

DESKTOP REVIEW ON BUSINESS RECOVERY STRATEGIES POST-COVID

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ABSTRACT

Business recovery strategies in the post-COVID era focus on helping companies recover from the economic impact of the pandemic, which has affected businesses of all sizes and sectors. Some of the strategies employed included cost-cutting measures, diversification, and digitalization. This review seeks to determine the cost cutting measures employed by businesses to reduce expenses and streamline operations, and exploring new revenue streams while finding ways to increasing efficiency, such as automating processes. The review also seeks to determine recovery strategies adopted to recover from the pandemic including expansion into new markets or product lines to help reduce the impact of any specific industry downturn. Digitalization strategy has become increasingly important for businesses in the post-COVID era-commerce, digital marketing, and online communication tools, to reach customers and improve efficiency. Another important strategy under review is continuity and crisis management which helps businesses to respond quickly and efficiently to unexpected events such as lockdowns, supply chain disruptions, or changes in consumer behavior. Responsiveness and adaptiveness to changing circumstances and customer needs is another key strategy under review since it opens to new opportunities and being agile in the face of challenges. Overall, the COVID-19 pandemic has presented many challenges for businesses, but with the right strategies in place, businesses achieve successful recovery with those able to respond quickly and adapt to new reality more likely to recover and emerge stronger from the crisis.

Key words: *Cost Cutting, Diversification, Digitalization. Responsiveness and Adaptiveness, Continuity and Crisis Management*

IMPACT OF HIV/AIDS EXPENDITURE ON PREVALENCE OUTCOMES

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ABSTRACT

Over the last three decades, the global HIV/AIDS prevention in community has prompted development of sets of proven strategies aimed at reducing the risk of acquiring or/ and transmitting HIV. The response to HIV/AIDS pandemic is related to international health outcomes and has in the last few decades been among the major global concerns. By 2021, 0.8 percent of adults were living with HIV globally, with sub-Saharan Africa alone accounting for 69 percent of these cases. Even though significant financial resources from governments and donors have been channeled to combat prevalence especially in sub-Saharan African countries, actual effect has not been empirically assessed. We use longitudinal data from 11 sub-Saharan Africa countries to unravel empirical effects of HIV/AIDS expenditure on prevalence outcomes. In tandem with theoretical hypothesis, our findings empirically emphasize the negative relationship of expenditure and prevalence rates. Thus, the resources channeled towards combating HIV/AIDS significantly reduce prevalence in our sample.

Keywords: *HIV/AIDS, Expenditure, Prevalence, Outcomes*

INTERNET BANKING AND SUSTAINABILITY OF REGISTERED COMMERCIAL BANKS IN KENYA

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ABSTRACT

The rapid growth of Fintech products has resulted in the development of internet banking offered by banks and other telecommunication companies. Internet banking services were initially offered by online financial companies but were later adopted by commercial banks. However, they have been posing threats to operational sustainability of banks especially when offered by other online platforms. Consequently, Commercial banks globally have started showing some signs of distress, and this ought to be examined because of their crucial role in the economy. This study is aimed at examining the influence of internet banking on long-term sustainability of bank in Kenya. The target population of this study was bank employees from Kenya registered banks. The targeted five seniors' officials in each Commercial banks, making a total target population of 210 respondents. A sample of 120 respondents was randomly selected from the target population. Questionnaires were used as the primary method of data collection. Results showed that internet banking had significant influence on sustainability of commercial banks in Kenya. It is recommended that commercial banks entrench online lending platforms to counter the threat of online non-banking lending platforms. This approach would enable commercial banks to have an advantage over non-banking financial service providers in the future.

Keywords: *Internet banking, Fintech, Sustainability and Commercial banks*

EFFECT OF BUSINESS RISKS ON INTEREST RATE SPREAD OF COMMERCIAL BANKS IN KENYA

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ABSTRACT

When a company experiences a high degree of business risk, it may impair its ability to provide investors and stakeholders with adequate returns. This study aimed at establishing the relationship between business risks and interest rate spread of commercial banks in Kenya. It is anchored on a study "determinant of interest rate spread of commercial banks in Kenya". Though several variables were studied, this paper concentrates on the effects of business risks on interest rate spread of commercial banks in Kenya. Correlation research approach was used. Data was collected using questionnaires and analysed using SPSS Version 19. After running different tests: reliability tests, factor analysis, descriptive tests, Pearson correlation, model of fitness and regression, results showed that business risks influence interest rate spread of commercial banks in Kenya. There is need for stakeholders' participation in review of existing policies on stability and soundness of the banking industry. Banks should also explore internal and industry driven strategies to mitigate some of the bank-specific factors associated with higher spreads. Based on the research of this study, it is concluded that business risks played significant role in explaining interest rate spread. It is therefore recommended that policy makers should implement sustainable political and macroeconomic environments to boost investors' confidence. Commercial banks in Kenya should thus participate in the interbank market or use the repurchase agreements for government securities to reduce their liquidity risks.

Keywords: *Interest Rate Spread, Business Risks, Interest Rate*

TEACHING STAFF RECRUITMENT IN TECHNICAL VOCATIONAL AND EDUCATIONAL TRAINING CENTRES IN KENYA

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ABSTRACT

Human resource management is a significant organizational component as it provides for viewpoints, ideals and characteristics of an organization's life, and when appropriately managed, these human characteristics can be considerably advantageous to an organization. As such, effective recruitment becomes a crucial component underpinning human resource management's foundational operations, which encompass acquisition, development and rewarding employees. This study sought to establish the factors affecting staff recruitment in Vocational Training Centres within Kiambu County in Kenya, with human resource planning and job analysis being the variables under investigation. The theories anchoring this study are; institutional theory and the resource-based view theory. Descriptive survey approach was used and a census was carried out involving the top management and heads of departments of the institutions. Data was collected using standardized questionnaires used and thereafter analysis was conducted both quantitatively and qualitatively. Descriptive and inferential analysis was done using Statistical Package for Social Sciences. Results showed that human resource planning was crucial in achieving the laid-out organizational goals. Job analysis was found to communicate the purpose, level of responsibility and scope of the job to potential applicants. Elaborate plans were put in place to nurture and develop employees to enhance their knowledge and skills through reskilling courses, workshops and seminars. With many of them transitioning from craftwork to the classroom, along with the upscaling of credentials to encompass Competence-Based Education, the centres, along with the goodwill of TVETA has created an enabling environment for employees to advance in knowledge and diversify their skillset. The calculated p-value ANOVA score was 0.000 for human resource planning and job analysis. With the critical scores being less than 0.005, it was concluded that the two variables were significant in determining recruitment decisions by vocational training centres.

Keywords: *Staff Recruitment, Job design, Job Analysis, Human Resource Planning*

STRATEGIC MARKETING APPROACHES AND MARKET PENETRATION BY GENERAL INSURANCE COMPANIES IN KENYA

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ABSTRACT

The insurance industry is faced with a number of challenges the world over, among them the internationalization and globalization leading to increased competition. In Africa, the nature of competition in the Insurance industry has generated various levels of marketing strategies and applications. All players in the insurance industry are competing for the limited insured population. There is much mistrust of the insurance sector among the population mostly out of ignorance, hence the need for a comprehensive awareness programme in order to tap the vastly un-served market hence the need for insurance companies to be innovative in their marketing approaches. The purpose of this study was to determine the effects of strategic marketing on market penetration of the general insurance companies in Kenya. The study sought to establish whether direct response marketing has a significant effect on market penetration of general insurance companies in Kenya; to establish the effects of electronic marketing on market penetration of general insurance companies in Kenya, establish whether strategic alliances have a significant effect on the market penetration of general insurance companies in Kenya. The study was guided by the resource dependence theory, commitment trust theory and resource based view theory. Descriptive research design was used and the target population was 160 employees in general insurance companies in Nyeri County from which a sample of 64 respondents was selected. Data was collected using questionnaires. Multiple regression analysis was used to establish the relationship between the dependent variables and the independent variables. Results showed that direct response marketing had a positive and significant influence on market penetration (Coefficient/beta =0.131, P-value= 0.001), effect of electronic marketing was positive but insignificant (Coefficient/beta =0.162, P-value=0.063), while strategic alliances were positive and significant (Coefficient/beta was 0.196, P-value = .031). This implied that if the general insurance companies were to increase market penetration, they should not only use the traditional methods of marketing (direct marketing), but have to be innovative and employ strategic alliances as a marketing penetration strategy among other marketing methods.

Key Words: *Market Penetration, Direct Response Marketing, Electronic Marketing and Strategic Alliances*

PROJECT MANAGEMENT PRACTICES IN SCHOOL CONSTRUCTION PROJECTS

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ABSTRACT

The study examined the project management practices used in school construction projects. Mixed methods of inquiry were used in the cross-sectional study. The target population comprised 920 headteachers and 82 District Education Officers (DEO). A sample of 279 respondents was scientifically determined and proportionately apportioned as 257 headteachers and 22 DEOs. Purposive sampling was used to sample regions, stratified random sampling with replacement to sample headteachers and simple random sampling to sample DEOs. Headteachers filled out questionnaires while DEOs were interviewed. Pilot testing of the questionnaire was done on 28 headteachers. Cronbach alpha was used to ensure reliability while peer review and pilot testing ensured validity. Responses were received from 247 head teachers and 20 DEOs. Thematic analysis was used to analyse interview data while descriptive statistics was used to analyse quantitative data. School construction projects were identified and selected largely without stakeholder involvement. Results showed that project management practices varied from school to school and were localized as the Ministry of Education and Higher Studies (MoEHS) was not hands-on with its policies largely due to budgetary constraints. Project management practices were significantly influenced by availability of project financing or lack of it which influenced which projects were mounted, the number of projects undertaken and how they were implemented and eventually the projects' performance realized. Completed construction projects were put into use before they were inspected for compliance with the school infrastructure policy. Headteachers oversaw project implementation and ensured project clean-up was done. There is a need to involve the stakeholders through the project cycle to increase projects' performance. Since headteachers doubled in as project managers for the school construction projects, there is a need to train them on basic project management skills. There is also need for Headteachers to explore other ways of financing school construction projects such as public-private partnerships and soliciting funding from donors and development organizations since community participation and MoEHS funding yielded inadequate funding in many of the schools surveyed.

Keywords: *Project Management Practices, Construction Projects, School Infrastructure, Public Schools, Physical Facilities.*

EFFECT OF INTERNAL CONTROL SYSTEMS ON FINANCIAL PERFORMANCE OF PUBLIC UNIVERSITIES IN KENYA

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ABSTRACT

A number of private universities have reported better financial performance than public Universities across the world. The dismal financial performance in public universities can be ascribed to poor financial management practices due to lack of robust internal control systems. Though financial management and internal control systems are essential, there exists only a few studies and empirical evidence on the relationship between financial performance and internal control systems in public universities in Kenya. This study investigated the effect of internal control systems on financial performance of public universities in Kenya. The research was informed by the systems theory, agency theory, attribution theory, and stewardship theory. The research adopted a causal research design, and targeted 160 respondents from 32 public universities. Census sampling technique was applied. Semi-structured questionnaires and secondary sources were used to collect primary and secondary on the financial performance of public universities for five years. The study respondents were the Deputy Vice chancellors (finance), Registrars, In-charge ICT, Finance Officers and Internal Auditors. A total of 142 questionnaires were returned duly filled representing 88.75%. Data was analyzed using Descriptive and inferential analysis. A pilot study was conducted to examine the reliability and validity of the research instruments and instrument adjusted accordingly. Diagnostic tests were carried out and the data was found to be normally distributed and did not suffer from multicollinearity and heteroscedasticity. Results showed that preventive controls regressed individually against the dependent variables. It was concluded that internal control system had to a large extent effect on financial performance of public higher learning institutions. There is need to strengthen internal control systems in state corporations to improve financial performance of internal control systems.

Key Word: *Internal Control Systems, Preventive Controls, Financial Performance, Public Universities*

CREDIT PRUDENTIAL GUIDELINES AND LOAN PERFORMANCE OF MICROFINANCE BANKS IN KENYA

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ABSTRACT

The credit prudential guidelines comprise interventions promulgated by Central Bank of Kenya aimed at mitigating credit risk faced by the banking sector. When they were issued, these guidelines which include: loan classification criteria, loan provisioning guidelines, loan write-off procedures and loan renegotiations were said to be key pillars in combating the non-performing loans menace that dogged the banking sector since independence in Kenya. Nonetheless, a review of studies carried out to evaluate the effectiveness of credit prudential guidelines in meeting this objective have provided conflicting results. It is this inconclusive situation that has motivated a follow-up study to establish an accurate empirical position. The study therefore sought to investigate the relationship between credit prudential guidelines and loan performance among the Kenyan microfinance banks by determining the influence of loan classification criteria, loan provisioning guidelines, loan write-off procedures and loan renegotiation policy on loan performance among the licensed microfinance banks in Kenya. The study was anchored upon the regulatory capture theory and the Laffort and Tirole Model. The study adopted descriptive survey research design and targeted 14 microfinance banks registered and licensed to operate in Kenya as of 31st December 2021. Structured questionnaires were used to collect primary data on the independent variable in all the 14 MFBs. A data collection sheet was used to collect secondary data on the dependent variable over a 10-year period (2012 - 2021). Respondents comprised the branch managers and credit officers. Both descriptive and inferential statistical analysis techniques were employed to obtain the results. Results showed that all the four credit prudential guidelines used in the study had a negative and significant influence on loan performance among Kenyan microfinance banks; implying that their implementation led to lower NPL ratio. Consequently, it is recommended that management of the microfinance banking institutions should continuously institutionalize the four credit prudential guidelines as primary tools for managing credit risks. Further, the Central Bank of Kenya should strengthen the credit supervision function to negate the growing trend in non-performing loans among the lenders by instituting appropriate sanctions

Keywords: *Credit Prudential, Credit Risk, Banking Sector, Loan Classification Criteria, Loan Provisioning Guidelines, Loan Write-Off Procedures and Loan Renegotiations*

EFFECT OF CUSTOM DUTY INCENTIVES ON FINANCIAL PERFORMANCE OF MANUFACTURING COMPANIES IN KENYA

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ABSTRACT

The Purpose of the study was to assess the effect of custom duty incentives on financial performance of manufacturing firms in Kenya. The study focused on the manufacturing companies registered by Kenya Association of Manufacturers. 447 manufacturing companies in the register of Kenya association of Manufacturers in 2019 were included in the study. Stratified random sampling technique was used to determine the sample size, and 211 manufacturing companies were selected for the study. Primary data was collected using questionnaires targeting accountants and other senior management officers in the manufacturing companies. Secondary data was collected from audited financial statements covering a period of 10 years from 2009 to 2018. The response rate on the questionnaires was 73.5 %. Data was analysed using SPSS version 25. Both descriptive and inferential statistics were used and diagnostic tests involving multi-collinearity tests, auto-correlation, heteroscedasticity and test of normality carried out. The data did not suffer from multi-collinearity neither was there auto-correlation. However, the data violated the assumption of normality. The study applied ordinal regression analysis to determine the predictive model. Pseudo-R square was computed which showed that custom duty incentives explains 4% of the change in financial performance meaning there are other factors that contribute to the change in financial performance. Custom duty incentive was significantly related to financial performance of manufacturing companies. It was concluded that custom duty contributes positively to the financial performance of manufacturing companies in Kenya and that manufacturing companies should embrace custom duty incentives offered by the government.

Keywords: *Financial Performance; Manufacturing Companies; Custom Duty Incentives*

ROLE OF ENTREPRENEURIAL (EO) IN MARKETING STRATEGY IMPLEMENTATION BY GARMENT MAKING MICRO ENTERPRISES IN NAKURU, KENYA

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ABSTRACT

Entrepreneurial Orientation (EO) is closely related to strategic decision-making process in business. A number of scholars argue that entrepreneurs tend to implement marketing strategies dependent on their skills, own experiences, and attitudes. This entails a strong unswerving orientation toward quest for opportunities for growth. As an entrepreneur in the garment-making industry, one needs to be innovative, risk-taking, autonomous, and proactive in order to remain competitive in the market. This is because EO is a main resource and capacity on 'firm growth. Pro-activeness in competition, innovativeness and willingness to take risks are critical to development of competitiveness to all types of businesses. However, no known study on marketing strategies has looked into the dimensions of EO in the garment-making sector and not all garment-making micro-enterprises are innovative, pro-active or open to risk. This study seeks to highlight the role EO in implementation of marketing strategies by entrepreneurs in the garment-making sector. The study employed *ex post facto* design with the main data collection instrument being a questionnaire which comprised of open and closed ended questions. Principal Component Analysis (PCA) was used to determine marketing strategies and EO factors that influence their implementation. The EO factors influencing implementation of marketing strategies by the garment making micro enterprises were identified as Autonomy, Risk-taking, Innovativeness and Pro-activeness. All the marketing strategies were positively influenced by entrepreneurial orientation in one way or another. Thus successful implementation of these strategies was dependent on the entrepreneur. In particular, Market Penetration was significantly influenced by all the orientations while, Pricing was only influenced by risk-taking and pro-activeness. Based on these results, the hypothesis that entrepreneurial orientation of the garment making entrepreneur does not significantly influence the implementation of the marketing strategies was rejected. This implies that EO is key to marketing practices of any garment-making enterprise

Keywords: *Micro Enterprises, Entrepreneurial Orientation, Marketing Strategies, Implementation*

LOAN MONITORING STRATEGIES AND LOAN REPAYMENT PERFORMANCE OF REVOLVING FUNDS IN KENYA

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ABSTRACT

The goal of this study was to investigate the influence of loan monitoring strategies on repayment performance of the revolving funds in Kenya. Specifically, the study evaluated the relationship between Number of monitoring visits, Number of arrears report and the repayment performance. A conceptual framework was used to determine factors that influence revolving fund repayment performance in Kenya. The study adopted descriptive correlational research design. A Stratified random sampling and purposive sampling techniques was utilized to give a sample of 181 youth and Woman Enterprise Fund officers in Kenya, while a questionnaire was used to collect primary and secondary data. Multiplelinear regression was used to test the research hypothesis and demonstrate the relationship between the variables. Results showed that the number of monitoring visits and arrears report had a positive and significance effect on repayment performance of revolving funds in Kenya. With a huge demand for low-interest fund schemes globally, a study focusing on Kenya's recovery strategies, which is a leader in the financial market in East Africa; promotes sustainability of the funds through proper management of the revolving schemes.

Previous studies have focused on the default rates of revolving funds in Kenya as well as the challenges facing the funds. This study went further to investigate the strategies put in place that influence repayment performance of revolving funds. The study contributes to the body of knowledge by establishing strategies that influence rate of repayment performance of revolving funds.

Key Words: *Client Appraisal Strategies, Rate of Repayment, Strategies, Default Rate, Revolving Fund.*

INFLUENCE OF GROUP DYNAMICS ON THE GROWTH OF YEDF- FUNDED YOUTH GROUP BASED ENTERPRISES IN NAIROBI COUNTY, KENYA

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ABSTRACT

This research work was conducted in Nairobi County in Kenya. The Youth Enterprises Development Fund (YEDF) was conceived in Kenya in 2006 with an aim encouraging the youth to actively participate in the country's economic growth through enterprise development. It was mandated to extend credit to the youth to start and grow their enterprises. Since most of the youth lack credit collateral the YEDF required them to form groups for them to start group enterprises where each member act as collateral for the group loan. Nairobi County is the smallest but the most populous of Kenyan counties with majority of the youth engaging in entrepreneurial activities in deed it has the highest uptake of the YEDF loans amounting to 2.3 billion and highest repayment rate of 48%. There were in total 255 group enterprises that formed the target population for this research work. A sample size of 156 group enterprises was arrived at and using a self-administered questionnaire data was collected where 121(77%) responses out of the sample were returned. The respondents were group leaders. The main group Dynamics aspects of interest were group leader characteristics and considerations made before joining the group. After analysis of data, it came out clearly that both group leader characteristics and considerations made before joining the group were significant in explaining the growth of youth group based enterprises in Nairobi County. Group leader characteristics especially the, age and entrepreneurial experience played the greatest role followed by considerations made before joining the group. In deed group leader characteristics had r of 0.297 while for considerations made before joining a group had an r 0.229 showing one-unit increase in group leader characteristics and considerations contributed to 8.8% and 5.3% growth respectfully.

Keywords: *Group Leader Characteristics, Considerations Made Before Joining a Group, Youth Enterprises Development Fund, Growth of Youth Group Based Enterprises*

WORK LIFE BALANCE AND EMPLOYEE RETENTION IN PUBLIC LEVEL FIVE HOSPITALS IN KENYA

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ABSTRACT

Work-life balance practices are human resource practices that ensure alignment of work and personal life. Retention of employees is a strategy that an organizations use to keep employees from preferring employment elsewhere. This investigated the influence of work-life balance on staff retention in public level five hospitals in Kenya. Specific objectives of the study were; to establish the influence of employee assistance programs and work schedules on staff retention in public level five hospitals in Kenya. The study adopted descriptive and correlational research designs. The study targeted 472 doctors, 3318 nurses and 449 clinical officers from the eleven (11) public level five hospitals in Kenya. Proportionate stratified random sampling design was used to select eight (8) public level five hospitals from which a total sample size of 40 doctors, 278 nurses, and 37 clinical officers were selected. Data was collected using a semi-structured questionnaire. Cronbach alpha was used to test reliability of the research instruments. Both descriptive and inferential statistics were used to describe study findings based on the objectives. Tables and percentages were used for descriptive statistics while Binary Logistic Regression Model computed using SPSS Version.23 was used for data analysis. Results showed that employee assistance programs significantly influenced retention of health workers'. Availability of work schedules did not influence retention. Employee assistance programs significantly influenced employee retention. There is need for management to invest in improving employee assistance programs to encourage employees to remain in the hospitals. Management should also design new approaches relating to work schedules so as to attract and retain their talented workforce.

Keywords: *Work life balance, Retention, Public Level Five Hospitals, Employee Assistance Programs, Work schedules*

IMPACT OF TOURISM ON THE ECONOMY OF RWANDA: SOCIAL ACCOUNTING MATRIX (SAM) ANALYSIS

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ABSTRACT

The primary objective of this study was to evaluate the economic impact of tourism and assess the strength of tourism inter-industry linkages in Rwanda's economy for the year 2013/2014. The SAM model was used to estimate the impacts and linkages of tourism in terms of output production, employment generation, labour income earnings and total value creation. The economic models identified and quantified the linkages between different sectors of the economy. The relationships between expenditure and output, and income and employment (direct and indirect) were described by multipliers. Data for analysis was sourced from EORA multi-region input-output table (MRIO) database: <http://www.worldmrio.com/>

All impacts have a starting point in the economy, defined as the direct effect that set off iterations of indirect (inter-industry production). Total tourism expenditure/consumption, which triggers direct effects, consists of internal tourism consumption as an aggregate that describes the size of direct visitor acquisition within a country of reference. Internal tourism expenditure (a portion of internal tourism consumption) was used as a basis for calculating tourism multipliers and their associated effects. There are several different types of multipliers depending on the secondary effects included and the measure of economic activity used. The common multipliers computed were associated with output, income, value addition and employment in the economy for the years 2013/2014. Multipliers were decomposed into their various multiplier effects: initial and production effects. Approximately \$286 million worth of internal tourism expenditure/consumption in the economy created 72,000 jobs (13% of economy-wide employment) and generated \$195 million in labour income (6.4% of national labour income), \$381 million in total value addition (6.8% of national total value) and \$803 million in output (7.3% of national output).

This study is useful in analysing the effects of changes in tourism expenditure/consumption, effects of policies and regulations that directly or indirectly affect tourism, resource allocation, policy and management of tourism development strategies. In this study, internal tourism expenditure (a portion of internal tourism consumption) was used as a basis for calculating relevant multipliers and their associated effects. Future studies can re-estimate the multipliers by considering internal tourism consumption in its entirety. A more robust methodology such as Computable General Equilibrium (CGE) models can be considered for further analysis.

Keywords: - *Tourism Satellite Accounts, Tourism Internal, Social Accounting Matrix Expenditure/Consumption, Rwanda*

DETERMINANTS OF SOCIAL CLASS AS DEMOGRAPHIC SEGMENTATION PRACTICES ON CONSUMER CHOICE OF READY TO WEAR CLOTHES IN KENYA

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ABSTRACT

Segmentation is the division of a large market into smaller homogeneous markets targets on the basis of common needs and/or similar lifestyles. One of the primary aims of segmenting a business sales programme is to focus on the subset of prospects that are mostly likely to purchase its offering. Segmenting on social class as demographic variables involves dividing consumers with regard to their income, and occupation. Part of The psychographic variables is social class. This study segmenting therefore sought to fill the existing knowledge gap by focusing on social class as demographic segmentation on consumer choice of ready to wear clothes. The study specifically focused on the influence of social class on consumer choice of ready to wear clothes in Kenya. The study adopted, marketing mix theory and location theory. The study adopted descriptive survey design to obtain in-depth information from the respondents. The study used purposive sampling to select ready to wear shops from the three cities in Kenya namely: Nairobi, Mombasa and Kisumu. Data was analysed using both descriptive and inferential statistics. Correlation analysis was employed to determine the relationship of variables. The findings indicated that there was a positive significant relationship between social factors and consumer choice of ready to wear clothes as shown by a regression coefficient of 0.449. The study recommended a study be done on market analysis to determine customer demand in terms of the market needs. Knowledge of all relevant aspects of consumer perceptions of products and how they can be useful for managerial practice. According to perceived values in ready to wear industry, different sets of products and different types of advertising strategies should be applied for people of different status.

Keywords: *Demographic, Segmentation and Social class*

EFFECT OF COLLECTIVE BARGAINING AGREEMENT ON EMPLOYEE RETENTION AMONG MEDICAL PRACTITIONERS IN COUNTY GOVERNMENTS IN KENYA: A CASE STUDY OF KIRINYAGA COUNTY

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ABSTRACT

County governments in Kenya have advised employee retention strategies in a bid to safeguard their valuable human resource. This analyzed the effect of collective bargaining agreement on employee retention among medical practitioners in Kirinyaga County. The study adopted a descriptive research design. The target population was 930 medical practitioners. A sample size of 272 participants was obtained through Krejcie and Morgan tables and stratified random sampling. Primary data was collected using mixed questionnaires from selected respondents while secondary data was sourced from Kirinyaga County website and database. Data was analyzed using descriptive and inferential statistics. A regression model of CBA predictors was run against employee retention. Based on the findings, the coefficient of correlation ($r = 0.641$) revealed that there existed a moderate strong positive relationship between collective bargaining agreement implementation and employee retention. The coefficient of determination ($R^2 = .411$) revealed that collective bargaining agreement implementation explained about 41.1% of the changes in employee retention among medical practitioners in County Governments in Kenya. This shows that 58.9% of the employee retention could be explained by other factors other than CBA implementation. This led to the conclusion that CBA implementation had an effect on employee retention among medical practitioners in County Governments in Kenya. It is recommended that the County Governments in Kenya implement collective bargaining agreements entered into with the medical practitioners to enhance employee retention.

Keywords: - *Collective Bargaining Agreement, Employee Retention*

EFFECT OF DIGITAL MARKETING STRATEGIES ON THE SALES GROWTH OF COFFEE EXPORT IN KENYA

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ABSTRACT

Kenya benefits from the export of coffee because it creates jobs, strengthens international bonds, brings in foreign currency, and fosters economic and physical development in the country. However, over the past two decades, Kenya's coffee sector has experienced challenges. Scholars have discussed factors that affect exports in general, highlighting areas like GDP per capita, real exchange rates, world production, export capability as well as foreign direct investment. However, digital marketing strategies have not been investigated as to whether they are effective ways of increasing sales for coffee produced in Kenya. Uganda was among the top ten countries that produced coffee for widespread consumption around the world and in order to increase chances of success in the face of competition, they capitalized on domestic market, established a profitable worldwide market, and automated their coffee marketing methods. It is through this understanding that the study sought to evaluate the effect of digital marketing strategies on sales growth of Coffee export in Kenya. Cross-sectional survey was adopted as the blueprint, while target population was all 157 coffee marketing firms in Kenya. Respondents were randomly selected to a sample size of 384 units. To assess multiple correlation problems, correlation matrix was applied and Multiple linear regression used for analysis. The study revealed that digital marketing strategies had a positive and significant effect on sales growth of Coffee exports in Kenya ($\beta_2 = 0.821$, $p < 0.05$). Hence, hypothesis was rejected. Regression analysis revealed the same positive effect of digital marketing on sales growth at ($P < 0.000$) significance. Digital marketing strategies played a significant role in the sales growth of coffee export in Kenya, hence the need to use digital marketing strategies like search engine optimization (SEO), social media marketing (SMM), and email marketing to increase their sales.

Keywords: - *Digital Marketing Strategies, Sales Growth, Coffee Export.*

SUBTHEME TWO: - EDUCATIONAL TECHNOLOGY AND REFORMS**IMPLEMENTATION OF COMPETENCE BASED CURRICULUM (CBC) IN KENYAN UNIVERSITIES: CHALLENGES AND OPPORTUNITIES****Kerubo J., Muiru A.**

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Correspondence: jkerubo@kyu.ac.ke, amuiru@kyu.ac.ke**Abstract**

The competence based Curriculum adopted by Kenya in 2019 aligns the country's education system and goals to the global SDG goal No 4 continental (African Economic Outlook, 2012 and regional (East African Community 2013). These global trends dictate that education responds to emerging social, technological and economic demands of the work-place. Curriculum reform is needed to empower our graduates to fit in a competitive, industrializing and closely networked globalized world (Republic of Kenya 2018a). The Competency Based Curriculum in Kenya under the 2-6-3-3 System of Education puts emphasis on seven core competences, namely; Communication and collaboration, Critical thinking and problem solving, Creativity and imagination, Citizenship, Digital literacy, learning to learn and self-efficacy. It advocates for identification and nurturing of learner's potentials and talents in preparation for life and work.

This paper uses the CBC policy framework to discuss perceived challenges and opportunities likely to arise in Universities during implementation of CBC. The paper adopts a theoretical and conceptual approach in highlighting the policies and strategies for implementation of CBC at the University level. The focus is on pedagogical approaches, assessment in CBC, resource mobilization and management as well as enrollment and gender equity in STEM. Suggestions are given on how universities can prepare adequately for successful implementation of CBC.

Keywords: *Competency Based Curriculum, Curriculum Reforms, Curriculum implementation, Policy Framework*

ROLE OF EDUCATION TECHNOLOGY IN INCULCATING ENVIRONMENTAL MANAGEMENT BEHAVIOUR AND MORALS: THE CASE OF KIRINYAGA COUNTY, KENYA

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ABSTRACT

The recent food shortage in Kenya has been associated with harsh environment and changing climatic patterns. According to Titus Masika (2016), the problem could be deeper than just climate change and environmental harshness and may also be a behaviour issue. Masika asserts that many people lack the wisdom to use the limited available resources, the necessary work ethic to entrench conservation and the personal integrity to refrain from unsustainable entrepreneurship. Thus, although all education reforms since 1976 emphasized the need for education to inculcate good morals among the learners, many teachers do not take up the role of mentorship and behaviour seriously. Thus education has been the weak link in matters of management, and is conspicuously absent or silent in prompting behaviour change. This explorative study sought to investigate the roles played by education institutions in Kirinyaga County to inculcate good morals and behaviour change, related to environmental management, together with motivations for the noted roles played, whether positive, neutral, or negative. This was both an explorative and descriptive study, employing both qualitative and quantitative methods. Data was collected using questionnaires, interview schedules, and observation guides. Leading and key participants were accessed using snow ball technique. Data was analysed and findings presented using narration, graphs, and charts. Results showed that education institutions in Kirinyaga County have not considered environmental management as one of their mandates. It is recommended that environmental management behaviour be adopted by the ministry of education as one of the key emerging issue to be included in the curriculum at primary, secondary, through tertiary and University education.

Keywords: *Behaviour Change, Environment, Conservation, Food, Climate Change, Education.*

ROLE OF EDUCATIONAL TECHNOLOGY IN BEHAVIOUR CHANGE AMONG STUDENTS IN PRIVATE UNIVERSITIES IN KIAMBU COUNTY, KENYA

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ABSTRACT

Educational technology plays an important role in improving classroom pedagogy in many institutions of higher learning. It enhances sharing of information among lecturers and students and reduces instructional time wastage. However, educational technology has been abused by students leading to behaviour change. Thus, many students get distracted from academic work, rarely concentrate in class but constantly on their mobile phones attending to issues not related to their academic activities. This study sought to assess the extent to which educational technology has influenced behaviour change among students in private universities in Kiambu County, Kenya. The study was guided by the theory of planned behavior and adopted mixed methodology and applied concurrent triangulation research design. The study targeted 6996 respondents comprising 349 lecturers, 113 Heads of Departments and 6534 students of whom a sample of 379 respondents (30 lecturers, 12 HoDs/CoDs and 337 students) was determined using Yamane's Formula. Qualitative data was analyzed thematically along the objectives and presented in narrative forms. Quantitative data was analyzed descriptively using frequencies and percentages and inferentially using Pearson's Product Moment Correlation Analysis in Statistical Packages for Social Science (SPSS 23) and presented using tables. The study established that, despite the noble role of technology in improving teaching and learning activities, 56.9% of students in private universities in Kiambu County have witnessed a change in their behaviour. Over 65.8% of the students rarely concentrate in class activities with more than 80.1% constantly using their mobile phones. There is need for students to embrace responsible use of educational technology for their academic benefit and reduce the time spent on non-academic matters. It is further recommended that University management should formulate and enforce ICT policies which restrict use of technology gadgets such as mobile phones during lectures.

Key Words: *Behaviour Change, Educational Technology*

A CRITICAL ANALYSIS OF 21ST CENTURY STUDENTS LEARNING OUTCOMES FOR EDUCATIONAL REFORMS IN KENYAN UNIVERSITIES

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ABSTRACT

The 21st century student learning outcomes are skills, knowledge and expertise that they should master to succeed in the ever changing global work environment. Through this process the students should demonstrate, Information and Communication Technology Literacy, Critical Thinking/ Problem Solving and Communication skills, Collaborative approaches to solving multisectoral global problems, Global Awareness, Citizenship and efficacy in Self- Management. Thus, whereas, English, mathematics, social studies, and science used to define the educational landscape, the world has changed and the core subjects changed to English, reading or language arts; mathematics; science; foreign languages; civics; government; economics; arts; history; and geography to reflect the demands of 21st century workplaces and communities making a foreign language, economics and geography to be the “new basics”. Thus besides the rigorous background students should in addition possess the skills listed above to survive in the ever changing dynamic world and will be assessed on these learning outcomes through their high school tertiary and University education to acquire the required proficiency in the 21st century.

Keywords: *Learning outcomes, Global awareness, Citizenship, Problem solving, Self-management*

**USING INDIGENOUS KNOWLEDGE AND EDUCATION TO INFLUENCE
AND SHAPE NATIONALLY DETERMINED CONTRIBUTIONS
IMPLEMENTATION IN THE FOREST AND LAND-USE SECTOR NEAR
MOUNT KENYA FOREST**

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ABSTRACT

The world is going through turbulent times due to climate change. The problem is compounded by increasing population in developing countries, exerting pressure on land due to needs for food, water, energy, and pasture, leading to forest degradation and carbon emission. The continued degradation of forests dims the future prospects of sustainable use of forest to achieve human needs notably, local communities and indigenous populations need to take more active roles in preservation of the forests. There has been ironically inadequate participation of indigenous and civil society groups in the REDD+ activities in Africa; making international bodies and organizations the major (and in some instances, the only) actors, thus reducing REDD+ processes to be 'expatriate' and 'foreign knowledge' based (p. 30). One wonders why indigenous knowledge and education has not been sought. The aim of this project is to find out, and support Mount Kenya communities to use indigenous knowledge and education to influence and shape preservation and implementation in the forest and land-use sector through the following specific objectives are 'research on indigenous knowledge of the Mount Kenya communities and indigenous peoples; strengthening available indigenous knowledge and education framework of the Mount Kenya communities and indigenous peoples through capacity building, encouragement and financial support. The study involved research on indigenous knowledge and education that support environmental management around Mount Kenya, and specifically Kirinyaga County. Both qualitative and quantitative methods were used to get primary data; documentary study was used to get secondary information. Results showed. Knowledge of justice systems related to environment; knowledge of forest benefits of species; and sacralization of objects and places; which have been instrumental in forest conservation around Mt Kenya. The study recommends that key stakeholders and local institutions should find ways of adopting and disseminating beneficial indigenous through education and advocacy.

Keywords: *Indigenous Knowledge, Environment, Land, Food, Mount Kenya, Sustainable Development.*

LUGHA NA UVUMBUZI WA KISAYANSI NA KITEKNOLOJIA

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Uvumbuzi kimsingi huwa unahusisha utambuzi wa vitu, hali na hali aambazo zilikuwapo awali lakini zikawa ama hazijulikani au hazikuwa zimetambuliwa kwa kupewa majina. Utambuzi huu hutumia lugha. Huku nikusema kuwa uvumbuzi niutambulishaji wakitu ambacho hakikujulikana kikajulikana. Ni uwasilishaji wamawazo kupitia uwazaji makinifu. Kwa kuwasilisha mawazo na maoni, wavumbuzi huwa wanatambulisha kitu kwa kutumia lugha. Uwazaji unaotumia lugha huwapa wavumbuzi uwezo wa kufikia taswira za kindani zilizojisetiri kwenye bongo zao. Wanasayansi makini hutumia lugha kuunda upya mawazo na maoni yao upya ili kuenda nana muktadha wa changamoto zinawasukuma kuvumbua. Suala hili huzua mtiririko wamawazo ambao hujengeka kwenye mawazo yao yaawali yaliyokuwa kwenye akilizao. Kwa hivyo ni wazi kwamba ili kufikia maarifa yoyote mapya katika uvumbuzi nisharti kutumia lugha. Kutokana na nafasi kubwa ya lugha katika uvumbuzi, inakisiwa kuwa umadhubutiwa sera ya lugha katika taifa lolote nirutuba ya uvumbuzi wa wanasayansi. Katika uchunguzi huu, tunajiuliza, wanasayansi huvumbua chochote kipya au huwa wanatumia lugha kutambulisha jambo, kitu, maarifa au mawazo yaliyokuwapo tayari? Na je, kipi cha msingi zaidi katika uvumbuzi, sayansi au lugha? Ikiwa uvumbuzi huandamana na kuwezesha alugha, je mwanasayansi yoyote anapaswa kuitwa mwanaisimu? Na je, sera ya lugha katika mataifa ya Afrika inaathiri uvumbuzi? Maswali haya ndiyo tutashughulikia katikautafiti huu. Uchanganuzi nauhakikiwa nafasi ya lugha katika uvumbuzi wakisayansi na kiteknolojia utafanywa katika utafiti unao kusudiwa. Matokeo ya utafiti huu yatatumiwa kupendekeza kwawashika dau kuimarisha sera ya lugha katika bara la Afrika kama njia ya kuendeleza uvumbuzi.

Istilahi Muhimu: *Lugha, Uvumbuzi, Sera ya lugha, Wanasayansi na Wanaisimu*

STRATEGIES OF PERSUASION IN DELIBERATIVE DISCOURSE: AN ANALYSIS OF KENYAN PARLIAMENTARY COMMITTEE REPORTS

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ABSTRACT

Parliamentary committee reports emanate from choices and collective decisions on what action to take in response to emerging situations. Because of competing interests, among legislators; parliamentary committee reports (PCRs) require clear strategies of persuasion, in order to unfold their deliberative and persuasive goals. This study analysed the rhetorical appeals used in selected Kenyan parliamentary committee reports advanced to achieve the genre's communicative purpose. The study involved an examination of rhetorical strategies of persuasion used in PCRs including logos, ethos as well as pathos and is premised on Aristotle's Rhetoric art of persuasion theory. Descriptive research design was used with corpora being generated from fifteen parliamentary committee reports sampled five each from selected County Assemblies, the National Assembly and the Senate. Results of this study indicated that different rhetorical appeals are blended and focused on convincing and persuading legislators to adopt PCRs. The findings offer insights on the interplay between deliberative discourse styles, rhetorical persuasive patterns and contribute to the pool of knowledge on genre, communication and rhetorical analysis.

Keywords: *Deliberative discourse, Genre, Parliamentary Committee Reports and Rhetorical Appeals*

RECONFIGURING GENDER AND CULTURAL PRACTICES FOR SUSTAINABLE DEVELOPMENT IN 21ST CENTURY: AN ANALYSIS OF OLE KULET'S BLOSSOMS OF THE SAVANNAH

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ABSTRACT

This paper examined the possibility of redefining and reconfiguring gender roles and cultural practices for sustainable development. Any venture in the realization of sustainable development for 21st century calls for a repositioning of some age-old traditional practices for a better society. Thus societal needs in the contemporary world require active participation of both genders to lay a solid foundation for any development to flourish. The paper points out that the inability of most societies to have gender inclusive structures and a bias of cultural biases work against the realization of sustainable development. Most societies across the globe such as India, Afghanistans, Iranians, and Africans grapple with the question of gender inclusivity embedded and camouflaged in the cultural practices. As a result, structures that entrench inequity and inequality become stumbling blocks to realization of development in the society since age old traditional and cultural practices have a direct influence on the worldview and behaviour of people. This paper pays attention to Ole Kulet's *Blossoms of the savannah* and how it advances the need to address gender and traditional practices as issues that need to be addressed in order to achieve development. The question that arises is: how possible can literary texts address issues pertinent to sustainable development and how can gender inclusivity propel the realization of development in society? Answers to these questions form part of analysis in this paper.

Keywords: *Gender, Sustainable Development, Culture, Traditional Practices, Literary Texts*

RETHINKING EDUCATIONAL REFORMS: AN INSTRUCTIONAL LANGUAGE REFORM APPROACH

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ABSTRACT

According to the Kenyan Policy document released in 2018, one of the key challenges facing individuals with hearing impairment is language. The document indicates that few individuals in Kenya use Kenyan Sign Language to communicate or are unaware of it hence limiting their participation in social events and everyday life. There is therefore, need to reduce or do away with such communication barrier. However, the numerous approaches employed in enabling hearing-impaired individuals are solely based on the idea of making them “normal”. That is trying as much as possible to make them learn how to speak and lip read. This process is strenuous and yields little outcome compared, to the input. This study seeks to determine the percentage, of the Kenyan population living with hearing impairment and the factors hindering the hearing impaired from acquiring proper education, and identify the possible solutions. The study adopted internet-based research methodology preliminary findings indicated that, the education of the hearing impaired in Kenya is insufficient, thus making a majority of them unable to integrate into the larger society, thereby, limiting their participation in social events, and in workplaces. There is need to advance strategies to minimize these barriers on the hearing impaired as well as the other learners.

Keywords: *Hearing Impairment, Language, Sign Language, Communication, Hearing-Impaired*

MORAL EDUCATION IN KENYAN SCHOOLS AT CROSS ROADS. ISN'T IT TIME TO INTRODUCE A STAND-ALONE MORAL EDUCATION CURRICULUM?

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ABSTRACT

One of Kenya's national goals of education is to promote sound moral and religious values in the learners. While moral values have an intrinsic good of helping students grow up into responsible adults capable of enjoying a good life, there is a clear moral deterioration among the Kenyan youth. A number of people are thus wondering where the youth are heading. This is because cases of drug abuse, alcoholism, violence, theft, teenage pregnancies, rape and suicide are being the cases reported almost daily in the media. It is quite evident that something is wrong with the value systems of our youth. Moral education has been entrusted to the school. However, it is possible that the school syllabi do not contain requisite elements that could enable learners to develop the needed moral insights. Since independence moral education has been taught using religious education subjects namely Christian Religious Education (CRE), Islamic Religious education (IRE) and Hindu Religious education (HRE) as well as Social Education and Ethics (SEE). But in spite of the existence of these subjects in the curriculum, moral standards among the youth have remained low. It seems that the teaching of moral goals of education through religious education subjects has not achieved the intended objective. This paper presents a discussion on the need to develop a stand-alone moral education curriculum with clear objectives in the Kenyan school curriculum.

Keywords: *School Curriculum, Moral Education, Morality, Social Ills, Values.*

USING EDUCATIONAL TECHNOLOGY IN TEACHING AND LEARNING IN UNIVERSITIES IN KENYA: IS IT A BLESSING OR A CURSE

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ABSTRACT

From Mid-20th Century through the 21st Century, modern technology has been blossoming rapidly in Kenya. At this moment, the Education system has incorporated Technology aiming to achieve its objectives. Most of the teachers and students in Secondary schools and Universities spend more time using Technology. The increase in use of Technology in Kenya has led some scholars to question how it enhances teaching and learning in universities, and what benefits it has both parties in the educational context? And how blessed or cursed it is to students. The goal of this paper is to review the literature related to the use of technology in University education in Kenya to determine whether it has been a blessing or a Curse. The paper is divided into three parts. The first part looks at the Definition of Technology and Educational Technology and proceeds to describe how it is being used in Kenyan Universities. The second part explores the advantages that educational technology has for teaching and learning- the blessings. Part three discusses various negative effects of Educational Technology- Curses. The findings incorporate all types of learners. It covers all styles of teaching and learning; including long distance learning. On the other hand, it is of curse to educational system, because it has encouraged laziness, misguidance, and dependency on it among learners. The paper presents suggestions on how educational Technology can become a blessing in the teaching and learning processes.

Keywords: *Technology, Educational technology, blessing, curses.*

INFLUENCE OF INSTRUCTIONAL METHODS ON GIRLS' PERFORMANCE IN KCSE MATHEMATICS IN BARINGO CENTRAL SUB COUNTY, KENYA

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ABSTRACT

Mathematics is an important subject to achievement of Vision 2030 in Kenya. Unfortunately, girls' performance in Mathematics has remained dismal over the years at the secondary school level. Such consistent underperformance is attributed to factors like teaching approaches. This paper examines the extent to which instructional methods used in teaching influence girls' performance in Mathematics in KCSE in Baringo Central Sub-County. The study was guided by the systems approach to teaching and learning developed by Ayot and Patel. The study was carried out through descriptive survey research design. A sample size of 190 subjects was used. It comprised of 18 Mathematics trainers, 6 Mathematics Heads of departments and 166 girls. Purposive sampling was used to select HoDs and Mathematics teachers while simple random sampling was used to select the Form Four girls. Two questionnaires, one for Mathematics teachers and the other for students namely interview schedules for Mathematics HODs and observation checklist were used during data collection. Data was analysed using descriptive statistical techniques like standard deviation, percentages, frequency tables and means. Results indicate that instructional methods have an influence on girls' performance in mathematics. The teachers approach to teaching mathematics impacts on the way pupils apply, analyse, and synthesize concepts to create knowledge and solve problems. Teaching methods had a low but significant influence ($r=0.210$) $p<0.05$) on girls' performance in KCSE Mathematics examinations. We recommend that teachers should be given more in-service training in Mathematics to improve performance in mathematics.

Keywords: *Instructional Methods, Teachers, Teaching mathematics, Secondary Schools, Baringo central Subcounty, Kenya*

EFFECT OF TECHNOLOGY ON STUDENT'S BEHAVIOUR IN UNIVERSITIES IN KENYA

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ABSTRACT

Technology is part of human day-to-day life, and education sector is no exception. Thus, teaching and learning have become digitalized. We live in a digital World of Technology and are part of the Net Generation hence use of Technology cannot be ignored, since it has become part of human life, with a high percentage of the people using smart phones and computers in their daily lives. Students in universities use technology to acquire and receive information, do research, undertake assignments and University expenditures do online business and kill boredom.

Behaviour is a way in which human beings acts or have response to a particular stimulus. Behaviour change takes place in the physical, mental and social phases of human life from infancy, childhood, adolescence and adulthood. In this paper we focus on the effect of technology on students' behaviour in Kenyan universities. The paper is based on a theoretical review of the literature. We start with a conceptual definition of technology in education then define behaviour change and discuss the use of technology in universities in Kenya and its effects on the behaviour of students. The change in behaviour is discussed with reference to teaching and learning, academic integrity academic performance and social interaction. We highlight the positive and negative effects of technology on student behaviour and make suggestions on how technology can be used in universities for positive behaviour change among students

Keywords: *Technology, Universities, Students, Behaviour Change*

ACADEMIC INTEGRITY IN KENYA UNIVERSITIES: USING THE PRISONER'S DILEMMA TO DEVELOP POSITIVE INTERVENTIONS

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ABSTRACT

This paper explores unethical practices in universities in Kenya, showing the challenges they pose to academic integrity. There has been a rapid expansion of university education in Kenya, even though demand for higher education has plateaued in recent years. The number of qualified students seeking to join private universities, and associated tuition revenue, has declined significantly since 2017 when cheating in high school examinations was eradicated. Some universities have resorted to unethical practices to enroll students and offer programs that have not been accredited by the Commission for University Education (CUE). There is also a growing concern among governments, educators, students, and other stakeholders that unethical practices in higher education is spreading quickly and compromising the integrity of academic programs.

The paper proposes that strategies can be put in place to enhance academic integrity. It does this by considering why individuals act unethically, even though doing so contributes to damaging the credibility of the sector. The idea of the prisoner's dilemma is introduced to explain why it remains in individuals' interest to act in this way. Based on this, we suggest that changes be made to shift the balance of risk and reward. These changes can include efforts to detect unethical behaviour; discourage it through more consistent penalties; and to encourage and reward positive alternatives. We propose that everyone in Higher Education could contribute to these changes, suggesting interventions that could be made by teachers in classrooms; by trainers within universities; and by policy makers nationally.

Keywords: - *Unethical Practices, Academic Integrity, Credibility, CUE*

II PHASE-SHIFT FABRICATION OF FIBER BRAGG GRATING BY POST-PROCESSING USING FEMTOSECOND LASER

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ABSTRACT

Fabricating of phase-shifted fiber Bragg grating (PSFBG) by a femtosecond (fs) laser post-processing of standard single mode fiber Bragg grating (FBG) without phase mask is demonstrated. A central region of grating is irradiated by an fs laser assisted with a rotating jig, which produces a π phase shift at the central region of the grating and forms a π phase-shifted FBG. The procedure is simple, fast, and has good reproductivity. The bandwidth of transmission peak of PSFBG grows with increasing amount of laser energy or length of irradiation and decreasing translation speed. Transmission loss decreases with increasing irradiation length. Repeatability of fs post-processing and temperature stability of PSFBG were investigated.

Keywords: *Phase-Shifted Fiber Bragg Grating, Femtosecond, FS Laser, Rotating Jig*

THE POTENTIAL OF CELLOPHANE SHEET AS A CHEAP OPTICAL RETARDER

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ABSTRACT

Birefringence is an inherent optical property of anisotropic materials that enables manipulation of polarization state of light beams for various photonic and optoelectronic applications. In this work, we demonstrate the ability of the cellophane sheet to act as a phase retarder. Results show that the cellophane introduces a phase shift of 0.98π radians on the incident beam. By rotating the cellophane sheet on the object beam, the fringe separation is measured for different angles and the values used to calculate the ordinary and extraordinary refractive indices as 1.4721 ± 0.0002 and 1.4680 ± 0.0002 respectively. Because of its sufficient birefringence and small thickness of $24 \mu\text{m}$, cellophane can be used to fabricate special polarization pupil masks by cutting and aligning different cellophane structures appropriately.

Keywords: - *Birefringence, Cellophane Sheet, Phase Retarder*

RESEARCH ON ULTRASONIC VIBRATION AIDED FEMTOSECOND LASER MACHINING PROCESS OF TRANSPARENT MATERIALS

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ABSTRACT

A new process of femtosecond laser micromachining with ultrasonic vibration aided device is proposed. An ultrasonic aided device has been designed, and the laser micromachining experiments of transparent materials have been carried out. The effects of the ultrasonic vibration with different power on surface quality and the drilling depth were investigated, and the mechanism of the ultrasonic vibration aided laser machining analyzed. After introducing the ultrasonic vibration device, the residue debris on surface of the ablated trench is significantly reduced, and the drilling depth is increased. These results show that, ultrasonic vibration can effectively improve the surface quality of material processing, increase the depth of the drilling hole and promote the processing efficiency of the femtosecond laser.

Keywords: *Femtosecond Laser Micromachining, Ultrasonic Vibration, Surface Quality*

POLARIZATION EFFECT IN PHASE HOLOGRAMS

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ABSTRACT

Holography has a wide application in medicine, optical computers and scanners among others. Conventional studies on analogue holograms have mainly been conducted on image generation, processing and reconstruction. However, these conditions may vary thus affecting hologram quality. Since convection holography use photosensitive recording interference patterns in holographic material, there is need to evaluate aberration or how high intensity of light has been reconstructed. In this paper, we analyzed the fundamental parameters such as exposure time and processing chemical composition effect in phase holograms. Optimization of these parameters resulted to phase hologram image of approximately 16% diffraction efficiency at an exposure time of 20s. The influence of objective beam polarization is investigated. Results showed that by varying the polarization orientation, diffraction efficiency and fringe visibility are greatly affected.

Keywords: - *Holography, High Intensity of Light, Exposure Time, Processing Chemical Composition Effect, Holograms*

USING GRAVITY, MAGNETIC FORCE, WIND AND INTERNALLY GENERATED ELECTRICITY TO MAKE A MOVING MACHINE

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ABSTRACT

High cost in transportation is among the challenges faced by human beings. Fuel is applied repeatedly to avoid vehicle stopping. This study develops a project where issues of when and how to supply the machine with fuel is addressed. Gravity, magnetic force, wind and electricity generated within the machine are some of the things to use in the engine of this machine. Engine will be connected in such a way that we will have two or more pairs of heavy two metals or magnetic materials. This material will be of equal weight and opposite distance from a given point. Metals will be fixed will balance. Additional magnetic forces will make these metals to start rotating. The magnet will be sealed in such a way that it will not attract other materials. Two magnets will be fixed on circumference made by rotating metal but they will be touching to pull or push the metal enhancing movement. Since there will be two or more such pair movement of the vehicle will be achieved. We will then connect the center of the two metals with an item like a windmill that will increase the speed as speed of wind increases hence enhancing the movement of this machine. Since there is magnet and moving parts, electricity will also be generated giving the machine sufficient power to move. These forces will make the vehicle to move on the ground and in the air due to high speed. The vehicle will also be speed limitless since wind and electricity will increase with speed. These results in saving human expenses, increasing mobility of thins, raising standards of living

Keywords: *Cost in Transportation, Fuel, Gravity, Magnetic Force, Wind and Electricity Generated*

DETERMINING THE LANDFILL GAS POTENTIAL FOR ELECTRICITY GENERATION IN KERUGOYA KUTUS MUNICIPALITY

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ABSTRACT

Landfill Gas Technology involves the use of renewable source of energy where biogasis generated from organic wastes and subsequent use of the gas to produce electricity. This study assesses the use of KerugoyaKutus Municipality Solid Wastes from Kagio, Kutus and Kerugoya markets, through Landfill Gas technology to electricity production. The organic solid wastes generation potential in tonnes and the subsequent methane gas generation potential in m³/year, will be estimated for a period of 10 years from 2023-2033. This will be followed by determining the electricity generation potential in Kwh/year. Economic viability of the project in this Municipality will be done based on the Net Present Values in U\$, Levelized cost of energy and Payback Period. Environmental impact analysis based on green gas emissions potential withand without energy recovery will be done. To undertake the wastes potential, a Land Gem model version 3.02, using the inventory defaults will be used. This research will provide a scientific guidance on viability of LFG electricity generation project in this municipality making the paper useful to Kirinyaga Local Authority who need to manage their organic wastes from thethree localmarkets. The research will also be beneficial to investors who may want to evaluate the LFG production potential.

Keywords; *Landfill Gas, Municipal Solid Wastes, Generation Potential, Green Gas Emissions, Land Gem Model*

ASSESSMENT AND MAPPING OF NATURAL RESOURCES AND LAND USE WITHIN NAIROBI RIVER AND MBAGATHI SUB-BASIN

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ABSTRACT

Natural and human activities have impacts on the quality of water within a basin over time. Nairobi River Basin and Mbagathi Sub-basin are affected by diverse land use activities and changes within the upper, middle and lower sections of the basins. A comprehensive approach was used to examine the effects of land use activities within the basins. GIS spatial analysis was employed to examine the spatial relationship of the effects of land use activities in the basins. There was a significant change in the quality of water due to sewer line discharges, effluent from water services providers, solid waste disposal, industrial effluent from settlements and pesticides and herbicides from agricultural areas. From the above findings, there is need for stringent measures on conservation of the riparian for the rivers traversing the informal settlements as they are all non-point sources of pollution and discharge solid waste and raw effluent directly to the rivers through establishment of buffer zones and water quality monitoring programme.

Keywords: *Mapping, Natural resources, Basin, Land Use, Point Pollution, No-Point Pollution*

COMPOSITION, APPLICATION AND HEAT TREATMENT OF DUAL PHASE STEELS

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ABSTRACT

The term dual phase steels, or DP steels, refers to a class of high strength steels which is composed of two phases; normally a ferrite matrix and a dispersed second phase of martensite, retained austenite and/or bainite. DP steels were developed in the 1970's to respond to the need for new high strength steels without reducing the formability or increasing costs. Dual phase steels are characterized by a microstructure consisting of 75-85 vol% ferrite with the remainder being a mixture of martensite, bainite, and retained austenite. They have better strength-ductility combinations than ferrite-pearlite steels of equivalent tensile strength and are presently being used commercially. These HSLA steels have a typical composition of 0.12 %C, 1.7 %Mn, 0.58 %Si, 0.04 %V (Vanadium is used for microalloying). Their microstructure is composed of islands of martensite embedded in a matrix of ferrite, which is produced by giving the steel a "subcritical anneal" at ~800°C (in the two phase g-a region) and then it is quenched to room temperature. Research on these unique steels has increased exponentially since their development in the mid-1970s. Present understanding of relationships between composition, microstructure, and tensile properties is briefly reviewed, and some trends in developmental work presented.

Keywords: *Dual Phase Steels, Ferrite Matrix, Martensite, Bainite, Vanadium*

CONSTRUCTION INDUSTRY OUTPUT AND CENTRAL BANK OF KENYA'S BASE LENDING INTEREST RATE (2007 - 2022)

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ABSTRACT

Performance of construction output is a pointer to economic wellbeing and thus requires effective management to maintain its contribution in a country's growth. However, in Kenya, there is a research gap on the interaction of construction output and CBK's base lending interest rates. This has the potential of limiting the government's capacity to effectively manage the construction industry output in Kenya. This study investigates Kenya's construction industry output and how it is affected by CBK's base lending interest rate. Time series data (for analysis) were obtained from Kenya National Bureau of Statistics and Central Bank of Kenya. The data covered a period of sixteen (16) years; from Year 2007 to Year 2022, on yearly basis. The twin variables in this study were construction industry output and CBK's base lending interest rate in Kenya. Eviews (version 10) a statistical software application, was used for data analysis. The statistical outputs generated graphical analysis, tests of stationarity and regression analysis. Dependent variable (construction output) was regressed on the independent variable (CBK's base lending interest rate); applying the second differences of base lending interest rate and natural logarithms of the second differences of construction output. Results showed that base lending interest rates had no significant influence on the construction industry output in Kenya in the period of the study. A model explaining this outcome was developed which has a coefficient of determination (R^2) of 0(zero). However, it has been observed that much of the impacts of base lending interest rate start to be felt much later after their implementation. This is displayed by a regression model of lagged base lending interest rate which showed R^2 value of 0.17. This figure is an indicator that the regression model of lagged interest rate has explanatory powers and thus it was logical to conclude that base lending interest rate has an impact on construction industry output in Kenya. This paper presents empirical findings indicating objectively how the base lending Interest rate impacts construction output and can be adopted for policy formulation for purposes of regulating the construction industry in Kenya. Therefore, experts and stakeholders in the industry are highly advised to factor in this impact in the early stages of feasibility study and appraisal of construction projects.

Keywords: *Construction Output, Time Series, Stationarity, Explanatory Variable*

SOCIO-DEMOGRAPHIC FACTORS OF FASHION PURCHASE: A CASE OF APPAREL CONSUMPTION AMONG KENYAN UNIVERSITY STUDENTS

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ABSTRACT

There has been a rapid growth of global fashion industry. Kenya like other developing nations is fighting for a slice of this growth and positioning itself as a competitive contributor to the same. In this regard, both the fashion marketers and academia are becoming increasingly interested in variables of fashion consumption. This study investigated the relationship between the socio-demographic characteristics of University students and apparel purchase. Demographic characteristics of students such as age, gender, marital status, religion and residence (urban/rural) play a key role in students' apparel fashion consumption decision. Targeting 4 public and 16 private universities, study sampled 7 universities and 534 students. However, 503 questionnaires were completed hence used to collect data, a Chi square was used to test the null hypothesis; Socio-demographic characteristics of university students have no relationship with their apparel consumption. Results showed that there was no significant relationship between age and fashion need conceptualization ($\chi^2 = 7.905$, $df = 5$, $p\text{-value} = 0.162$) among university students. There was no relationship between students' gender and evaluation of all information before making apparel purchase ($p\text{-value} = 0.066$) though females were more likely to conceptualize a need before buying new clothes than males. There was a significant relationship between marital status of students and evaluation between possible alternatives ($p\text{-value} = 0.043$). Religion of the students had no significant relationship with fashion consumption. In summary results of this study showed that demographic characteristics of respondents had no significant relationship with apparel fashion consumption decision making among university students ($\chi\text{-square} = 15.000$, $df = 12$ and $p\text{-value} = 0.241$).

Keywords: *Apparel Consumption, Socio-Demographic Characteristics, Consumption Decision Making Process, University Students.*

SUBTHEME FOUR: - HEALTH MANAGEMENT AND SOCIAL RESPONSIBILITY

OPTIMAL CONTROL OF CHOLERA INCORPORATING THE DYNAMICS OF THE INDUCED ACHLORHYDRIA CONDITION WITH COST EFFECT STRATEGIES

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ABSTRACT

A nonlinear dynamical system is proposed and qualitatively analyzed to study the dynamics of cholera disease in a population. The basic model is extended to include; reduce infection rate (u_1), increase rate of seeking treatment(u_2), decrease development of achlorhydria condition(u_3), increase recovery rate from achlorhydria condition (u_4), increase recovery rate (improve efficacy of the drugs)(u_5). This leads to an optimal control problem which is qualitatively analyzed using Pontryagin's maximum principle. Numerical simulation of the resulting optimal control problem is carried out to gain quantitative insights into the implications of the model and pertinent results are displayed graphically. The simulation reveals that a multifaceted approach to the fight against the disease is more effective than single control strategies.

Keywords: *Cholera, Optimal Control, Pontryagin's Maximum Principle, Numerical Simulation, Multifaceted Approach*

MOLECULAR EPIDEMIOLOGY OF NOROVIRUS IN KENYA

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ABSTRACT

Norovirus (NoV) is a major cause acute gastroenteritis (AGE) across the world. However, limited information on epidemiology of NoV exists in many African countries despite the plausible burden this enteric virus exerts on her population, especially <5 years old, the elderly and immunocompromised individuals. A systematic review of studies that adopted detection of NoV by conventional or RT-PCR from January 2013 to December 2022 was conducted to determine prevalence and seasonality of NOV in Kenya. For determination of NoV seasonality, only prospective studies conducted over of ≥ 12 months were included. "Norovirus and Kenya" was used to search for publications in the PubMed database. A total of eleven studies identified. Of these, 7 (63%) met the inclusion criteria. The remaining studies (4) were excluded because they did not involve detection of NoV. The samples types in studies included were stool for five studies and the remaining two studies analyzed environmental samples. Stools were obtained from participants of all ages living rural and urban settings of Nairobi, western and coastal Kenya. Participants included outpatients, inpatients and food handlers with or without diarrhea. This study established that NoV prevalence ranged from 15.2% to 25%. Interestingly, two studies conducted in Kilifi County reported an increase in NoV prevalence post-rotavirus vaccine introduction in Kenya in 2014. Although determination of seasonality of disease is important for adoption of disease control efforts, only one study attempted to determine NoV seasonality and reported that peak NoV infections occur in rainy seasons. On the other hand, two studies demonstrated high detection rate (63% to 100%) of NoV in water for domestic use sourced from rivers and boreholes and ineffectually-contaminated waste water. From this study, it is apparent that NoV of public health importance in Kenya. Hence, increased NoV surveillance is required to guide adoption of diarrheal disease control programmes.

Keywords: *Norovirus, Acute Gastroenteritis, Diarrhea, Kenya, Africa*

A SCOPING REVIEW: IDENTIFYING THE ROLES OF THE NURSE CLINICAL INSTRUCTOR IN MIDDLE INCOME COUNTRIES

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ABSTRACT

The process of educating a nurse till they are able to effectively take on a professional role requires the student to go through theory work in class as well as clinical practice both in the laboratory skills labs and in clinical sites in the hospital and community. Nursing clinical practicum is widely agreed to be the nucleus of Nursing Education by both Nurse Educators and Staff Nurses. Nursing Clinical Instructors main activity is to help the Nursing students not only translate the theory they learn in class to clinical practice but also to orient them to their future roles as Nurses working in the clinical area in different functions. However, their role is not well understood as they are situated in both academia and clinical sites, more-so in developing countries since nursing is still developing and nurses are taking on different roles. The focus of focus of this research is to review literature on the role of nursing clinical Instructor in Low-and-Middle Income Countries of which Kenya is one. The methodology used is Scoping Review. It will utilize three databases namely EBscohost, Pub Med and Pro Quest which will help identify the roles of Nursing Clinical Instructors as seen by nurse student, the academic staff and the staff nurse in the hospital. Content analysis will be used to analyse the data received. This research will be used to add into research knowledge regarding Nursing Clinical Instructors, create awareness to both nursing staff and administrators of nursing academic institutions on the roles of Nursing Clinical instructors both in the academia and clinical area.

Keywords: - *Nurse, Clinical Practice, Skills Laboratory, Clinical Sites, Hospital Community, Clinical Practicum*

PRACTICES BY NURSES TO PREVENT PRESSURE INJURIES AT A LEVEL 5 HOSPITAL IN KENYA

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ABSTRACT

Pressure ulcer refers to a breakdown of skin due to prolonged pressure or shear. The incidence of pressure ulcers is about 20% in most clinical settings, despite existence of numerous national and international guidelines. The aim of this study was to assess the level of adherence to the Nursing Council of Kenya (NCK) procedure manual on pressure ulcer guidelines among nurses working at Embu Level 5 Hospital, and the associated challenges.

This was an institution based descriptive cross-sectional study. Data was collected using a researcher developed self-administered questionnaire based on NCK procedure manual guidelines. 145 respondents were selected using stratified random sampling combined with systematic random sampling. Data was analyzed using SPSS version 21.

On adherence to NCK guidelines, the study showed that, 53.91% always adhered to NCK guidelines, 36.5% sometimes adhered and 9.6% never adhered. The main reported challenges to adherence of guidelines were shortage of staffs (36.3%) and inadequate equipment (24.7%). Others were lack of the guidelines in the wards, lack of time for documentation and patient turning. Availability of guidelines in the wards ($X^2 = 5.546$, $df=1$, $P=0.019$), lack of time for documentation ($X^2 = 5.642$, $df=1$, $P=0.018$, $RR=2.63$) and patient turning ($X^2 = 5.817$, $df=1$, $P=0.016$, $RR=2.72$) were statistically significant at $P<0.05$. The study concluded that, Adherence to NCK guidelines was low, and significant challenges were lack of guidelines in the ward, lack of time for documentation and patient turning.

Keywords: *Clinical Settings, Manual Pressure Ulcer, NCK Guidelines*

INJURY PATTERNS AND MORTALITY RATE OF MOTORCYCLE RELATED INJURIES IN KERUGOYA TOWN, KIRINYAGA COUNTY

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ABSTRACT

Globally, Road Traffic Injuries (RTIs) are ranked 8th among the leading causes of disability adjusted life years lost among all populations and is the leading cause of death in children and young adults 5-29 years of age. The burden is disproportionately borne by pedestrians, cyclists and motorcyclists, in particular those living in developing countries. Kenya, as a country has made little efforts in ensuring safety for all road users at all times. The objective of this study was to assess the patterns and mortality rates of motorcycle related injuries in Kerugoya town, Kirinyaga County. A retrospective cross-sectional study design was employed. Secondary data on motorcycle related accidents was collected and analysed for 385 victims. Data was collected using structured checklists. The process involved one-year review of existing records from Kerugoya Referral Hospital and the County Traffic Police Department. Data analysis was done using Statistical Package for Social Sciences (SPSS) version 20. The mean age of motorcycle crash victims was 31.5 years (range 7-60years). Males were 228(62.1%) and females 139(39.7%). The most common pattern (anatomical part) of injury sustained by victims was lower extremity injuries 124(34.0%), followed by head and neck injuries 107 (29.1%), chest injuries 74(20.1%) and upper extremity injuries 62(17.0). Majority of motorcycle riders 62 (32.6%) and passengers 58 (30.5%) who did not have a helmet during the time of crash sustained head and neck injuries. Passengers (65%) constituted a larger percentage of the crash injury victims reporting to hospital. We recommend that County traffic department should organize consistent public awareness education on road safety.

Key Words: *Motorcycle/motorbike, Motorcyclists, patterns of Injuries, Collision*

EXPLORING THE POTENTIAL OF NANOPARTICLES FOR TARGETED DRUG DELIVERY IN DISEASE TREATMENT

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ABSTRACT

In recent years, there has been growing interest in the use of nanotechnology for drug delivery in disease treatment. Nanoparticles, which are particles with a size range of 1-100 nanometers, have unique properties that make them attractive for targeted drug delivery. They can be designed to specifically target diseased cells and tissues and can also protect the drug payload from degradation and elimination before reaching the target site. Therefore, further research and development were needed to fully realize the potential of nanoparticles for targeted drug delivery. Furthermore, this paper aimed to introduce the ongoing research on the use of nanoparticles for targeted drug delivery that was conducted at the Kenya Medical Research Institute (KEMRI) in Nairobi, Kenya. KEMRI was a leading research institution in East Africa with a strong focus on advancing health research in the region. The study focused on developing nanoparticle-based drug delivery systems for the treatment of infectious diseases prevalent in the region. To carry out this research, a mixed-methods approach was adopted, using both quantitative and qualitative data collection methods. A population of 100 pharmacists in Nairobi, Kenya, was targeted, from which 10 were randomly selected using simple random sampling technique. For the quantitative data collection, a structured questionnaire was used to collect information on the pharmacists' knowledge of nanoparticle-based drug delivery, their opinions on the potential of nanoparticles for drug delivery, and their experience with the use of nanoparticles in drug delivery. The questionnaire was administered through face-to-face interviews and was analyzed using SPSS. Descriptive statistics were used to analyze the data, and the findings were presented in tables and graphs. For the qualitative data collection, in-depth interviews were conducted with selected pharmacists to explore their perceptions and experiences with the use of nanoparticle-based drug delivery in disease treatment. The interviews were audio-recorded, transcribed, and analyzed using thematic analysis. Open-ended questions were used to encourage the pharmacists to express their thoughts and ideas freely. The findings of the study were presented in two parts. The quantitative findings were presented in tables and graphs, summarizing the pharmacists' knowledge, opinions, and experiences with the use of nanoparticles for drug delivery. Furthermore, the qualitative findings were presented in the form of themes that emerged from the interviews, providing insights into the pharmacists' perceptions and experiences with nanoparticle-based drug delivery. Based on the findings, conclusions were drawn on the potential of nanoparticle-based drug delivery for disease treatment, as well as the challenges and opportunities associated with its use in clinical practice. The results of this study contributed to the development of effective and safe nanoparticle-based drug delivery systems that can be used to treat diseases in the region and beyond.

Key words: *Nanoparticles, Drug Delivery, and Disease Treatment.*

MOLECULAR CHARACTERISATION OF FULL-LENGTH HIV-1 ENVELOPE-GENE IN ANTIRETROVIRAL TREATMENT INJECTION SUBSTANCE USERS IN NAIROBI, KENYA

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ABSTRACT

Statistics have shown that injection drug use and antiretroviral therapy influenced HIV-1 diversity and epidemiology. However, molecular characteristics of HIV-1 envelope-gene among antiretroviral treatment Kenyan injection drug users remains unknown. This cross-sectional study determined HIV-1 *envelope*-gene diversity, co-receptor tropism, and fusion inhibitor drug resistance among injection drug users in Nairobi, Kenya. Injection drug users (n=249) were recruited through respondent driven sampling method. Socio-demographic data was collected from each participants upon enrolment. HIV-1 *envelope*-gene was amplified and sequenced directly. Diversity, co-receptor tropism, and drug resistance mutations of the resulting sequences were determined using COMET, MEGA, and DNASTAR bioinformatics tools, respectively, after alignment with well characterised HIV-1 reference sequences. There were 27 (73.0%), 6 (16.2%) and 4 (10.8%) subtypes A1, AG and A1/G/AE recombinants respectively. Phylogenetic studies revealed that 35 (94.6%) sequences out of the 37 available sequences (72.9%) clustered with at least one other sequence, with little genetic diversity. Co-receptor typing showed that, 33 (86.4%) and 4 (10.8%), respectively, of the HIV isolates belonged to CCR5 and CXCR4. No mutation conferring resistance to enfuvirtide was detected. Identification of HIV-1 envelope-gene diversity, co-receptor tropism, and fusion inhibitor resistance informed decision on treatment, vaccine trials, and prevention of the spread of HIV.

Keywords: - *HIV-1 Envelope-gene, Antiretroviral Treatment, Injection Drug Users*

AN ASSESSMENT OF SOCIAL MEDIA USE ON MENTAL HEALTH OF UNIVERSITY STUDENTS

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ABSTRACT

Studies on how social media platforms are being used as tools for individuals to interact, connect and support one another have been done in the past. A great number of youth are spending significant amount of time accessing social media sites. Scholars are yet to reach a consensus on whether usage of social media is beneficial or detrimental on the mental health of young adults. This study explored the effects of social media access on the mental health of university students. The study used phenomenological research design. The target population was 10,000 students. The sample size was 309 students drawn from 5 purposely selected schools. Data was collected using randomly distributed questionnaires and analyzed using SPSS's descriptive statistics and presented using frequency tables, pie charts, graphs, cross tabulations. The findings revealed that university students are spending upto six hours of their time in a day on social media to access content on fun, video games and sports. Results showed that time spent on social media had no significant effect on the mental health of students and this could be attributed to the fact that the content students' access of social media enables them to cope with stress and other issues which could have a detrimental effect on their mental health. Based on the findings, there is need to encourage university students to find additional activities they could engage in while on social media which could contribute to the lives in a better way such as blogging, online jobs, and listening to motivational material.

Keywords: *Social media, University Students, Mental health, Stress*

LIMITED POTENCY OF ADJUVANT CAPECITABINE TREATMENT IN TNBC PATIENTS WITH RESIDUAL INVASIVE DISEASE

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ABSTRACT

The triple negative breast cancer (TNBC) is one of the sub-types of breast cancers. This subtype is not only very aggressive, but also has worse prognosis, than the others. For instance, patients without pathological complete response (pCR) after NACT have a 20 - 30% risk of relapse of the disease within 2 years. The adjuvant maintenance treatment options for this group of patients who do not achieve pCR are limited. Capecitabine, an anti-metabolite that has been shown to be effective for other cancers such as, Gastro-intestinal cancers is among the most commonly used drug for the TNBC with residual invasive carcinoma. However, given the heterogeneity of TNBC, aggressiveness of the sub-type, the overall poor prognosis, high dosage required for efficacy, associated toxicity or intolerability of the drug, there is need for determination and development of new therapies, treatment modalities or strategies to optimize response rates as well as management of severe side effects. The aim of the meta-analysis was to assess the absolute benefits, weighed against the adverse effects of capecitabine therapy in TNBC patients with residual invasive disease compared with other standard treatment options. The 5-year overall treatment effect defined as the overall survival hazard ratio for death was 1.09 (0.75-1.64), the average relative risk reduction of death only 11.9%. Increased events including grade 3 and 4 haematological, gastrointestinal toxicities and hand-foot syndrome were noted in the capecitabine treatment arm compared to controls. The limited potency as seen in the marginal overall survival advantage and adverse effects highlights the need for careful selection of patients who may and may not benefit from the treatment.

Keywords: TNBC, Adjuvant Capecitabine, Residual Invasive Carcinoma, NACT

EFFECT OF PRISON PROGRAMS ON REHABILITATION OF INMATES IN COUNTY, KENYA

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ABSTRACT

The main objective of prisons in general and Kenyan in particular is to rehabilitate the inmates facilitate acquisition of self-dependence skills with a view of avoidance of repeat. The aim of this research was to interrogate the effect on male and female inmates' life in prison in their journey of rehabilitation. The study was directed by the objective; to examine the effect of prison programs on inmates' rehabilitation. The study employed descriptive survey research design. Questionnaires, interview guides as well as Focus Group Discussions were adopted to gather both quantitative and qualitative data. The investigation targeted 500 convicts who included first-time offenders and recidivists, 30 prison warders, and 4 key informers in Thika main and women prison. Stratified sampling was used in the investigation to first place the convicts according to gender to get three hundred male and two hundred female convicts. A sample size of 30% of the entire population of male and female convicts and prison warders was used in the investigation to get 90 male, 60 female convicts and 9 prison officers. Quantitative data was analyzed descriptively by percentages and mode and were recorded in graphs and tables. Qualitative data were examined thematically and in patterns presented and formed in verbatim and narrative forms. The study established that inmates participated in elaborate prison programs which helped them ease the pain of imprisonment and gave them hope of getting employment after imprisonment making them more positive about future. Therefore, the study recommended that the prison management should sensitize inmates on the essence of the prison programs as they offer life skills which are supposed to help them when easily fit they go back to society. The government should also improve the rehabilitative programs and provide more resources geared towards these programs. Further, the government should set aside stipends to facilitate inmates to start a business after imprisonment using some of the skills acquired while in prison.

Keywords: *Prison Programs, Rehabilitation of Inmates*

EFFECT OF CULTURAL CONDITIONS AND PHYSICAL FACTORS ON PRODUCTION OF ANTIBIOTIC METABOLITES BY SELECTED ACTINOMYCETES

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ABSTRACT

Antibiotic resistance is one of the biggest global problem of our times. The leading producers of antibiotics that can be used to curb this problem are actinomycetes. This study sought to isolate antibiotic producing actinomycetes from the soils of Menengai crater and identify the cultural and physical factors that favoured production of antibiotics by selected actinomycetes. Soil samples were collected from 32 randomly selected sampling points within Menengai crater and actinomycetes isolated using serial dilution technique and tested for antagonism against selected bacterial and fungal pathogens using primary and secondary screening bioassays. Based on broad spectrum of activity and the size of zone of inhibition, four potent actinomycetes were selected for further studies. The effect of growth media, pH, temperature, incubation period, aeration, inoculum concentration, carbon source, nitrogen source and salt concentration on growth and production of antibiotic metabolites was determined. The isolated presented varying morphological characteristics. There was a significant difference in the diameters of zones of inhibition produced by the test pathogens when subjected to antibiotic metabolites from the selected actinomycetes ($F = 6.6046$ $P = 0.001338$). The growth and production of antibiotics by the selected actinomycetes was favoured by use of Luria Bertani as the culture medium, a pH of 6, incubation temperature of 28°C, incubation period of 7d, aeration rate of 200rpm, inoculum concentration of 1%, glycerol as carbon source, oat meal as nitrogen source and a salt concentration of 1.5%. There is need to carry out structure elucidation of the antibiotics from the selected actinomycetes.

Keywords: *Actinomycetes, Antibiotics, Culture, Extraction, Sensitivity.*

EFFECTS OF LEASEHOLD ON COMMUNITY FOREST ASSOCIATION BENEFITS IN DRYLAND RESOURCES MANAGEMENT: A CASE STUDY OF KIBWEZI FOREST IN KENYA

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ABSTRACT

The aim of this paper was to investigate whether or not community forest association (CFA) get benefits as they conserve dryland forest that is also fully leased. The study adopted descriptive survey design and was conducted between the year 2018 December and 2020 January in Kibwezi forest. 139 individuals were issued with questionnaires (household survey) and 5 officials from forest department were interviewed. The questionnaires response rate was 96% since 134 questionnaires out 139 were returned. Introduction of leasehold significantly reduced benefits community forest association used to get. There is no significant association between being a member of Community Forest Association and getting employment in dryland forest conservation since Chi square results were; $\chi^2 = 3.953$, $df=3$, $P=.267$. There is no special benefit the Community Forest Association gets from conservation of Kibwezi forest. There should be incentives for the community to partner in the management of the leased forests in order to get the desired results that confer benefits to the Community Forest Association and compel the lessee to adhere to the legal requirement of continued access of benefits to the communities as it was before the lease.

Keywords: *Participatory Forest Management; Lessee; Lease; Benefits; Forest Dwellers; Conservation; Community and Stakeholders*

DETERMINATION OF INVITRO LETHALITY OF ACTINOMYCETES ANTIBIOTIC EXTRACTS FROM MENENGAI CRATER GEOTHERMAL VENTS, KENYA

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ABSTRACT

Drug resistance is a serious threat to human existence today. This study investigated sensitivity of selected pathogenic microorganisms to antibiotic extracts from soils of Menengai crater geothermal vents in Kenya. Antibiotic producing actinomycetes were isolated from geothermal vents and identified using colony characteristics and biochemical means. Sensitivity of selected pathogenic microorganism was carried out using primary and secondary screening techniques. Four actinomycetes coded PAN 9, PAN 18, PAN 117 and PAN 138 were selected for further analysis based on the size of zone of inhibition and broad spectrum of activity. Extraction of antibiotics was carried out using ethyl acetate. Sensitivity test of the pathogens to the extracts was done using Karby Bauer disk diffusion technique and Cytotoxicity of antibiotic extracts carried out using Brine shrimp lethality test and sheep blood hemolytic bioassays. Isolates presented typical actinomycetes characteristics. A total of 20 actinomycete isolates showed antagonism against the test pathogenic microorganisms. Selected actinomycetes inhibited growth of Gram positive and negative bacterial and fungal pathogens in both primary and secondary sensitivity tests. There was a significant difference in the diameters of zones of inhibition produced by the test pathogens when subjected to antibiotic metabolites from the selected actinomycetes ($F = 6.6046$ $P = 0.001338$). The minimum inhibitory concentration and minimum bactericidal concentration/minimum fungicidal concentration did not vary significantly ($F=0.4503$, $P = 0.7187$). The LC_{50} values of the antibiotic extracts varied from $2.438 \pm 0.47 \mu\text{g}$ in PAN 9 to $9.3455 \pm 0.41 \mu\text{g}$ in PAN 138. PAN 19 and PAN 117 showed partial hemolysis while PAN 9 and PAN 138 exhibited complete hemolysis of sheep erythrocytes. There is need to purify and conduct structural elucidation of these antibiotics to determine whether or not the observed hemolysis resulted from the said antibiotics or other compounds in the extract.

Keywords: *Actinomycetes, Antibiotic, Extracts, Cytotoxicity, Invitro*

EFFECTS OF FRESH WATER DEGRADATION ON HUMAN ACTIVITIES: A CASE OF ATHI RIVER, MACHAKOS COUNTY, KENYA

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ABSTRACT

Global diminishing of essential natural resources for survival of biodiversity due to depletion and pollution is a concern for governments and the United Nations's agenda 21 which suggested best ways to conserve the resources. African water vision 2025 has raised concerns over equitable and sustainable use of water resource for socioeconomic development. There is great global concern over high levels of freshwater degradation. In Kenya, freshwater degradation is on the rise as reported by National Environmental Monitoring Authority. The authority has given warning on poor solid waste disposal and discharge of effluents most water bodies. In Machakos County where the study was carried out there is evidence of freshwater degradation yet the majority of residents are highly dependent on fresh water sources for their livelihood. No study had been carried out to establish a relationship between degradation of water resources and the community's livelihood. This study assessed effects of freshwater degradation on human economic activities including domestic consumption, agricultural activities, and fishing activities. The study adopted a descriptive research design. Both qualitative and quantitative data were collected from 160 respondents and analyzed using descriptive statistics and later subjected to inferential statistics. The Pearson Correlation test ($r=0.195$, $p=0.028$) revealed a significant correlation between water degradation and level of disturbances on domestic activities. Regression equation: $A=2.345406+0.345X1$, ($P>0.05$) showed a significant relationship between water degradation and agricultural activities. The coefficient of the regression was 0.167 at ($P<0.05$) implying that a unit increase in water degradation significantly increased disturbances on fishing activities by 0.167 units.

Key words: *Natural Resource, Fresh Water, Degradation, Human Activities*

A DEEP DECISION FORESTS MODEL FOR HATE SPEECH DETECTION

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ABSTRACT

Detecting and controlling propagation of hate-speech over social media platforms is a challenge. This problem is exacerbated by extreme fast flow, readily available audience, and relative permanence of information on social media. The objective of this research is to propose a model that could be used to detect political hate speech that is propagated through social media platforms in Kenya. Using Twitter textual data and Keras Tensor Flow Decision Forests (TF-DF), three models were developed that is, Gradient Boosted Trees with Universal Sentence Embeddings (USE), Gradient Boosted Trees, and Random Forest respectively. The Gradient Boosted Trees with USE model exhibited a superior performance with an accuracy of 98.86%, recall of 0.9587, precision of 0.9831, and AUC of 0.9984. Therefore, this model can be utilized for detecting hate speech on social media platforms.

Keywords: - *Hate Speech Detection, Tensor Flow Decision Forests, Gradient Boosted Trees, Universal Sentence Embeddings, National Cohesion and Integration Commission.*

WEB SERVICES SHARING AMONG BUSINESS ENTERPRISES

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ABSTRACT

Web services are self-contained, modular, distributed, dynamic applications that can be described, published, located, or invoked over the network to create products, processes, and supply chains. These applications can be local, distributed, or web-based. The services are built on top of open standards such as Transmission Control Protocol/Internet Protocol (TCP/IP), Hypertext Transfer Protocol (HTTP), HyperText Markup Language (HTML), Extensible Markup Language (XML) and Java. Software applications written in various programming languages and running on various platforms can use web services to exchange data over computer networks like the Internet in a manner similar to inter-process communication on a single computer. With web services, companies are able to host their services in a wider market and also connect to other companies. However, with business expansion also follows trust issues. In order to share Web Services in a business partner relationship, it is necessary to have a relation of trust. The purpose of this article is to review how Web Services can be made as a “network of trust” between partners and possible solutions that can be applied to address the problem. The study will undertake desktop literature review of literature on the subject. A range of web services trust issues and their causes will be identified and discussed. Further the article will attempt to propose possible solutions to address the problem.

Key words: *web services, network of trust, business enterprises*

KNOWLEDGE MANAGEMENT SYSTEMS AS A CATALYST FOR SOCIETAL EMPOWERMENT: A KENYAN PERCEPTIVE

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ABSTRACT

Despite the potential benefits of knowledge management systems (KMS) for societal empowerment, there is limited understanding of how KMS can be effectively implemented and utilized in a Kenyan context to address societal challenges such as poverty, education, and healthcare. This research aims to fill this gap by investigating the impact of KMS on societal empowerment in Kenya and identifying the key factors that contribute to successful KMS implementation. This research examines the impact of knowledge management systems (KMS) on societal empowerment in Kenya. The study employs a qualitative research design, using interviews and case studies to gather data from a sample of Kenyan organizations that have implemented KMS. The findings reveal that KMS have had a positive impact on societal empowerment in Kenya by increasing access to information and facilitating knowledge sharing among individuals and organizations. The use of KMS has also led to improvements in decision making and problem solving, as well as increased innovation and competitiveness. Additionally, the study found that KMS have played a key role in addressing societal challenges such as poverty, education, and healthcare. Overall, the results of this study suggest that KMS can be a valuable tool for promoting societal empowerment in Kenya and other developing countries.

Keywords: *Knowledge Management Systems (KMS), Societal Empowerment, Kenya*

MACRO FACIAL EXPRESSION RECOGNITION AND ANALYSIS USING SUPERVISED 2D-PCA AND LINEAR SVM

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ABSTRACT

Facial expressions are a convenient way of expressing non-verbal communication effectively. The feasibility of this subject has become a dominant area of research in the field of computer vision and artificial intelligence. The applications of facial expression recognition include but not limited to; Human Computer Interaction (HCI), entertainment, consumer feedback systems, health care systems, transport, security, social emojis, emoticons, and avatars. An efficient macro-expression geometric model known as Two-Dimensional Principal Component Analysis (2D-PCA) to extract facial features is proposed in this paper and it utilizes the linear Support Vector Machine (SVM) classifier to group facial emotions. The proposed 2D-PCA model uses Discrete Wavelet Transform (DWT) for feature extraction to extract eigen values from salient frequency domain regions. The extracted eigen values are projected to low pass and high pass filters and transformed into eigen vectors after which they are forwarded into 2D-PCA for dimensionality reduction and retention of spatial and temporal facial properties. The extracted features are trained and tested using ten folds cross-validation strategy and the SVM classifier finally groups the emotion labels into different expressions. Performance of SVM is evaluated using three kernel functions: linear, Radial Basis Function (RBF), and polynomial kernels. Two benchmark datasets namely, Japanese Female Facial Expression (JAFFE) and Extended Cohn Kanade (CK+) and confidence levels of 97.29% on JAFFE database with six expressions and 90.07% on seven expressions obtained. Using CK+ database confidence level attained were 92.30% on six expressions and 91.1% on 7 expressions. A comparative analysis with other futuristic systems was performed and the proposed 2D-PCA model obtained excellent results.

Keywords: Cross Validation, 2D-PCA, SVM, FER DWT, Kernel Function, CK+, JAFFE

BIG DATA ANALYTICS FOR SUSTAINABILITY OF SMES' PERFORMANCE AFTER COVID-19 PANDEMIC IN KENYA

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ABSTRACT

The majority of a nation's wealth comes from small and medium-sized businesses (SMEs), which account for half of all jobs and 90% of all businesses worldwide. However, SMEs continue to face limited credit availability from suppliers, who also face liquidity problems, low sales, and high default rates. Advance reimbursement, the weight of punishments on postponed credit installments and other repeating costs have made the SMEs much more helpless. Big Data Analytics for sustainability of SMEs' Performance in Kenya after COVID-19 pandemic was the goal of the study using data analytics and data science. The study's theories are Complex Adaptive System and Strategic Choice Theory. Descriptive survey design was used in the study by the researchers. In each subcounty of Nairobi, the study focused on SMEs in Eastlands, Dagoretti North, Dagoretti South, Langata, Kibra, Roysambu, Kasarani, Ruaraka, Embakasi South, Embakasi North, Embakasi Central, Embakasi East, Embakasi West, Makadara, Kamukunji, Starehe, and Mathare are Nairobi County. In each SME, managers of operations, finance, customer relations, and supply chain was surveyed to obtain data. The Krejcie and Morgan tables was used to gather the 222 respondents for the target population. For the purpose of data analysis, descriptive statistics such as frequencies, percentages, mean, and standard deviation were utilized. The relationship between the variables was determined using multiple regression and Pearson correlation. Tables, charts, and graphs were used to present the data. The study sought to determine if Data Science has an impact and it was established that, Business Intelligence has a mean of 3.9 (std. dv = 0.851) and Machine Learning a mean of 3.7 (std. dv = 0.928), average mean of 3.8 (std. dv = 0.8895) and all have a positive impact. The study also sought to determine if Data Analytics has an impact and it was established that, Predictive Analytics has a mean of 3.73 (std. dv = 0.850) and Prescriptive Analytics a mean of 3.85 (std. dv = 0.684), average mean of 3.79 (std. dv = 0.767) and all have a positive and significant influence on the Sustainability of SMEs' Performance in Kenya after COVID-19. The SMEs have ability to solve many unforeseen challenges in competitiveness through Data Science drivers such as Business Intelligence and Machine Learning. They were also able to implement legal framework that protects data on Data Analytics on Predictive and prescriptive analysis on the improvement of SMEs performance, survival and growth.

Keywords: *Big Data Analytics, Data Science, Data Analytics, Business Intelligence, Machine Learning, Predictive Analytics, Prescriptive Analytics.*

BIVARIATE BASED SUSCEPTIBILITY MAPPING FOR GULLY EROSION IN WANJOGA RIVER CATCHMENT UPPER TANA BASIN, KENYA

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ABSTRACT

Gullies often occur in semi-arid regions characterized by rainfall variability, seasonality and increased overland flow, affecting ecological fragility of an area. In most gully prone areas, extent of land affected by gullies is increasing. Thus, predicting susceptibility to gully erosion in semi-arid environment is an important step towards effective rehabilitating and prevention of gully erosion. Proneness to gully occurrence was assessed against; Land cover/land use, slope, soil characteristics, rainfall variability and elevation, and modelled using GIS-based bivariate statistical approach. The study assessed influence of geomorphological factors on gully erosion, analyzed and developed gully erosion susceptibility map and verified gully susceptibility images using error matrix of class labels in classified map against ground truth reference data. A total of 66 gullied areas (width and depth \geq ranging 0.5m), were mapped using 15m resolution Landsat images for 2018 and field surveys to estimate susceptibility to gully erosion by Global Mapper software in GIS. The images were verified using 120 pixels of known 15 gully presence or absence to produce an error matrix based on comparison of actual outcomes to predicted outcomes. Influence of conditioning factors to gully erosion showed a significant positive relationship between gully susceptibility and gully conditioning factors with consistency value; CR =0.097; value < 0.1, indicating, individual conditioning factors influenced gully erosion. Slope (43%) and soil lithotype (25%), had most influence on gully susceptibility, while land cover/land use (12%) and rainfall (12) had least impact. Verification results showed satisfactory agreement between susceptibility map and field data on gullied areas at approximately 76.2%, an error of positive value of 4% and a negative value of 7%. Thus, production of susceptibility map by bivariate statistical method represents a useful tool for ending long and short-term gully emergencies by planning conservation of semi-arid regions.

Keywords; *Susceptibility, Gully, Bivariate, Land cover, GIS*

MODELLING OF DAILY COVID-19 CASES IN KENYA USING A SARIMA MODEL

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ABSTRACT

Severe Acute Respiratory Syndrome is the primary cause of coronavirus disease (COVID-19). The first case was reported in Wuhan, China, on December 30th, 2019 with the first case in Kenya on 13th March, 2020. This contagious disease became a global challenge because it led to millions of deaths, economic disruption leading to loss of employment and economic instability. There was therefore a need to model daily COVID-19 cases in Kenya using the Seasonal Autoregressive Integrated Moving Average (SARIMA) model and forecast. Secondary data from the World Health Organization from 13th March, 2020 to 13th Jan, 2023 using R software. Data was found to be non-stationary using the Augmented Dickey Fuller test and differencing was done to make it stationary. The Box-Jenkins methodology was used in fitting the model to the data and afterwards forecasting was done. The best model was selected as the model with the least Akaike Information Criterion. The SARIMA model was fitted to the daily COVID-19 data then forecasting was done for sixty days. These forecasts will greatly create awareness of the trend and seasonality of this disease and therefore can be useful to the health care providers and the government for purpose of planning, policy formulation and resource allocation.

Keywords: *Covid-19, Sarima, Seasonality, Forecasts*

AN INVESTIGATION ON DECLINING WATER LEVELS OF RIVER MUTONGA IN THARAKA NITHI COUNTY, KENYA

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ABSTRACT

Variations in river water volumes have direct or indirect effects on biodiversity because sustainable development is highly dependent on availability of adequate water. Global records show declining water levels in most rivers. Most rivers flowing through TharakaNithi County have recorded notable decline in water volumes and this is a major challenge to achieving sustainable development in the County. Knowledge about water volume variations and factors responsible for the variations is key to effective water resource management. This study aimed at establishing extent of water volume decline in river Mutonga, the impact of human water abstraction and effects of climate change on the declining water volumes over the last 30 years. The study adopted a descriptive survey research design. The study corrected primary and secondary data from 270 households' heads, three regional NEMA officials and three regional water resources authority officials. Data was analyzed using descriptive and inferential statistics. A long-term variation in the recorded rainfall in the region in the period between 1990 and 2020 and was associated with the decline in river volume. There was a significant relationship between increased temperatures and river discharge amount ($0.639816 > 0.05$). The R square value of 0.8597, shows a significant relationship between the number of intakes constructed to abstract water and the river discharge. It is advisable for County Governments to adapt suitable water management strategies during implementation of development projects that are likely to affect water resources.

Keywords: *Declining Water Level, biodiversity, Sustainable Development, Human Water Abstraction*

INFLUENCE OF COMMUNITY FOREST ASSOCIATION ACTIVITIES ON DRYLAND RESOURCES MANAGEMENT: CASE OF KIBWEZI FOREST IN KENYA

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ABSTRACT

Gazetted forests in Kenya are owned and managed by the government through Kenya Forest Service. Other stakeholders including communities formally participate in forest management through Participatory Forest Management, concessions and leasehold. In each management regime, the forest has to be well managed and the community continue accessing forest products. The aim of this study was to investigate whether Community Forest Association activities lead to improved forest cover in a leased forest. The study adopted a descriptive survey design where both qualitative data and satellite data was collected. A sample size of 139 individuals was issued with questionnaires and 5 key informants were interviewed. Satellite imagery was used to quantify changes and trends in forest cover of Kibwezi forest for ten years. Results showed that infrastructural development had a great effect on destruction of forest cover in Kibwezi forest. There was significance relationship between community participation and improvement of forests since Chi square results were ($\chi^2 = 27.631$, $df=9$, 0.001). The improvement of the forest was partially contributed to by presence of community forest association during inception of project but later David Sheldrick Trust which fenced the forest. There should be deliberate action by stakeholders to give community forest association incentives to operate optimally.

Keywords: *Community Forest Association, Leasehold, Forest-Cover, Forest Destruction, Conservation, Incentives.*

ANALYTIC SOLUTION OF A NONLINEAR BLACK-SCHOLES EQUATION VIA LONG AND SHORT GAMMA POSITIONS

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Abstract

This study presents a nonlinear Black-Scholes equation whose nonlinearity is due to feedback effects. The market involved is illiquid as a result of transaction costs. An analytic solution to the equation via long and short gamma positions is currently unknown. After transforming the equation into a parabolic nonlinear porous medium-type equation, find that the assumption of a traveling wave profile to the later equation reduces it to Ordinary Differential Equations (ODEs). This together with the use of long and short gamma positions facilitate a twice continuously differentiable solution. Both positive and negative gamma exposure can lead to an out-of-the-money option.

Keywords: *Nonlinear Black-Scholes Equation, Illiquid Markets, Transaction Cost, Gamma Position, Analytic Solution*

ON DENTABLE SETS AND MAPPINGS

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Kirinyaga University, KENYA⁴**Correspondence:** - josephowuorowino@gmail.com**ABSTRACT**

Characterizations of properties of operators in a Banach space setting have been done over many years with interesting results obtained. Dentability of sets and norm-attainable mappings is one of the important properties that have been considered. Most researchers have worked on dentable sets with regard to density of norm-attainable operators. We characterize dentable sets and mappings. This work establishes a link between measure theory, norm-attainability and dentability with the help of Radon-Nikodým Property. It also improves the understanding of optimization problems at a deeper level.

Keywords: *Dentability, Density, Norm-Attainable Class, Optimization, and Norm-attainability.*