING, ENGAGEMENT, AND ACHIEVEMENT IN SECONDARY SCHOOL BIOLOGY IN KAKAMEGA COUNTY, KENYA

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Abstract

Persistent underachievement in secondary school Biology in Kenya has been associated with limited laboratory infrastructure, abstract content, and teacher-centred pedagogies. Rapid advancements in Information and Communication Technology (ICT) present transformative opportunities through Digital Simulation and Virtual Laboratory-Based Instruction (DS-VLBI), which enables interactive visualization of complex biological processes. This study examined the influence of DS-VLBI on students' conceptual understanding, engagement, and academic achievement in Kakamega County of Kenya. Anchored in the Cognitive-Affective Theory of Learning with Media (CATLM), the study adopted a quasi-experimental pretest-posttest control group design involving 349 Form Four students (241 experimental; 108 control) and 46 Biology teachers. Data was collected using standardized pretests and posttests, Conceptual Understanding Tests, Student Engagement Questionnaires, and semi-structured interviews. Quantitative data was analyzed using ANOVA, z-tests, and multiple regression, while qualitative data were thematically analyzed to triangulate findings. Pretest results indicated no significant differences between groups ($p > 0.05$). However, post-intervention findings revealed statistically significant gains in the experimental group ($M = 67.45$, $SD = 8.78$) compared to the control group ($M = 48.67$, $SD = 6.89$), $p < 0.001$, with learner engagement partially mediating achievement outcomes. It is concluded that CATLM-aligned DS-VLBI significantly enhances conceptual mastery, motivation, and performance in Biology. There is need for strategic ICT investment, structured integration of virtual laboratories into the curriculum and sustained teacher professional development to advance technology-enhanced science education in Kenya.

Keywords: Digital simulations; Virtual laboratories; Biology education; Conceptual understanding; Student engagement; Academic achievement.

ADAPTATION IN KENYA'S ICT REVOLUTION

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This study examines the digital transformation of Kenya's oral artistic traditions within the evolving Information and Communication Technology (ICT) landscape. Focusing on Kamba popular music, it explores cinematic adaptations and hybrid audiovisual productions, with Ken Wa Maria as a central case study. Using textual and visual analysis, digital ethnography across platforms such as YouTube, Apple Music, and Spotify, and stakeholder interviews, the study highlights three dynamics: namely democratization of creative production via accessible digital tools, fusion of music and cinematic aesthetics, and amplified sociopolitical influence of artists in digital public spheres. Results demonstrate that ICT innovations are revitalizing oral traditions, fostering hybrid cultural expressions where heritage and digital storytelling converge. There is need for advancement of policies to enhance technological literacy, support rural artists, and safeguard creative freedom.

Keywords: ICT; Oral traditions; Kamba music; Digital transformation; Cinematic adaptation; Cultural innovation; Kenyan creative industries.

UNIVERSITY-INDUSTRY LINKAGES AS A STRUCTURAL CATALYST FOR COMPETENCY-BASED CURRICULUM REFORM IN KENYAN HIGHER EDUCATION

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Abstract

Kenya's transition to Competency-Based Education and Training (CBET) necessitates alignment of higher education with labour market needs. This study investigates university-industry collaborations as structural mechanisms to enhance CBET curriculum relevance. Evidence from the Kenya Association of Manufacturers (KAM), Technical and Vocational Education and Training Authority (TVETA), and selected universities reveals persistent skills mismatches. Analysis of policy frameworks, institutional practices, and Commission for University Education (CUE) guidelines highlights the role of Sector Skills Advisory Committees in bridging gaps. Results underscore the importance of sustained partnerships, industry participation in curriculum design, and resource allocation to improve graduate employability and responsiveness to emerging technological trends, including AI.

Keywords: Competency-based education; University-industry collaboration; Curriculum reform; Skills mismatch; Kenyan higher education; Sector skills advisory.

PREVALENCE AND CORRELATES OF POST-TRAUMATIC STRESS DISORDER AMONG
TEACHERS IN BANDIT-PRONE AREAS OF BARINGO COUNTY, KENYA

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Abstract

Banditry in Baringo County, Kenya, poses severe security challenges, affecting social and educational systems. This study investigates the prevalence and correlates of Post-Traumatic Stress Disorder (PTSD) among teachers in these conflict-affected areas, guided by Frustration-Aggression Theory. A mixed-methods design was used to collect quantitative data from 384 teachers using PCL-5 and DASS-21 instruments, complemented by qualitative interviews. Results indicate high PTSD prevalence across intrusion (98.96%), avoidance (90.10%), negative cognition/mood (94.53%), and arousal/reactivity (95.31%) clusters, with 87.25% meeting criteria for probable PTSD. Themes of professional identity erosion, persistent trauma responses, and psychosocial strain emerged. The study emphasizes the need for trauma-informed interventions, institutional safety measures, and policy support to safeguard teacher welfare and educational stability.

Keywords: Post-traumatic stress disorder; Banditry; Teacher mental health; Occupational trauma; Conflict-affected education

LITERATURE AS A SHAPER OF CONTEMPORARY KENYAN POLITICAL DISCOURSES: A CLOSE STUDY OF GEN Z'S LITERARY LANGUAGE

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Abstract

This paper explores how literary language shapes contemporary Kenyan political discourse, focusing on Generation Z's digital and public interventions. Drawing on Bhabha's hybridity concept and Butler's performativity theory, it positions literature as a dynamic medium of political expression and protest aesthetics. Through qualitative discourse analysis of speeches, protest chants, slogans, and social media texts, the study identifies hybrid linguistic performances – including metaphor, satire, code-mixing, and intertextuality – that challenge dominant political narratives. Results show that Gen Z's literary interventions operate in a "third space," reconstructing citizenship and accountability within Kenya's evolving democratic culture.

Keywords: Kenyan political culture; Generation z; Literary language; Hybridity; performativity; Political discourse; Digital aesthetics; Postcolonial theory.

INTERROGATING EQUITY, EQUALITY AND SOCIAL INCLUSION IN COMPETENCE-BASED ASSESSMENT IN KENYA

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Abstract

Competency-Based Education (CBE) in Kenya emphasizes critical thinking and problem-solving but faces challenges in promoting equity, equality, and social inclusion in assessment. This study reviews literature and policy documents, guided by Social Equity Theory, to evaluate how assessment practices influence inclusive learning outcomes. Results indicate that disparities in resource allocation, inconsistent implementation, and limited institutional support hinder equitable outcomes. There is need for improved teacher capacity, inclusive assessment policies, and strengthened resource distribution to ensure all learners benefit under the CBE frameworks.

Keywords: Equity; Equality; Social inclusion; Competency-based education; Assessment; Foundational learning.

EFFECTIVENESS OF SOLID WASTE MANAGEMENT STRATEGIES IN KISUMU CITY, KENYA

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Rapid urbanization in Kisumu City has intensified solid waste management challenges, threatening environmental sustainability and public health. This study evaluates the effectiveness of existing strategies, including private sector participation, public awareness campaigns, and recycling initiatives. Using a descriptive research design with 300 residents and 10 key informants, data was analyzed quantitatively (SPSS) and qualitatively. Results show that private sector involvement significantly improves collection efficiency ($r = 0.69$, $p < 0.0001$), awareness campaigns enhance community engagement, and recycling contributes moderately to performance ($r = 0.35$). Integrated strategies combining stakeholder participation and environmental education are critical for sustainable urban waste management.

Keywords: Solid waste management; Urban sustainability; Recycling; Public awareness; Environmental management

INFLUENCE OF COST-BENEFIT ANALYSIS OF DIGITAL INVESTMENTS ON STUDENTS' COMPLETION RATES IN PUBLIC UNIVERSITIES IN KENYA

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Abstract

Public universities in Kenya invest in digital infrastructure to enhance student completion rates, yet low graduation and high dropout persist. This study examines the impact of cost-benefit analysis of digital investments on student progression. A descriptive survey of 300 respondents – including Chairpersons of academic departments, ICT staff and undergraduate students – analyzed quantitative and qualitative data using SPSS. Findings reveal a significant positive relationship between cost-benefit evaluation and completion rates ($r = 0.62$, $p < 0.05$), with 38% of variance explained. Universities that assess financial, operational, and academic benefits report higher timely completion. There is need for structured cost-benefit frameworks, adequate funding, and continuous monitoring of digital systems' impact on student completion rates.

Keywords: Cost-Benefit Analysis; Digital Investments; Student Completion Rates; Public Universities; Educational Technology

FASIHI KAMA MIKAKATI WA KUKUZA MAADILI MIONGONI MWA WANAFUNZI KATIKA MTAALA WA UMILISI

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Ikisiri

Mtaala wa umilisi ulianzishwa kama njia ya kuboresha elimu kwa watoto nchini Kenya. Kati ya malengo yake makuu, mtaala huu ulinua kuwakuza wanafunzi wawe wananchi bora wa kutegemewa. Ulinua kukuza maadili bora, uwajibikaji na kuthamini watu wengine. Fasihi ni kati ya mikakati mmojawapo ambao kwayo maadili hukuzwa na kufunzwa. Makala haya yanalenga kuchunguza mchango wa fasihi katika kukuza maadili kwa wanafunzi wanaosoma mtaala wa umilisi. Data ya uchunguzi huu itapatikana kutokana na usomaji kina wa malengo na madhumuni ya mtaala huu pamoja na sera ya elimu iliyozaa mtaala huu. Mtaala na machapisho mengine kuhusu sera ya elimu nchini Kenya yatahakikiwa na kurejelewa. Data zaidi itatokana na uhakiki wa novela mbili ambazo zitateuliwa kwa mbinu kusudio. Hii ni kwa sababu novela zitakazoteuliwa ni kati ya zile ambazo zimeidhinishwa na taasisi ya ukuzaji mtaala ya KICD kutumiwa kufunzia katika gredi za saba. Novela za gredi ya saba zitateuliwa kwa vile hii ndio gredi ya kwanza katika daraja la pili la elimu katika mfumo huu. Hii ni daraja ya shule za sekondari msingi. Novela ambazo zitateuliwa kutumiwa katika uhakiki huu ni *Uteuzi wa Chale* (Matei 2022) na *Mshale wa Matumaini* (Habwe 2022). Uchunguzi huu utachukulia kuwa uidhinishaji wa novela na tungo zingine za kifasihi kwa shule huzingatia kikamilifu sera na malengo ya elimu nchini. Tunajiuliza, malengo ya elimu kwa mujibu wa mtaala wa umilisi ni yepi? Je, malengo haya yanaendelezwa katika novela teule kwa gredi ya saba? Maadili muhimu yamesisitizwa katika novela hizi? Haya ndiyo maswali ambayo tutajizatiti kuyajibu katika makala haya. Uchunguzi huu utaongozwa na nadharia ya maadili. Itakuwa data ya kinaelezo kwa hivyo itachanganuliwa na kuwasilishwa kwa njia ya kinaelezo.

Istilahi Muhimu: Fasihi; Maadili; Mtaala wa kiumilisi na novella.

A STUDY ON THE LEXICAL TRANSLATION PROBLEMS IN THE KĪKAMBA BIBLE

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Translation plays a critical role in facilitating cross-cultural communication by reproducing the meaning and stylistic features of a source language within a target language. Biblical translation presents unique linguistic and cultural challenges because the original texts originate from historical and socio-cultural contexts that differ significantly from those of contemporary target-language communities. In many African languages, including Kikamba, achieving lexical equivalence between the source and target languages is often complicated by semantic, cultural, and contextual differences. This study investigates lexical translation challenges encountered in the translation of the Bible into the Kikamba language. The study seeks to identify the major lexical problems that arise during the translation process and to examine how these challenges influence meaning transfer and interpretation within the target language context. A descriptive research design was adopted, employing purposive sampling to select one book from each of the seven biblical categories. Two chapters from each selected book were analyzed. Data were collected through a comparative textual analysis of the English Revised Standard Version (RSV) Bible and the Kikamba Bible, with particular attention to lexical choices and translation equivalence. The findings reveal five major categories of lexical translation challenges: culture-specific terms, words lexicalized differently in the target language, expressions lacking direct one-word equivalents, polysemous words with multiple contextual meanings, and archaic lexical forms in the source text. These challenges largely stem from linguistic and cultural differences between the source language and the Kikamba linguistic environment. The study concludes that effective biblical translation requires translators to possess strong linguistic competence, deep cultural understanding of both languages, and mastery of appropriate translation strategies to address lexical gaps. The study contributes to applied linguistics and translation studies, particularly in the context of Bible translation in African languages.

Keywords: Biblical translation; Lexical equivalence; Kikamba language; Source text; Target text; Translation studies.

WOMEN'S QUEST FOR EQUITY AND SOCIAL INCLUSION IN THE INVISIBLE WEEVIL

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This paper examines how female characters in *The Invisible Weevil* navigate entrenched socio-cultural and political structures that perpetuate gender inequality and exclusion in order to assert agency. It analyses the ways in which these characters' challenge and subvert patriarchal power relations that confine them to marginal positions. Particular attention is given to the representation of women and the pervasive nature of inequity and social injustice across different levels of society. Methodologically, the study adopts a qualitative textual analysis of the primary text, focusing on Nkwanzi's struggle against systemic social and political constraints that hinder female self-realization and potential. The analysis is informed by Gayatri Chakravorty Spivak's concept of subalternity, as articulated in *Can the Subaltern Speak?*, and bell hooks' notion of marginality as a space of resistance, as discussed in *Choosing the Margin as a Space of Radical Openness*. Drawing on these theoretical frameworks, the paper interrogates themes of female vulnerability, enforced silence as a structural practice, and the transformative strategies women employ to resist marginalization. It argues that through acts of resistance and self-assertion, female characters reconstruct their identities and ultimately attain agency, equity, and social inclusion.

Keywords: Gender; Equity; Social inclusion; Marginality; Representation.

UNIVERSITY LECTURERS' READINESS TO IMPLEMENT MODULARIZED CBET CURRICULUM IN KENYAN HIGHER EDUCATION INSTITUTIONS

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Abstract

The transition to Competency-Based Education and Training (CBET) in Kenya's higher education sector represents a paradigmatic shift toward outcomes-based, industry-aligned learning. This study critically evaluates university lecturers' readiness to implement modularized CBET curricula, with emphasis on pedagogical transformation, assessment competencies, and institutional support mechanisms. Drawing on a mixed analytical approach incorporating policy analysis and empirical insights, the study interrogates the extent to which academic staff are equipped to operationalize CBET principles. Findings reveal a significant awareness-implementation gap, wherein lecturers demonstrate conceptual understanding but lack the requisite pedagogical and assessment competencies for effective modular delivery. Key constraints include entrenched reliance on summative assessment models, limited industry engagement, and inadequate digital infrastructure to support competency tracking. Disciplinary disparities are evident, with STEM fields exhibiting relatively higher alignment with CBET practices. The study conceptualizes lecturer readiness as a multidimensional construct encompassing cognitive, technical, and institutional dimensions. It argues for a systemic, rather than incremental, reform approach, advocating for sustained professional retooling, industry-embedded academic models, and digitally enabled learning ecosystems.

Keywords: CBET; Modular curriculum; Lecturer readiness; Competency assessment; Higher education reform; Kenya.

FACTORS INFLUENCING THE IMPLEMENTATION OF THE COMPETENCY-BASED CURRICULUM: A CASE STUDY OF IVECHE PRIMARY SCHOOL, EMBU COUNTY, KENYA

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Abstract

The successful implementation of Kenya's Competency-Based Curriculum (CBC) is contingent upon the alignment of pedagogical practices, resource availability, and institutional support systems. This study investigates the determinants influencing CBC implementation at Iveche Primary School in Embu County. Grounded in Constructivist Learning Theory and Educational Change Theory, the study employs a descriptive cross-sectional design integrating quantitative and qualitative data. Findings indicate that while teachers exhibit moderate pedagogical competence and understanding of CBC principles, structural constraints—including excessive workload, inadequate instructional materials, and limited ICT infrastructure—significantly impede effective implementation. Additionally, gaps in leadership coordination, monitoring frameworks, and collaborative practices undermine institutional support. The study conceptualizes CBC implementation as a systemic process requiring coherence across teacher capacity, resource provisioning, and administrative governance. It concludes that targeted professional development, strategic resource investment, and strengthened institutional leadership are critical to achieving sustainable curriculum reform outcomes.

Keywords: Competency-based curriculum; Educational change; Teacher capacity; Resource constraints; Institutional support; Kenya.

INFLUENCE OF EXAMINATION VENUE ON EXAMINATION MALPRACTICES AMONG BACHELOR OF EDUCATION STUDENTS IN KENYA

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Abstract

Examination malpractice poses a significant threat to the integrity and credibility of higher education systems. This study examines the influence of examination venue characteristics on malpractice among Bachelor of Education fourth-year students in Kenyan public and private universities. Utilizing a mixed-methods research design, the study integrates quantitative survey data with qualitative interview insights to provide a comprehensive analysis. Findings reveal that spatial configuration, supervision intensity, security protocols, and environmental conditions within examination venues significantly shape students' propensity to engage in malpractice. Comparative analysis indicates institutional variations driven by policy enforcement mechanisms and organizational culture. The study advances a contextual understanding of malpractice as a function of environmental and systemic factors rather than solely individual behavior. It concludes that optimizing examination environments and strengthening institutional governance frameworks are essential for promoting academic integrity and ethical compliance.

Keywords: Examination malpractice; Assessment integrity; Learning environment; Higher education; Kenya.

CHALLENGES FACING THE IMPLEMENTATION OF COMPETENCY-BASED EDUCATION IN SENIOR SECONDARY SCHOOLS IN NAKURU COUNTY, KENYA

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Abstract

Kenya's transition to Competency-Based Education (CBE) represents a transformative shift toward skills-oriented learning; however, its implementation at the senior secondary level remains fraught with systemic challenges. This study investigates the constraints affecting the transition of Grade 10 learners from junior to senior secondary schools in Nakuru North Sub-County. Employing a descriptive case study design, the study targets school principals as key policy implementers, utilizing questionnaires and observational tools for data collection. Findings reveal critical gaps in policy preparedness, teacher training and retooling, resource allocation, and institutional capacity. Delays in infrastructure development and ambiguities in placement processes further exacerbate implementation challenges. The study conceptualizes these constraints within a broader framework of policy-practice misalignment and institutional readiness deficits. It concludes that effective CBE implementation requires coordinated policy execution, adequate resourcing, and inclusive stakeholder engagement.

Keywords: Competency-based education; Policy implementation; Teacher preparedness; Educational transition; Kenya.

FOSTERING STEM EDUCATION THROUGH ENHANCED DIGITAL LITERACY IN KENYAN SENIOR SCHOOLS: PROSPECTS, CHALLENGES AND POSSIBLE SOLUTIONS

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Abstract

Science, Technology, Engineering and Mathematics (STEM) education has become central to socio-economic development in the 21st century, underpinning innovation in critical sectors such as agriculture, healthcare, and industry. In alignment with the African Union Agenda 2063 and national development priorities, Kenya has adopted the Competency-Based Education (CBE) system, which emphasizes STEM education and experiential learning supported by digital literacy. This study examined the prospects, challenges, and possible solutions for fostering STEM education through enhanced digital literacy in Kenyan senior schools. A thematic literature review methodology was employed, drawing on policy documents, empirical studies, and regional education reports. It was observed that enhanced digital literacy offers significant prospects, including workforce readiness, access to global learning resources, personalized instruction, and improved pedagogical effectiveness. However, key challenges persist, notably inadequate ICT infrastructure, limited teacher digital competencies, large class sizes, and disparities between urban and rural schools. There is need for targeted investment in ICT infrastructure, continuous professional development for teachers, and policy-driven integration of digital tools across STEM curricula. Strengthening digital literacy is essential for maximizing transformative potential of STEM education and equipping Kenyan learners with future-ready skills.

Keywords: STEM education; Digital literacy; Competency-based education; ICT integration; Kenyan senior schools.

SUB-THEME: INFORMATION AND KNOWLEDGE MANAGEMENT**TEXT MINING AND TOPIC MODELLING FOR KNOWLEDGE DISCOVERY IN DIGITAL COLLECTIONS**

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Abstract

The rapid expansion of digital scholarly repositories has intensified challenges in semantic organization, scalable metadata management, and thematic navigation, rendering traditional indexing approaches increasingly insufficient. This study investigates the application of text mining and probabilistic topic modelling as intelligent mechanisms for automated knowledge discovery in large-scale digital collections. A corpus-based quantitative design grounded in Natural Language Processing (NLP) was adopted. Scholarly publications (2015–2024) were retrieved from the CORE repository, filtered for relevance, and subjected to structured preprocessing, including text normalization, tokenization, stop-word removal, and lemmatization. Feature extraction employed Bag-of-Words and Term Frequency–Inverse Document Frequency (TF-IDF) representations. Latent thematic structures were identified using Latent Dirichlet Allocation (LDA), with optimal topic numbers determined through coherence scoring and interpretability validation. Results revealed coherent and semantically distinct thematic clusters aligned with digital infrastructure, metadata governance, open access systems, repository architectures, and scholarly communication trends. Coherence metrics confirmed statistically meaningful topic separability, while visualization outputs improved interpretability and analytical transparency. Document similarity analysis further demonstrated measurable intra-corpus thematic diversity. The findings indicate that integrating text mining and topic modelling into digital library ecosystems enhances automated classification, improves retrieval precision, and supports evidence-based collection analytics. Adoption within academic libraries—particularly in resource-constrained contexts—can strengthen knowledge management efficiency and reduce information overload.

Keywords: Text mining, Topic modelling, Digital libraries, NLP, Knowledge discovery, Artificial intelligence.

LEVERAGING ARTIFICIAL INTELLIGENCE TO FOSTER INTERDISCIPLINARY COLLABORATION IN RESEARCH AND PRACTICE

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Abstract

Addressing complex global challenges requires interdisciplinary research frameworks capable of integrating diverse epistemologies, datasets, and methodological traditions. However, disciplinary silos, semantic fragmentation, and data incompatibility constrain effective collaboration. This study examines the role of Artificial Intelligence (AI) as a computational and translational infrastructure for enabling interdisciplinary integration. A systematic and integrative literature review was conducted covering publications (2023–2026), selected through structured database searches and inclusion criteria emphasizing AI-enabled collaborative systems. Thematic synthesis analyzed mechanisms such as natural language processing for semantic alignment, multimodal data integration, intelligent workflow orchestration, and AI-supported decision systems. Selected applied case examples were examined to contextualize theoretical evidence, with attention to Global South research environments. Results indicate that AI facilitates cross-domain knowledge integration by reducing semantic barriers, harmonizing heterogeneous datasets, accelerating hypothesis generation, and supporting distributed collaboration. AI-driven platforms thus enhance collaborative ideation, real-time data sharing, and innovation scalability. However, challenges persist, including algorithmic bias, authorship ambiguity, data governance risks, infrastructural inequities, and unequal access to computational resources. Sustainable interdisciplinary advancement requires ethically governed AI deployment, transparency in algorithmic design, institutional capacity building, and policies promoting epistemic equity. When embedded within human-centered governance frameworks, AI functions as a strategic enabler of collaborative research ecosystems and inclusive innovation.

Keywords: Artificial intelligence, Interdisciplinary research, Knowledge integration, Ethical governance, Digital collaboration.

EVALUATING DIVERSITY, EQUITY, AND INCLUSION (DEI) PRACTICES IN ACADEMIC LIBRARIES IN KENYA: CHALLENGES, STRATEGIES, AND IMPACT

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Abstract

Diversity, Equity, and Inclusion (DEI) have become central to contemporary academic library practice, shaping policies, service delivery models, user engagement strategies, and institutional accountability frameworks. In increasingly heterogeneous higher education environments, academic libraries are expected to provide equitable access to information resources, foster inclusive learning spaces, and eliminate structural barriers that marginalize users based on socio-economic status, disability, gender, culture, or other identity dimensions. In Kenya, where higher education institutions serve a highly diverse student and research population, systematic evaluation of DEI implementation within academic libraries remains limited. This study critically evaluates the current state of DEI practices in Kenyan academic libraries, with particular emphasis on implementation frameworks, institutional strategies, and measurable impact on service delivery and user experience. Specifically, the study assesses existing DEI policies and practices, examines their influence on accessibility and inclusivity of library services, identifies institutional and structural barriers to effective implementation, and analyzes strategies adopted to advance DEI integration within library systems. Guided by the assumption that DEI frameworks are variably adopted across institutions, the study employs a qualitative desktop and observational research design. Data sources include peer-reviewed literature, institutional reports, government policy documents, and credible digital resources. Thematic analysis is applied to identify recurring patterns, conceptual frameworks, implementation gaps, and best practices related to DEI in academic libraries. Results are expected to contribute empirically grounded insights for library administrators, higher education leaders, and policymakers by informing evidence-based strategies for strengthening inclusive service delivery, policy alignment, and institutional transformation within Kenyan academic libraries.

Keywords: Academic libraries; Diversity; Equity; Inclusion; Inclusive access; Library services; Kenya.

ENHANCING THE CYBER RESILIENCE OF INFORMATION SYSTEMS THROUGH MACHINE LEARNING

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Abstract

The increasing sophistication of cyber threats necessitates a transition from static cybersecurity models toward adaptive cyber resilience architectures emphasizing anticipation, absorption, recovery, and continuous learning. This study explores the application of Machine Learning (ML) techniques in strengthening cyber resilience across information system environments. A structured systematic review was conducted, analyzing 87 peer-reviewed studies published between 2020 and 2026. Data extraction focused on ML algorithms, deployment contexts, resilience phases, performance metrics, and operational constraints. Comparative analysis evaluated supervised, unsupervised, and deep learning approaches in intrusion detection, anomaly recognition, behavioral analytics, incident response, and recovery optimization.

Results demonstrate that ML significantly improves threat detection accuracy, reduces response latency, and enhances predictive modeling for evolving and zero-day attacks. Adaptive algorithms support continuous system monitoring and automated mitigation strategies. However, identified limitations include model overfitting, adversarial attacks, dataset imbalance, limited interpretability, and dependency on high-quality training data. The review underscores the importance of explainable AI mechanisms, continuous model validation, robust data governance, and integration within hybrid human-machine cybersecurity frameworks. Effective deployment of ML strengthens institutional cyber resilience, enhances operational continuity, and supports proactive risk management strategies in complex digital infrastructures.

Keywords: Machine learning, Cybersecurity, Cyber resilience, Anomaly detection, Artificial intelligence.

INTEGRATING KNOWLEDGE-SHARING ECOSYSTEMS AND FINANCIAL SUPPORT FOR AGRICULTURAL VALUE ADDITION: AN ASSESSMENT OF THE NYOTA FUND AMONG YOUNG MANGO FARMERS IN KENYA

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Abstract

Youth participation in agribusiness is increasingly positioned as a strategic lever for structural transformation, rural industrialization, and inclusive economic growth in developing economies. In Kenya, mango production presents significant opportunities for value addition, export diversification, and agro-processing-led development. However, young farmers continue to face multidimensional constraints, including limited access to financial capital, insufficient technical expertise, weak institutional coordination, fragmented extension systems, and inadequate integration into structured knowledge-sharing networks. While youth-targeted financial instruments such as the Nyota Fund have been introduced to enhance enterprise development, limited empirical research examines how embedded knowledge-sharing ecosystems within such funding mechanisms influence agricultural value addition outcomes. Grounded in Knowledge Management Theory, Social Capital Theory, and Innovation Diffusion Theory, this study conceptualizes value addition as an outcome of the dynamic interaction between financial capital, knowledge flows, institutional linkages, and collaborative learning systems. Employing a qualitative case study design complemented with document analysis and stakeholder interviews, the study evaluates training frameworks, extension support mechanisms, mentorship structures, digital knowledge platforms, peer-learning arrangements, and market linkage systems accessible to young mango farmers benefiting from the Fund. The study advances theoretical understanding by reframing financial support initiatives as integrated knowledge ecosystems rather than standalone funding instruments. It further proposes a systems-based model linking financial inclusion, knowledge exchange, innovation adoption, and market integration. The findings are expected to inform evidence-based policy reforms aimed at strengthening youth-centered agribusiness financing frameworks, enhancing value chain competitiveness, and promoting sustainable agro-industrial development in Kenya and comparable contexts.

Keywords: Knowledge-sharing ecosystems; Youth agribusiness; Financial inclusion; Agricultural value addition; Nyota Fund; Mango value chain; Kenya.

SEMANTIC WEB AND LINKED DATA TECHNOLOGIES FOR NEXT-GENERATION LIBRARY KNOWLEDGE MANAGEMENT

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Abstract

Traditional library knowledge management systems, built on isolated metadata schemas and record-centric architectures, face limitations in interoperability, semantic connectivity, and cross-platform resource discovery. Semantic Web and Linked Data technologies offer machine-readable, graph-based frameworks that enable structured knowledge representation, distributed data integration, and enhanced contextual discovery. This study conducted a comprehensive systematic literature review analyzing 35 global, regional, and Kenyan sources, including peer-reviewed publications, technical standards, policy documents, and institutional reports. Thematic synthesis examined implementation maturity, architectural models, interoperability standards, adoption barriers, and institutional readiness. Global implementations, including ontology-driven architectures and Linked Data integrations, demonstrate improved semantic interoperability, enhanced resource linking, and knowledge reuse. Regional adoption remains exploratory, constrained by infrastructural limitations and technical capacity gaps. In Kenya, operational deployment is minimal, with most initiatives remaining conceptual or pilot-based. Key challenges include limited institutional expertise, inadequate digital infrastructure, and absence of harmonized policy frameworks. Despite these constraints, Semantic Web and Linked Data technologies provide a scalable foundation for next-generation library ecosystems, enabling knowledge graph development, advanced discovery services, and collaborative metadata governance. Strategic investment in capacity building, infrastructure modernization, and policy alignment is essential for transformative adoption within academic libraries.

Keywords: Semantic web; Linked data; Knowledge graphs; Library innovation; Interoperability.

AN ASSESSMENT OF LIBRARIAN-TEACHER COLLABORATION IN IMPLEMENTATION OF
COMPETENCY-BASED EDUCATION IN PRIMARY SCHOOLS IN LAIKIPIA EAST
CONSTITUENCY, KENYA

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Abstract

Successful implementation of Competency-Based Education (CBE) in Kenya requires multi-sectoral collaboration that extends learning beyond the classroom, yet structured librarian-teacher partnerships, particularly in rural contexts, remain underexplored. This study assessed the nature, extent, and effectiveness of librarian-teacher collaboration in supporting CBE implementation in primary schools within Laikipia East Constituency, Kenya. Guided by Collaboration Theory, the study employed a mixed-methods approach using a descriptive survey design. The target population comprised primary school teachers, public librarians, and county-level library administrators. Data was collected using structured questionnaires, semi-structured interviews, and observation checklists, with instrument reliability confirmed using Cronbach's alpha ($\alpha > 0.7$). Quantitative data was analyzed using descriptive statistics, while qualitative data was thematically analyzed. Results showed moderate but inconsistent collaboration, largely characterized by informal learner referrals and resource recommendations, with limited engagement in curriculum-aligned activities such as co-teaching and instructional planning. Collaboration was found to be episodic, personality-driven, and constrained by absence of formal frameworks and dedicated resources. It is concluded that institutionalizing librarian-teacher collaboration through structured programs, curriculum-linked initiatives, and policy support would significantly enhance CBE implementation, literacy development, and learner engagement in rural primary schools.

Keywords: Librarian-teacher collaboration; Competency-based education; Public libraries, Primary schools, Kenya.

THE “PUBLISH OR PERISH” TRAP; FACTORS INFLUENCING POSTGRADUATE STUDENTS’ ENGAGEMENT WITH PREDATORY JOURNALS

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Abstract

The intensifying pressure to publish within contemporary academia has significantly shaped postgraduate students’ publication behaviors, in some cases exposing them to predatory journals that undermine research quality and integrity. Thus, despite growing global concern, empirical evidence on the factors driving postgraduate students’ engagement with predatory journals within African higher education institutions remains limited. This study investigates the determinants of postgraduate students’ engagement with predatory journals, focusing on awareness levels, publication pressures, mentorship structures, and institutional support mechanisms. Employing a mixed-methods research design, the study will collect quantitative data through structured surveys administered to postgraduate students across multiple disciplines, complemented by qualitative data from focus group discussions. Quantitative data will be analyzed using descriptive and inferential statistics, while qualitative data will be thematically analyzed to capture nuanced experiences and perceptions. The anticipated findings will illuminate critical awareness gaps, systemic pressures, and institutional deficiencies influencing publication choices. The study aims to generate evidence-based recommendations to strengthen scholarly publishing literacy, enhance mentorship frameworks, and inform institutional policies that promote ethical publishing practices and safeguard research integrity within higher education institutions.

Keywords: Predatory journals, Postgraduate students, Scholarly publishing, Research integrity, Higher education.

CO-DESIGNING ERGONOMIC INFORMATION ENVIRONMENTS FOR STUDENTS WITH PHYSICAL DISABILITIES: EVIDENCE FROM KENYAN UNIVERSITIES

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Abstract

Inclusive university environments require a shift from compliance-based accessibility toward participatory, ergonomically responsive information spaces. In Kenyan universities, students with physical disabilities continue to face functional barriers within library and digital information environments, particularly in workstation design, furniture adaptability, spatial layout, and assistive technology integration. This study examined how co-design approaches can be applied to develop ergonomic information environments that enhance access and usability for students with physical disabilities. A sequential mixed-methods design was employed across selected public universities. Phase one involved ergonomic audits, surveys of students with physical disabilities, and interviews with librarians, disability coordinators, and ICT personnel to assess existing conditions. Phase two utilized participatory co-design workshops that actively engaged students and institutional stakeholders in identifying barriers and developing context-sensitive ergonomic solutions. Results showed that although basic structural modifications are present, functional ergonomics remain limited and user involvement in accessibility planning is minimal. The co-design process resulted in practical ergonomic interventions, including optimized workstation layouts, adjustable furniture specifications, improved assistive technology placement, and clearer spatial circulation. The study proposes a Co-Designed Ergonomic Information Environment Model grounded in participatory and universal design principles, integrating improved independent access, user satisfaction, and operational efficiency.

Keywords: Co-design; Ergonomic information environments; Physical disabilities; University libraries; Inclusive higher education; Kenya.

ARTIFICIAL INTELLIGENCE-DRIVEN DIGITAL TRANSFORMATION: A CONCEPTUAL FRAMEWORK FOR INDUSTRIAL RESILIENCE AND SUSTAINABLE DEVELOPMENT

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Abstract

Industries worldwide face increasing pressure to remain competitive while responding to environmental degradation, resource scarcity, socio-economic inequality, and systemic disruptions such as pandemics and climate change. Artificial Intelligence (AI) has emerged as a central driver of digital transformation with the potential to enhance industrial resilience and advance sustainable development aligned with the United Nations Sustainable Development Goals (SDGs). However, existing research remains fragmented, often treating resilience and sustainability as separate outcomes and offering limited guidance for developing and emerging economies. This study develops a context-sensitive conceptual framework linking AI-driven digital transformation, industrial resilience, and sustainable development. Using a structured review of peer-reviewed literature published between 2020 and 2025, thematic analysis was conducted and guided by the Technology–Organization–Environment (TOE) framework and Dynamic Capabilities Theory. Results showed that AI enhances resilience through predictive analytics, process optimization, and adaptive decision-making. The proposed three-dimensional framework positions AI as the enabler, digital transformation as the mediating mechanism, and sustainable development as the strategic outcome, moderated by digital literacy, infrastructure readiness, and change management capacity. An embedded ethical governance layer addresses risks such as algorithmic bias, energy consumption, and workforce displacement. The framework offers strategic guidance for policymakers and industrial managers in emerging economies and provides a foundation for future empirical validation in East Africa.

Keywords: Artificial intelligence; Digital transformation; Industrial resilience; Sustainable development; Conceptual framework; Emerging economies; Ethical governance.

ASSESSMENT OF INSTITUTIONAL CULTURE IN PROMOTING COLLABORATIVE RESEARCH BETWEEN LIBRARIANS AND INFORMATION SCIENCE FACULTY AT UNIVERSITIES IN MERU COUNTY, KENYA

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Abstract

Collaborative research is increasingly essential in addressing the growing complexity of the information science profession and strengthening academic and professional outcomes. Despite this need, collaboration between librarians and information science faculty in Kenyan universities remains limited and underexplored. This study examined the role of institutional culture in promoting collaborative research between librarians and information science faculty at universities in Meru County, Kenya. Anchored on Kezar and Lester's model of collaboration in higher education, the study adopted a qualitative descriptive research design. Data was collected using interviews with information science faculty and directors of research, and focus group discussions with librarians. Participants included 16 librarians, six faculty and two research directors. Thematic analysis revealed that although collaborative research is recognized as critical for professional growth and curriculum relevance, institutional culture characterized by hierarchical structures, weak policy frameworks, limited recognition of librarians' scholarly roles, and constrained leadership support hinders its promotion. While goodwill for collaboration exists, it is not matched by deliberate institutional action. The study recommends formalizing collaborative research policies, incentivizing joint research outputs, and prioritizing capacity-building initiatives to reposition librarians as intellectual partners in scholarly research.

Keywords: Institutional culture; Collaborative research; Librarians; Information science faculty; Higher education; Kenya.

DIGITAL TRANSFORMATION STRATEGIES FOR SUSTAINABILITY OF INFORMATION SCIENCE CONSULTANCY FIRMS; A SYSTEMATIC LITERATURE REVIEW

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Abstract

Digital transformation has become a strategic imperative for organizational sustainability in technology-driven and knowledge-intensive sectors. Information science consultancy firms increasingly rely on digital technologies such as artificial intelligence and big data analytics to enhance service delivery and long-term viability. However, empirical and conceptual studies on digital transformation within information science consultancy remain limited. This systematic literature review examined digital transformation strategies, enabling determinants, and theoretical frameworks supporting sustainability in information science consultancy firms. Peer-reviewed literature published between 2018 and 2025 was retrieved from IEEE Xplore, Scopus, Google Scholar, and African Journals Online. Thematic analysis, guided by Dynamic Capabilities Theory and the Technology–Organization–Environment framework, revealed that modernization of digital infrastructure, organizational agility, knowledge-based service innovation, human capital development, and strategic partnerships are central to sustainability. The review further indicates a global shift toward asset-based and AI-enabled consulting models. Based on these findings, we propose a Digital Sustainability Capability Model to guide information science consultancy firms in integrating digital technologies for scalable, resilient, and sustainable business models.

Keywords: Digital transformation; Sustainability; Information science consultancy; Dynamic capabilities; TOE framework; Systematic literature review.

ASSESSING INSTITUTIONAL REPOSITORIES' EFFECTIVENESS IN ADVANCING OPEN ACCESS SCHOLARLY OUTPUTS IN KENYAN UNIVERSITIES

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Abstract

Institutional repositories (IRs) have become essential scholarly communication infrastructures that enhance visibility, accessibility, and long-term preservation of research outputs while supporting the global Open Access (OA) movement. Despite increasing adoption across Kenyan universities, the effectiveness of institutional repositories in advancing open access remains uneven, particularly among institutions with varying policy frameworks and technological capacities. This study examined the effectiveness of institutional repositories in promoting open access scholarly outputs in selected universities in Central Kenya. A mixed-methods research design was employed, integrating quantitative data from structured questionnaires with qualitative insights derived from semi-structured interviews with librarians, faculty members, and postgraduate students. Quantitative analysis examined repository usage patterns and content deposition trends, while qualitative analysis explored institutional support mechanisms, policy implementation, and user perceptions. Results indicate that although repositories have significantly improved access to scholarly outputs, several constraints – including inadequate funding, low levels of user awareness, weak policy enforcement, and limited technological infrastructure – continue to hinder their optimal utilization. Strengthening repository governance frameworks, investing in sustainable infrastructure, and implementing targeted training programs for repository stakeholders are critical to improving effectiveness of open access initiatives to scholarly outputs in Kenyan universities.

Keywords: Institutional repositories; Open access; Scholarly communication; Research dissemination; Academic libraries; Kenya.

ASSESSING TECHNOLOGICAL INFRASTRUCTURE AND ITS IMPACT ON OPEN ACCESS TO IMPLEMENTATION AMONG SELECTED UNIVERSITIES IN CENTRAL KENYA**Kamau, B. M. & Maina, S.**

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Open Access (OA) has emerged as a transformative approach for enhancing visibility, accessibility, and societal impact of scholarly research produced within universities. Many Kenyan universities have adopted OA-supporting technologies such as institutional repositories, discovery systems, and digital research management platforms. However, disparities in technological capacity continue to influence implementation outcomes. This study examined the influence of technological infrastructure on Open Access implementation among selected universities in Central Kenya. A mixed-methods approach was adopted, combining survey data collected from librarians, ICT personnel, postgraduate students, and academic staff with qualitative insights obtained from semi-structured interviews and institutional policy document analysis. The study evaluated infrastructural components including internet connectivity, server capacity, system interoperability, cybersecurity mechanisms, power reliability, digitization tools, and technical support services. Results indicate that reliable internet connectivity, robust hosting infrastructure, and skilled technical support significantly improve repository performance through enhanced system uptime, metadata quality, discoverability, and increased scholarly content deposits. Conversely, infrastructural constraints such as limited bandwidth, unstable power supply, weak system integration, and insufficient ICT staffing hinder scalability and sustainability of OA initiatives. Technological infrastructure forms a critical foundation for successful OA implementation and must be reinforced by strong institutional policies, sustained funding, and continuous capacity building.

Keywords: Open access; Technological infrastructure; Institutional repositories; Research visibility; Interoperability; Kenyan universities.

ACCESS TO CLIMATE INFORMATION AND ITS ROLE IN BUILDING CLIMATE-RESILIENT COMMUNITIES IN KITUI COUNTY, KENYA

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Abstract

The increasing frequency and intensity of extreme weather events have heightened vulnerability of rural communities, particularly within arid and semi-arid regions. Access to timely, credible, and locally relevant climate information is therefore essential for enabling communities to adopt adaptive practices that strengthen resilience. This study investigated the role of climate information access in supporting climate-resilient livelihoods among households in Kitui County, Kenya. A mixed-methods research design was employed, combining quantitative data obtained from 350 household surveys with qualitative insights from 15 key informant interviews and three focus group discussions. Results show that approximately 71% of households' access climate information, primarily through radio broadcasts, agricultural extension services, and community barazas. However, barriers such as limited localization of climate information, technical complexity of forecasts, and inadequate communication infrastructure continue to constrain effective utilization. Households with access to climate information were significantly more likely to adopt adaptive practices including drought-resistant crop cultivation, adjusted planting seasons, and water harvesting techniques. The study highlights the importance of strengthening climate information services through localized communication strategies, simplified messaging, and improved dissemination infrastructure to enhance community resilience in semi-arid regions.

Keywords: Climate change; Climate information services; Climate resilience; Rural adaptation; Kenya.

SOCIAL MEDIA AS A MECHANISM FOR COMMUNICATING CLIMATE CHANGE AND SUSTAINABILITY TO THE YOUTH IN KENYA : A SYSTEMATIC LITERATURE REVIEW

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Abstract

Climate change remains one of the most pressing global challenges of the twenty-first century, with youth constituting a critical demographic in climate advocacy and sustainability action. In Kenya, social media platforms such as Instagram, X (formerly Twitter), WhatsApp, and TikTok have increasingly become dominant channels for information exchange and civic engagement among young people. This study systematically reviewed existing literature to evaluate how social media platforms facilitate communication of climate change and sustainability issues to Kenyan youth. Guided by the PRISMA framework, peer-reviewed journal articles, conference papers, and academic theses published between 2010 and 2025 were retrieved from major scholarly databases and screened using predefined inclusion and exclusion criteria. Thematic analysis revealed that effective communication strategies include visual storytelling, influencer engagement, localized narratives, and hashtag-driven campaigns. Outcomes associated with social media-based climate communication include increased climate awareness, youth activism, and peer-to-peer knowledge exchange. Nevertheless, challenges such as algorithmic bias, climate misinformation, digital inequality, and limited translation of awareness into sustained environmental action persist. Social media platforms are powerful tools for climate communication but require strengthened digital literacy initiatives and integration with offline sustainability programs to maximize long-term impact.

Keywords: Climate change communication; Social media; Youth engagement; Sustainability communication; Digital activism.

ASSESSING THE EFFECTS OF AI ADOPTION ON KNOWLEDGE MANAGEMENT EVALUATION PRACTICES IN ACADEMIC LIBRARIES; A CASE STUDY OF KIRINYAGA UNIVERSITY LIBRARY**Kamau, F. M. & Karambu, L.**

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Artificial Intelligence (AI) technologies are increasingly transforming knowledge management processes in academic libraries through automation, advanced analytics, and intelligent information retrieval systems. However, traditional library evaluation metrics—such as circulation statistics and gate counts—often fail to capture the broader impact of AI-driven services. This study examined how AI adoption influences knowledge management evaluation practices within academic libraries, using Kirinyaga University Library as a case study. An exploratory case study design was employed, incorporating document analysis, surveys, interviews, and service data review to examine emerging evaluation practices. The analysis was guided by the SECI Knowledge Creation Model, ISO 30401 Knowledge Management Standard, the DeLone and McLean Information Systems Success Model, and the Technology-Organization-Environment framework. Results indicate that AI adoption expands evaluation metrics to include user engagement analytics, knowledge discovery patterns, service personalization indicators, and data-driven decision-making processes. Nonetheless, challenges relating to staff capacity, data interpretation, ethical governance, and privacy concerns remain significant. There is need for a comprehensive evaluation framework that integrates performance indicators, user outcomes, organizational readiness, and ethical governance dimensions to support responsible assessment of AI-enabled library services.

Keywords: Artificial intelligence, Knowledge management, Academic libraries, Evaluation frameworks, Information systems success.

ARTIFICIAL INTELLIGENCE AS A CATALYST FOR DIGITAL INCLUSION AND KNOWLEDGE ACCESS IN KENYA: REIMAGINING THE KENYA NATIONAL LIBRARY SERVICE

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Abstract

Artificial Intelligence (AI) is increasingly transforming the global knowledge ecosystem by enhancing information discovery, improving service delivery, and enabling inclusive access to knowledge resources. In Kenya, national development frameworks such as Vision 2030 and the Bottom-Up Economic Transformation Agenda (BETA) emphasize equitable knowledge access and technology-driven innovation. Libraries – particularly the Kenya National Library Service (KNLS) – play a strategic role in bridging the digital divide by serving as community knowledge hubs. This conceptual paper examines how AI technologies can be integrated into KNLS operations to enhance digital inclusion and knowledge access across diverse communities. The study explores potential AI applications including intelligent search and discovery systems, multilingual knowledge platforms, automated reference services, digital literacy support tools, and inclusive information access for marginalized populations. Notably, strategic AI integration within public libraries can strengthen educational access, support entrepreneurship, and facilitate community empowerment. There is need for policy-driven AI adoption, ethical governance frameworks, capacity building for library professionals, and sustained investment in digital infrastructure to enable responsible and inclusive AI-enabled library services.

Keywords: Artificial intelligence; Digital inclusion; Knowledge access; Public libraries; Kenya National Library Service; Vision 2030.

FROM PAPER TO PLATFORM; EVALUATING THE EFFECT OF DIGITIZATION GAPS ON
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Abstract

Digital transformation in healthcare increasingly depends on electronic health records to improve service delivery, operational efficiency, and accountability. Notably, many public health institutions in developing contexts continue to experience significant digitization gaps. This conceptual and analytical study examined the impact of incomplete digitization on records accessibility and institutional efficiency in Laikipia County Referral Hospitals, specifically Nanyuki and Nyahururu hospitals. Drawing on digital transformation theory, knowledge management theory, and health information systems literature, the paper analyzes technological, institutional, human capacity, and policy barriers affecting transition from paper-based to digital record systems. Fragmented information systems, limited interoperability, inadequate ICT infrastructure, and weak governance frameworks significantly affect patient record accessibility, delay clinical decision-making, increase operational costs, and heighten data security risks. There is need for a strategic framework for strengthening digital health governance and supporting sustainable digitization within county-level health care institutions. These results contribute to ongoing discourse on e-health transformation and public sector digital reforms in Sub-Saharan Africa.

Keywords: Health records management; Digitization; E-health; Institutional efficiency; Digital transformation, Kenya.

ARTIFICIAL INTELLIGENCE INTEGRATION AT THE KENYA TVET INSTITUTIONS: A HUMAN-CENTERED FRAMEWORK FOR INCLUSIVE SKILLS DEVELOPMENT

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Abstract

Artificial Intelligence (AI) is rapidly transforming education and workforce development globally, particularly within skills-oriented training systems designed to respond to evolving industry demands. In Kenya, Technical and Vocational Education and Training (TVET) institutions play a pivotal role in preparing instructors capable of delivering competency-based training (CBT). This conceptual study explores integration of AI technologies within the Kenya TVET institutions to enhance training, research, and professional capacity development. A human-centered AI framework is proposed to support AI-assisted instructional design, simulation-based learning, data-driven feedback systems, and digitally enhanced competency assessment models. The study further examines digital inclusion, ethical governance, and trainer readiness to ensure responsible and equitable deployment of AI technologies. Results suggest that strategic AI integration within trainer-capacity institutions can modernize the national skills ecosystem, strengthen workforce readiness, and support achievement of Kenya Vision 2030 development objectives.

Keywords: Artificial intelligence; TVET education; Competency-based training; Digital pedagogy; Workforce development.

IMPACT OF AI IN LIBRARIES AND MANAGEMENT PRACTICES ON INFORMATION RESOURCES AND SERVICE QUALITY

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Abstract

Artificial Intelligence technologies are increasingly influencing library management practices and delivery of information services in academic libraries. This study examined the impact of AI integration on information resource management and service quality in academic libraries, with specific reference to Kirinyaga University Library. A mixed-methods research design was employed, combining quantitative data obtained from structured questionnaires administered to library users with qualitative insights derived from interviews with library professionals. The study examined the effects of AI-driven technologies such as chatbots, machine learning-based discovery systems, recommendation engines, and automated cataloguing tools on user engagement, information retrieval efficiency, and managerial decision-making. Results indicate that AI significantly enhances personalized user experiences, improves search efficiency, and supports data-driven library management. However, challenges including data privacy concerns, algorithmic bias, infrastructural limitations, and staff preparedness remain critical barriers to sustainable implementation. There is need for a structured framework to guide responsible and ethical AI adoption within academic libraries.

Keywords: Artificial intelligence; Library management; Information services; Academic libraries; Service quality.

ARTIFICIAL INTELLIGENCE-DRIVEN LIBRARIANSHIP FOR EDUCATIONAL TRANSFORMATION IN KENYA

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Abstract

The accelerating evolution of Artificial Intelligence (AI) is redefining the functional and epistemic foundations of librarianship, positioning libraries as intelligent knowledge systems within digitally enabled educational ecosystems. This paper critically examines the potential of AI-driven librarianship to catalyze educational transformation in Kenya. It synthesizes key AI technologies including machine learning, natural language processing, and semantic web applications and evaluates their applicability in enhancing information discovery, automated knowledge organization, and context-aware retrieval. The paper advances a conceptual perspective on AI-enabled, user-centered library services, highlighting how predictive analytics, recommender systems, and adaptive interfaces can support personalized learning and improve user engagement. It conceptualizes the role of librarians as knowledge engineers and data stewards, requiring advanced competencies in AI literacy, digital curation, and data governance within evolving educational environments. Furthermore, the study interrogates critical ethical, legal, and governance issues associated with AI integration, including data privacy, algorithmic bias, intellectual property, and equitable access. It also examines the challenges confronting AI adoption in Kenyan academic libraries, notably infrastructural limitations, skills deficits, and financial constraints, while identifying opportunities for innovation, enhanced research support, and institutional competitiveness. Finally, the paper proposes strategic directions for sustainable AI integration, emphasizing policy development, capacity building, and collaborative frameworks. It concludes that AI-driven librarianship offers a transformative pathway for education in Kenya, contingent upon inclusive, ethical, and context-responsive implementation.

Keywords: Artificial intelligence; AI-Driven librarianship; Educational transformation; Academic libraries; Knowledge organization; Personalized learning, Kenya.

THE FUTURE OF OPEN SCIENCE: ENHANCING TRANSPARENCY, ACCESSIBILITY, AND COLLABORATION IN GLOBAL RESEARCH

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Abstract

Open science has emerged as a transformative paradigm in contemporary research systems by promoting transparency, accessibility, and collaborative knowledge production. Traditional scholarly communication models often restrict access to research outputs through subscription paywalls, limited data sharing, and closed research processes, thereby constraining the global dissemination and utilization of scientific knowledge. These limitations are particularly pronounced in developing regions where access to research infrastructure and scholarly resources remains uneven. This study examines the future prospects of open science and its potential to enhance transparency, accessibility, and collaboration within global research ecosystems. The study explores key open science practices – including open access publishing, open data sharing, open methodologies, and collaborative digital research platforms – and evaluates their role in improving research visibility, reproducibility, and innovation. A systematic review of scholarly literature and global open science initiatives was conducted to analyze institutional policies, technological infrastructure, and international collaborations supporting open science implementation. Particular attention is given to the role of digital technologies and institutional frameworks in facilitating equitable participation in global knowledge production. Findings indicate that open science significantly enhances knowledge dissemination, fosters interdisciplinary collaboration, and strengthens the societal impact of research outputs. However, challenges such as intellectual property concerns, limited digital infrastructure, insufficient researcher awareness, and policy inconsistencies continue to constrain widespread adoption. The study concludes that strengthening policy frameworks, institutional commitment, and researcher capacity development is critical for the successful integration of open science practices. Such efforts will enable universities and research institutions – particularly in developing regions – to participate more effectively in the global knowledge economy and contribute to inclusive knowledge production.

Keywords: Open science; Research transparency; Open access; Research collaboration; Knowledge sharing; Global research systems.

KNOWLEDGE SHARING MECHANISMS DRIVING INNOVATIVE HEALTH INSURANCE SERVICES IN SELECTED KENYAN REGIONS

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Abstract

Innovation in the health insurance sector increasingly depends on effective knowledge sharing mechanisms that enhance service delivery, streamline claims management, support digital transformation, and enable responsiveness to regulatory changes. Existing empirical studies provide fragmented evidence, often focusing on isolated outcomes such as performance and customer satisfaction, with limited attention to the integrative role of knowledge sharing in driving service innovation. This study investigates the effectiveness of knowledge sharing mechanisms in enhancing innovative health insurance services across selected Kenyan regions: Nairobi, Coast, Eastern, and North Eastern. It examines how knowledge sharing practices influence innovation in service processes and delivery within health insurance institutions. The study is anchored on social exchange theory, open innovation theory, and dynamic capabilities theory, which collectively explain how knowledge flows foster innovation capacity. Guided by a pragmatic research philosophy, the study adopts a cross-sectional mixed-methods design. Quantitative data are collected from 384 policyholders using structured questionnaires, while qualitative data are obtained through in-depth interviews with 56 key informants and focus group discussions. Purposive, stratified, and simple random sampling techniques are employed. Quantitative data are analysed using descriptive and inferential statistics, including multiple regression analysis, while qualitative data are analysed thematically using NVivo software. The study is expected to demonstrate that effective knowledge sharing mechanisms significantly enhance innovation in health insurance services by improving efficiency, promoting digital adoption, and strengthening institutional responsiveness. The findings will inform knowledge-based strategies for scaling innovative health insurance services in Kenya and similar contexts.

Keywords: Knowledge sharing; Innovation; Health insurance; Service delivery; Digital transformation; Kenya.

INCLUSIVE INNOVATION FOR GENDER EQUITY**Muoki, J.; Kinuthia, L.**¹Egerton University, KENYA²Kirinyaga University, KENYA**Correspondence:** *jamesmuok@yahoo.com****Abstract***

Digital technologies are transforming industries and economies globally. Despite these advances, women and other vulnerable groups remain marginalized due to unequal access to digital tools, skills, and opportunities, particularly in developing economies. Within the context of ongoing industrial transformation, this paper examines how inclusive innovation can promote Gender Equity and Social Inclusion (GESI) and help bridge the gender digital divide. The study explores structural barriers that hinder women's participation in digital sectors, including socio-cultural norms, limited digital literacy, unequal access to finance, and policy gaps. Adopting a mixed-methods approach, the research analyzes gender disparities in digital access and industrial participation while identifying effective inclusive strategies. Findings indicate that public-private partnerships, gender-responsive policies, inclusive financing mechanisms, and targeted digital skills development significantly enhance women's participation in the digital economy. The study concludes that integrating GESI principles into digital transformation strategies is essential for achieving inclusive economic growth and fostering sustainable industrial resilience.

Keywords:

Digital economy, Sustainable development, Inclusive innovation, Gender Equity and Social Inclusion (GESI), Digital transformation.

SUB-THEME: AGRICULTURE & FOOD SECURITY**AUGMENTING FOOD SECURITY IN THE DRYLANDS OF KENYA : A CASE FOR NATIONAL FOOD POLICY REFORM****Mwenzwa, E. M.**

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Food security has remained a central concern in Kenya's development agenda since independence in 1963; however, persistent food insecurity continues to characterize large sections of the population, particularly in the arid and semi-arid lands (ASALs). This paper presents a critical historical review of Kenya's food security policy frameworks, with specific focus on the Sessional Paper No. 10 of 1965 on African Socialism and the Sessional Paper No. 4 of 1981 on National Food Policy. Using documentary analysis and policy review methods, the study interrogates how these policy instruments prioritized agricultural investment in high-potential regions while marginalizing the drylands, which constitute approximately 90% of Kenya's landmass and support a substantial proportion of the population. The analysis reveals that although subsequent policies sought to enhance national food sufficiency, they inadequately addressed issues of food access, equity, and the unique production constraints of dryland environments. Consequently, communities in these regions continue to experience chronic food deficits and heightened vulnerability to climatic shocks. Notably, sustainable food security in Kenya cannot be achieved without deliberate integration of dryland-specific strategies into national food policy. There is need for policy reform measures emphasizing inclusive planning, context-sensitive agricultural investments, climate-resilient production systems, and equitable food distribution mechanisms to enhance food security and livelihoods in Kenya's drylands.

Keywords: Food security; Drylands (ASALs); National food policy; Agricultural development; Policy reform; Kenya.

BARRIERS TO THE ADOPTION OF INDIGENOUS AGRICULTURAL PRACTICES FOR CLIMATE CHANGE RESILIENCE AMONG SMALLHOLDER FARMERS IN MOGOTIO SUB-COUNTY, KENYA

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Abstract

Indigenous agricultural practices have historically enabled smallholder farming communities to adapt to environmental variability and climatic stressors. Thus, despite their proven potential in enhancing climate change resilience, systematic adoption of these practices remains limited across many rural regions in Kenya. This study investigates the barriers constraining the uptake of indigenous agricultural practices among smallholder farmers in Mogotio Sub-County, Kenya. Employing a descriptive survey research design, data was collected from 384 farming households using structured questionnaires. Descriptive statistical techniques were used to characterize adoption patterns, while binary logit regression analysis examined the relationship between identified barriers and climate resilience outcomes. Results showed that adoption is significantly hindered by inadequate access to indigenous knowledge systems, limited institutional and extension support, constrained access to productive resources, weak market structures for indigenous crops, generational dynamics, and a growing preference for externally promoted modern agricultural technologies. These constraints collectively undermine the integration of locally grounded adaptation strategies into contemporary farming systems. The study underscores the critical role of indigenous knowledge in strengthening climate resilience and advancing sustainable agriculture among smallholder farmers. There is need for enhanced collaboration between farmers, agricultural extension services, and county governments through targeted capacity-building initiatives, financial support mechanisms, and inclusive policy frameworks to mainstream indigenous agricultural practices within climate adaptation and rural development strategies.

Keywords: Indigenous knowledge; Indigenous agricultural practices; Climate change resilience; Smallholder farmers; Adoption barriers; Kenya.

MITIGATION OF ANTIMICROBIAL RESISTANCE IN DORPER SHEEP MANURE USING BLACK SOLDIER FLY LARVAE: INSIGHTS FROM SHOTGUN METAGENOMIC PROFILING

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Abstract

Antimicrobial resistance (AMR) is a critical global health challenge, with livestock manure acting as a significant reservoir for antimicrobial-resistant bacteria (ARBs) and resistance genes (ARGs). In Kenya and other low- and middle-income countries, untreated manure is widely applied in agriculture, accelerating the spread of resistance across soil, water, and food systems. This study evaluated the efficacy of Black Soldier Fly Larvae (BSFL; *Hermetia illucens*) in mitigating AMR in Dorper sheep manure using shotgun metagenomic profiling. A controlled experimental design was employed involving three treatments: untreated manure, manure treated with BSFL for 10 days, and post-treatment incubated manure. High-throughput Illumina MiSeq sequencing and bioinformatics analyses were used to assess microbial diversity, community structure, and resistome dynamics. Findings revealed that BSFL treatment significantly restructured microbial communities, reducing Proteobacteria while increasing Firmicutes and Bacteroidetes, indicating enhanced stabilization. Microbial diversity increased following treatment and incubation. Resistome analysis showed a mixed response: reductions in aminoglycoside, fluoroquinolone, and sulfonamide resistance genes, but persistence or enrichment of tetracycline and β -lactam resistance genes. Notably, zoonotic pathogens such as *Escherichia coli*, *Klebsiella pneumoniae*, *Salmonella enterica*, and *Pseudomonas aeruginosa* declined in relative abundance after treatment. The study concludes that BSFL bioconversion partially mitigates AMR by altering microbial ecology and reducing key resistance determinants, though it does not achieve complete elimination. Integrating BSFL treatment with post-processing strategies is recommended to enhance biosafety. These findings contribute to sustainable manure management practices within a One Health framework.

Keywords: Antimicrobial resistance, BSFL, Metagenomics, Manure management, Resistome, Zoonotic pathogens.

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