GRETSA UNIVERSITY

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December, 2021

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ACKNOWLEDGEMENT

The Conference Organizing Committee is immensely grateful to the Gretsa University Management for the financial support which enabled the successful hosting of the Conference and the publication of this Conference Proceedings. Our appreciation also goes to the Conference Keynote Speakers and Cluster Moderators for their invaluable contribution during the conference. Finally, the committee wishes to salute all presenters, exhibitors and attendees for their active participation in the conference activities.

KEYNOTE SPEAKERS

Dr. Daniel Wambiri: Director, Career Development and Mentoring Programmes, Kenyatta University

Mr. Shem Omuga: Head, Talent Resourcing, Learning and Development. National Bank of Kenya.

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CLUSTER 1

Sub-Theme 1: Computing and Informatics

Sub-Theme 2: Library and Information Science

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Dr. Johnson Masinde: Gretsa University

CLUSTER 2

Sub-Theme 3: Hospitality and Tourism Management

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CLUSTER 3

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Dr. Hellen Guantai: Kenyatta University

Dr. Justus Osero: Kenyatta University

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WELCOME REMARKS

Prof. Wabuke Bibi

Ag.Vice Chancellor, Gretsa University

Prof. Wabuke opened the conference by welcoming the University Chancellor, Guest Speakers, Moderators and participants. He thanked them for honoring the invitation to attend and participate in the virtual conference. He noted that the conference theme was particularly relevant as the world continues to confront the full range of challenges brought about by the Covid 19 pandemic. In this regard, he thanked the organisers of the conference for choosing a timely theme and encouraged participants to warmly participate in the conference.

Dr. Kibathi Mbugua

Chancellor, Gretsa University

Dr. Kibathi noted that the fact that the conference was being held virtually for the first time was a clear indication of the rapid change brought about by the Covid 19 pandemic. “Although the pandemic has taken its toll on the economy and livelyhoods of many Kenyans, the pandemic has a silver lining, I urge you to shift the fcus of the discussion towards the opportunities that the pandemic presents”. He also encouraged the participants to embrace change and be the agents of change in the society by being innovative and pulling together to generate renewed momentum.

KEYNOTE SPEECH 1

Dr. Daniel Wambiri
Director, Career Development and Mentoring Programmes, Kenyatta University

Speech Title: Strategies in Higher Education for Building An Enhanced, Diversified and Transformative Training: The Covid 19 Experiences

The Chancellor
The Chairman of the University Governing Council
The Vice Chancellor
Distinguished Guests
All Participants
Good morning!

It gives much Pleasure to participate in the Gretsa University 4th International Multidisciplinary Research Conference with the Theme: Sustainability in the Era of Covid-19.

I want to admit from the onset that this is a very important and relevant theme because sustainability is a global issue. Sustainability is well captured in the United Nations' set of 17 distinct interrelated goals. These goals were designed in 2015 to guide the aspirations of the world towards better living standards for all persons up to 2030. The COVID-19 is the most recent challenge to engulf the world.

I note with great appreciation the "research conference" aspect in the theme. This is because research and knowledge production and utilization are considered as key drivers of the world economy. It is research and knowledge production which has catapulted the world economic giants into what they are today. Unfortunately, research has always been the elephant in the room in Kenya and the rest of Africa. Research and knowledge production has catapulted the world economic giants into what they are today. Research and knowledge production which has catapulted the world economic giants into what they are today.

Research Gaps in Africa

Research in Africa is basically dominated by five Countries-Egypt, Algeria, Nigeria, Kenya and South Africa. NB. It is therefore not a surprise that Nigeria, South Africa, Egypt and Algeria are leading in terms of GDP in Africa.

1. The World Bank Report of 2003-2012 (One decade) compared favorably to Malaysia and Vietnam with the whole of Africa. Nb. Vietnam and Malaysia represent only 1.67 % while Africa represents 16.72 % of the world population.
2. The Sub-Saharan Africa global research for a whole decade is at 0.72 % of the total world research.

3. Africa as a whole account for less than 1% of the total world research output. Africa is home to 16.72 % of the total world population. This is despite the fact that several of the UN SDGs such as poverty, hunger, health, gender disparity, quality education, water and sanitation, clean energy, decent work, peace among many others focus on Africa.

   My topic "Strategies in Higher Education for Building an Enhanced, Diversified and Transformative Training: The Covid_19 Experiences" is part of the build-up to the education and research challenges identified in the theme of this conference and partly the UN SDGs.

One major question as we explore this theme is "how do we survive and sustain higher education as researchers, lecturers, professors and generally as universities"? While there are no straightforward answers to this question, there are certainly specific ways that can assist universities to sustain equitable research and education. These are ways that can help the universities in Kenya and Africa to sustain their research agenda and thereby survive in the turbulent and competitive world of research. Among these ways are:

1. **Agility and competencies as opposed to bureaucracy** - One of the lessons learnt from COVID-19 is agility, speed and removal of tedious bureaucratic and red tape systems in research. Universities and researchers should move fast to secure opportunities identified and the gains made. This goes hand in hand to acquiring new and required competencies. The world found itself all of a sudden in very unfamiliar waters. Those who moved with speed to acquire new competencies survived and made a lot of money. The higher education institutes that changed the direction of their thinking delved into serious research that today is the result of the patented scientific works and major breakthroughs in the world of medicine/vaccines.
2. **Change acceptance** - This involves accepting new business models with the aim of retaining customers. Researchers in universities and higher institutes of education have to shift to customer centered approach to business. No more cold shoulders, for instance, Blockbuster videos refused to accept change at the advent of digital virtual play stations. The changes overran them and today they are obsolete. "Progress is impossible without change" Benard Shaw.
3. **Adaptability** - This is adapting to new environment like what we found ourselves in the COVID-19. Just like people have learnt to live with past world pandemics (Influenza, plagues, yellow fever, polio, Spanish flu and HIV-Aids, among many others) COVID 19 is here to stay. Sustainability will depend on how we adapt to live with COVID 19.
4. **Pursue of Purpose** - What is our purpose as researchers in universities and other institutes of higher learning? What is our niche? How can we sustain our niche amidst severe competition? NB. Lack of purpose is the only thing worse than death.
5. Prepare our students and researchers to fit in the world as global citizens without geographical, cultural, religious, language and technological barriers.
6. **Work towards transforming mankind and the world.** This is possible through researching on life changing topics, for instance, development of vaccines even if it is herbal/dietary medicine, food production and sustainability, post-harvest loses, general agriculture among many others.
7. Leave better children for the world and not better world for the children.

Transformative strategies in Kenya

1. Prioritize STEM. This is what Vietnam and Malaysia have done. **NB:** We should play in our league. Forget what USA, Russia, Japan, Germany and China have done. What lessons do we learn from Malaysia, South Korea, Thailand, Taiwan, Singapore, Hong Kong and Philippines among many others? What have they done differently to give their people quality education and sustain food productivity?
2. Focus on knowledge economy- Again this is what has catapulted the Asian Tigers to where they are. This is one of the UN SDGs. Knowledge production through research and utilization is key to development. The COVID-19 experiences and the need for social distancing and the eventual lockdowns were a major lesson. Countries whose economy had not put up proper ICT infrastructure and their internet connectivity was low or nonexistent came to a standstill unlike knowledge based economies which thrived amidst the pandemic. The internet and knowledge disparity among the countries in Africa and the developed world was conspicuously noticeable.
   Isaiah 4: 6 "My people perish for lack of knowledge".
3. Increase goodwill from governments/university management. African governments are yet to give the one (1 %) of their GDP to their country's home grown research as agreed in the African Union Lagos Convention. Donor dependence is great. NB. Revisit our internal political intrigues and promises. Any politician talking about building research and knowledge fund to sustain our economy, health and food production as a way of enhancing and diversifying employment in the country? None. Zero. It is all about dishing out nonexistent goodies that will translate into higher taxation if realized to the few people who pay taxes.
   Albert Einstein "Insanity is doing the same thing over and over and expect different results". Tonny Robbins "If you do what you have always done, you will get what you've always gotten".
4. Better remuneration for researchers to stop brain drain to other countries and local lucrative professions. Some researchers migrate to well remunerated and pampered professional lines such as politics while others move out to retail shop keeping businesses. NB. Kenya is basically a supermarket driven economy. No manufacturing. No knowledge to sell. There is great need to up-scale a knowledge based economy where researchers can securely monetize their research findings without unnecessary bureaucracy and frustrations.

Building Sustainable Research Base in Universities

1. Adopt the strategies alluded to earlier.
2. Adopt the Kaizen Principles of continuous improvement with emphasis on customer centric approach. This could help universities to approach teaching, learning and research as business enterprises. Sustainable business enterprises include serious adoption of the three Cs in business: character, competencies, and commitment.
3. Stop the shallow swimming syndrome. Adopt the risky and high return risky deep end swimming. Run away from comfort zone. UNISA swam in the deep seas several years ago by adoption and use of technology to teach distance and online students.

The venture paid big. Today UNISA has the biggest online student population in Africa. Other universities delved into the STEM disciplines and established sustainable research portfolios. What are we doing for sustainability of our universities and research portfolios?

4. Build the presence of a strong local, regional and international research and knowledge networks.
5. Adopt the eight Rs to build a strong higher education research base
   - ✓ Reimagine
   - ✓ Retool
   - ✓ Relearn
   - ✓ Retrain
   - ✓ Realign
   - ✓ Re-research
   - ✓ Refocus
   - ✓ Reinnovate

In conclusion, let us try to build literate graduates as opposed to building illiterates. The illiterates are the 21st century graduates who will learn but fail to unlearn and relearn, imagine but fail to reimagine, focus but fail to refocus, research but fail to re-research; they will not retool, retrain and realign with the prevailing demands. That is the dilemma in Kenya and Africa. That is why our total research output in Africa is only 0.72 % of the world research and knowledge production.

KEYNOTE SPEECH 2

By Shem N. Omuga

Head of Talent, Learning & Development National Bank of Kenya

Speech Title: COVID 19: The Reset in the Corporate World

The COVID-19 pandemic has adversely affected the global economy by disrupting financial and commodity markets, global supply chains, trade, travel and economic activity. This has plunged the global economy into a severe recession akin to the great depression of 1930s. Consequently, the International Monetary Fund (IMF) has projected a contraction of 4.9 percent in 2020 from a growth of 2.9 percent in 2019.

- Advanced Economies Contraction projection – 8.0% in 2020
- Emerging Economies Contraction projection – 3.0% in 2020

Snapshot of Ravaging Impact in Kenya

The economic and social disruptions induced by the COVID-19 (coronavirus) pandemic have eroded progress in poverty reduction in Kenya, forcing an estimated 2 million more Kenyans into poverty.

- Job Losses - 1.72 million workers lost jobs during Lockdown (KNBS)
- Almost 1 in 3 household-run businesses are not operating currently, with revenues decreasing across all sectors.

- Local businesses also face weaker access to cash and credit.
- Private sector firms are facing lower demand due to reduced consumption and demand for inputs. This has been compounded by disrupted supply chains, limiting access to intermediate goods, labor and sales channels
- COVID-19 forced schools, colleges and universities worldwide into online education

Practical Shift on How Corporate adjusted to the Pandemic Crisis	**Safety! Safety! Safety!** – Adherence to Gov't & WHO Protocols, Alternate sites for working including working from home, Vaccination drives on site(staff+ family), Mental health and psychosocial support
	Crisis Management Plan: Scenario planning & Implementation (Worst, Moderate and Best case), Performance Management Plans were put on HOLD!
	Review Operating Model: how do we continue offering our products and services in a safe way? Renewed focus and foresight on digital channels and engagements
	Resilience: Whenever there is a crisis there is danger and an opportunity! – Managed danger through wellness programs, exploit opportunities through new offerings e.g. School Funding Loans to reopen, Business Stimulus Loans to support MSMEs through Government guarantees etc.

The Reaction – How did we go through the period of survival?

1. **People & Purpose Before Profits**
   - Reprioritized budgets to support staff :
   - Testing & Preventive measures on a rolling basis
   - Set up Quarantine Isolation facilities,
   - Scaled up technology to support virtual and collocated office locations including working from Home – Ms teams for videoconferencing
   - Live Crisis Management team for decisioning in line with changing Government directives
   - Psychosocial support through Counselling

2. **Reprioritized budgets to support customers**:
   - Restructured Loans worth KSh1.63 trillion, equivalent to 54.2% of the total banking sector loan book by the end of December 2020.

3. **Cost Containment**
   - Reserve cash for rainy days
   - Cut down on unnecessary spending e.g. Travel, Expansion, Training

4. **Digital Capabilities**
   - Mobile & Internet Banking – Mitigate risk of Virus spread and encourage digital finance

5. **Reskilling:**
    - How to manage remote teams,
    - Stress management, Working Virtually etc

Global Economic Outlook by Mckinsey Survey
As the effects of the pandemic recede, Corporate executives cite the following emerging risks that will hinder economic growth in the following order:

- Supply Chain Disruptions
- Inflation
- Covid 19 Pandemic
- Labour shortages
- Domestic Political Conflicts
- Geopolitical Instability/Conflicts

Challenge: What are you doing in your capacity to address the above issues?

Trends that will define 2021 and beyond	Leisure travel bounces back, but business travel lags behind. Impacts: Business opt for videoconference e.g. Intercontinental & Radisson Blu Hotels wound up operations, This conference is virtual as opposed to in person.
	The future of work arrives ahead of schedule – Working from Home, Hybrid Work, Gig economy.
	The crisis sparks a wave of innovation and launches a generation of entrepreneurs – In US there were 472K new business applications in the 1st 6 months of 2021.
	Digitally enabled productivity gains accelerate the Fourth Industrial Revolution e.g. Telehealth, Virtual learning etc. The COVID-19 pandemic sped up digitization by three to seven years.
	Pandemic - induced changes in shopping behavior permanently alter consumer businesses

Sustainability

Dilemma - What does it take for the new Normal to stick?

1. Leadership: Courage to challenge the old ways of doing things while embracing new operating models that worked during the pandemic
2. Review Policies & Structures to anchor new operating models that are in tandem with changing consumer behaviors

Research
PAPERS PRESENTED

CLUSTER 

Sub-Theme 1: Computing and Informatics &
Sub-Theme 2: Library and Information Science

Moderator:
Dr. Faith Mueni: University of Embu

Rapporteurs:
1. **Vincent Mbandu,** Gretsa University
2. **Pascaline Ndila,** Gretsa University

A Model for Face Recognition using Principal Component Analysis Algorithm

By Vincent Mbandu – Gretsa University

Abstract

Using a computer to recognize a person by their face is known as face recognition in artificial intelligence. The term biometrics is an umbrella term that includes face recognition and signature, fingerprint, eye scanning, gait, and palm print recognition. The principal component analysis technique was used in this paper to extract distinctive features from the faces that are matched with other faces stored in the database. Predictive results indicated which faces were recognized and those not identified. The accuracy of these techniques was calculated, and the principal component analysis technique was found to be 86.3636% accurate. The study concluded that the technique performs better in face recognition.

1. Introduction

Nowadays, problems are being solved in computer vision such as medical imaging, surveillance, face recognition, among others, through various techniques. This research highlights the application of linear algebra in computer vision and face recognition. Computer Vision is the same way people use their eyes and brains to sense and see the world. It uses algorithms to analyze and understand images and classify them based on the information collected from images (Bahurupi, 2018). Linear Algebra is a concept that has been used in this paper since the techniques used for face recognition mostly use the concept of linear Algebra. The idea is widely used in computer vision, specifically in face recognition. This study presents the concept of face recognition using Eigen and fisher's faces and gives the basic idea of linear algebra applications in computer vision. The scope of this work is to work on a technique to detect or recognize faces using Eigen and Fisher's looks. It is a very well-formulated application of linear algebra in the field of computer vision (Sahoolizadeh, 2018, September).

The study applied the face recognition technology to the face dataset, and the dataset was divided into training and testing. The training dataset consisted of 60 faces, while the testing dataset consisted of 44 faces. The training and testing dataset faces consisted of the PGM file extension images. First, the study tried dimensionality reduction techniques on the dataset and used principal component analysis (PCA) and linear discriminant analysis (LDA). The study visualized and explored the spectrum of uncovered Eigen and Fisher's faces. It then examined the effect of varying parameters and compositions of different techniques on overall facial recognition performance, including changing the number of eigenvectors such as limiting eigenvectors, removing top eigenvectors found in PCA, comparing PCA, LDA, and dimensionality reduction in terms of accuracy and classification performance (Turk, 2019, January).

2. Related Work

Security concern is a significant issue that needs a lot of research; hence, this has motivated many research in face recognition to identify people quickly. Different techniques are being used to extract features from faces and use these features to locate and classify faces uniquely. A comparison of face recognition techniques is being studied to recommend the best method based on the experimental results. Some face recognition techniques widely used in computer vision include Eigen Faces, Fisher's Faces, Neural Network, Dynamic Link Architecture, Hidden Marvok Model, Geometrical Feature Matching, Template Matching, etc.

The most widely used face recognition technique is Eigen Faces, also known as the Principal Component Analysis method. According to Sirovich 2019, Eigen Faces is a method used to extract only relevant features from faces, and these relevant features are the need to reconstruct faces (Sandhu, 2019). Petland, in 2017, obtained 85% proper categorization of looks by using Eigenfaces. The method usually extracts features from the face, and the resultant features are the feature vectors; hence it is considered the principal component. The covariance matrix is the one that is usually used to generate the feature vector that is used to represent the face. The feature vectors are the Eigen Vectors, typically used to differentiate one image from another. In 2014 Petland et al. attained recognition of 0.95 on the PERET image dataset, which had 7562 ideas. The experiment used a less sensitive approach of extracting Eigen features from eyes, cheeks, mouth, and nose and using the parts for face recognition, unlike the other method of using Eigen Faces (Meethongjan, 2017).

Neural Network is one of the methods used in face recognition; Sung et al. in 2015 used Convolution Neural Network and Multilayer Perceptron for face recognition. Their experiment used 400 images for the ORL database and achieved a face recognition rate of 0.962 with Convolution Neural Network. According to their investigation, it took 0.5 seconds to extract features from the dataset, and training the model from the components extracted from the training dataset took four hours (Sharif, 2018).

The hierarchy of computer vision would be a four-staged process, as shown below.

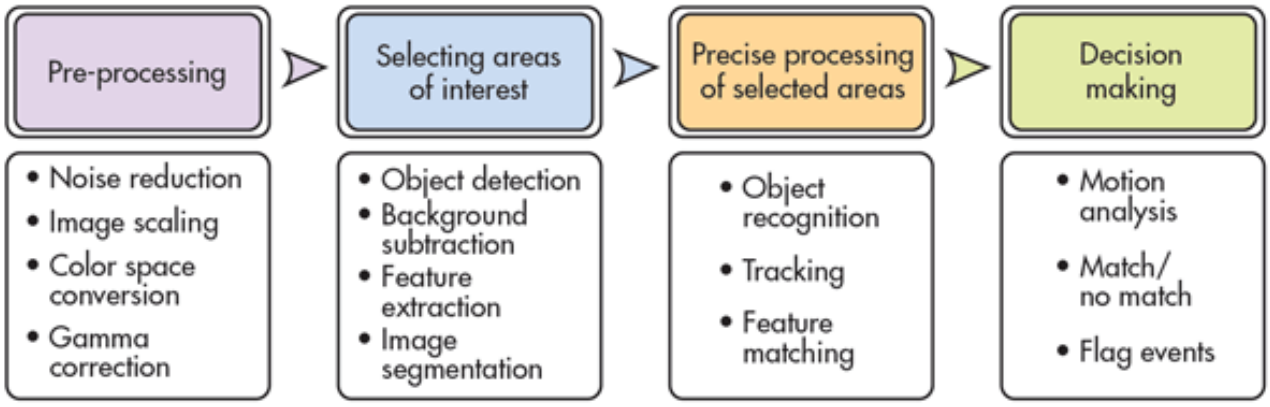


Figure 1. Hierarchy of Computer Vision

The approaches have been made in many different ways to perform the task of face recognition, like the one where automated face recognition is used. These methods of performing the task of face recognition, each one has their advantages and disadvantages. It is our part to choose the best available way.

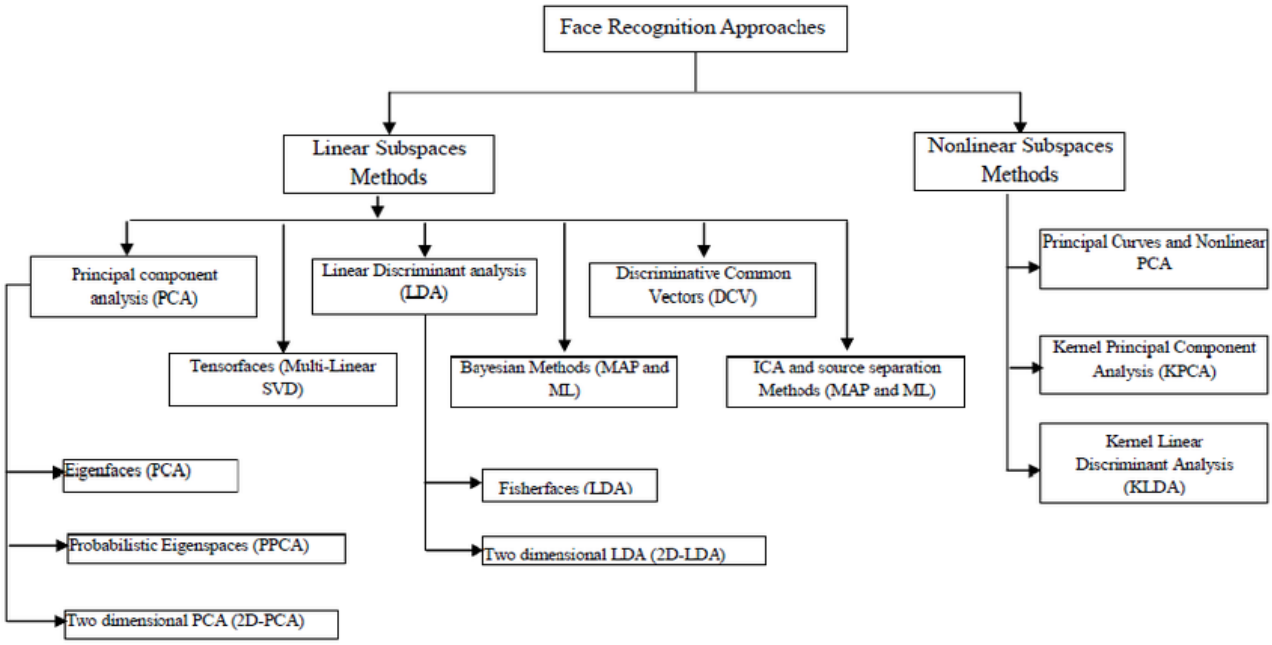


Figure 2. Face Recognition Approaches

The face Recognition technique can be done by considering the variation of one face of a person from the face of the other person in terms of ratio, and that is what exactly fisher's face method does. Methods used to recognize faces have weaknesses and advantages; hence face recognition is usually affected by certain factors that affect the performance of these techniques. Furthermore, accuracy usually varies depending on some face recognition techniques. The best way to reduce these affectace recognition factors is to use the hybrid approach (Joseph, 2016).

3. Methodology

3.1 Data Collection and Preprocessing

The face dataset consisted of 104 images. The training dataset consisted of 60 images. The testing dataset consisted of 44 images, and the image was of type PGM since they were edited using adobe photoshop. The image dataset was used as a secondary dataset obtained from Github. To read the photos, we used anaconda IDE, which supports python programming language, to import the imread library from the matplotlib. Image.

3.2 Train/Test Split

The study used an image dataset split into two partitions: train and test, housed in different folders to ensure that our test sets are untainted by downstream processing. The training and test sets were sampled from the same distribution by taking an equal proportion of samples from each folder.

Figure 3. Train Images

Figure 4. Test Images

3.3 Face Recognition Techniques

i. Computing Eigen Faces

• Main idea behind eigenfaces

- Suppose Γ is an N^2x1 vector, corresponding to an NxN face image I.

- The idea is to represent Γ (Φ=Γ - mean face) into a low-dimensional space:

$$\hat{\Phi} - mean = w_1 u_1 + w_2 u_2 + \cdots w_K u_K \ (K << N^2)$$

- **Step_1:** Obtain face images I_1, I_2,…….I_M (Training images).
- **Step-2:** Represent every image I_i as Γ_i.
- **Step-3:** Compute average face vector Ψ.

$$\Psi = \frac{1}{M}\sum_{i=1}^{M}\Gamma_i$$

- **Step-4:** Subtract the mean face.

$$\Phi_i = \Gamma_i - \Psi$$

- **Step-5:** Compute the covariance matrix C.

$$C = \frac{1}{M}\sum_{n=1}^{M}\Phi_n\Phi_n^T = AA^T \quad (N^2 \text{x} N^2 \text{ matrix})$$

where $A = [\Phi_1\ \Phi_2 \cdots \Phi_M]$ $(N^2 \text{x} M \text{ matrix})$

- **Step-6:** Compute the eigenvectors $_{UI}$ of AA^T

The matrix AA^T is very large --> not practical !!

Step 6.1: consider the matrix $A^T A$ (MxM matrix)

Step 6.2: compute the eigenvectors v_i of $A^T A$

$$A^T A v_i = \mu_i v_i$$

What is the relationship between us_i and v_i?

$A^T A v_i = \mu_i v_i$ => $AA^T A v_i = \mu_i A v_i$ =>

$CAv_i = \mu_i Av_i$ or $Cu_i = \mu_i u_i$ where $u_i = Av_i$

Thus, AA^T and $A^T A$ have the same eigenvalues and their eigenvectors are related as follows: $u_i = Av_i$!!

Note 1: AA^T can have up to N^2 eigenvalues and eigenvectors.

Note 2: $A^T A$ can have up to M eigenvalues and eigenvectors.

Note 3: The M eigenvalues of $A^T A$ (along with their corresponding eigenvectors) correspond to the M *largest* eigenvalues of AA^T (along with their corresponding eigenvectors).

Step 6.3: compute the M best eigenvectors of AA^T: $u_i = Av_i$

(**important:** normalize u_i such that $\|u_i\| = 1$)

Step 7: keep only K eigenvectors (corresponding to the K largest eigenvalues)

ii. Representing faces on this basis

- Each face ϕ_i (minus the mean) can be represented as a linear combination of the best K eigenvectors

$$\hat{\Phi}_i - mean = \sum_{j=1}^{K} w_j u_j, \quad (w_j = u_j^T \Phi_i)$$

(we call the u_j's *eigenfaces*)

- Each normalised face ϕ_i is represented in the vector:

$$\Omega_i = \begin{bmatrix} w_1^i \\ w_2^i \\ \cdots \\ w_K^i \end{bmatrix}, \quad i = 1, 2, \ldots, M$$

Recognition of faces

The below image provides a flowchart of the Eigen Faces algorithm

- Given an unknown face image Γ (centered and of the same size like the training faces) follow these steps:

Step 1: normalize Γ: $\Phi = \Gamma - \Psi$

Step 2: project on the eigenspace

$$\hat{\Phi} = \sum_{i=1}^{K} w_i u_i \quad (w_i = u_i^T \Phi)$$

Step 3: represent Φ as: $\Omega = \begin{bmatrix} w_1 \\ w_2 \\ \cdots \\ w_K \end{bmatrix}$

Step 4: find $e_r = \min_l \|\Omega - \Omega^l\|$

Step 5: if $e_r < T_r$, then Γ is recognized as face l from the training set.

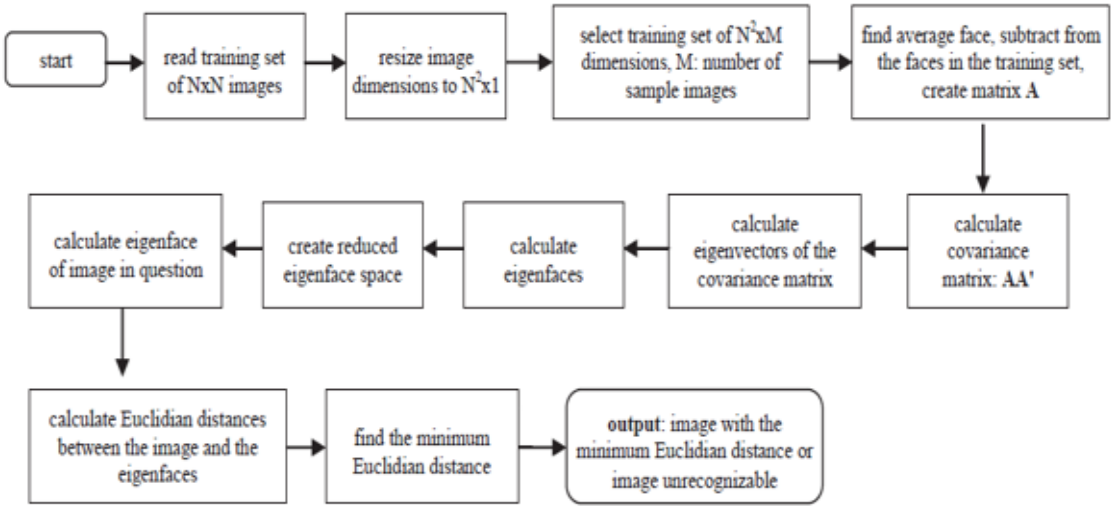
- The distance e_r is called distance within the face space (difs)

Comment: we can use the common Euclidean distance to compute e_r, however, it has been reported that the *Mahalanobis distance* performs better:

$$\|\Omega - \Omega^k\| = \sum_{i=1}^{K} \frac{1}{\lambda_i} (w_i - w_i^k)^2$$

(variations along all axes are treated as equally signifi cant)

Figure 5. Flowchart of the Eigen Faces algorithm



3.4 Dimensionality Reduction

Principal Component Analysis (PCA)

The primary use of PCA in this research is for dimensionality reduction. We treat each image as a flattened 1-dimensional vector and find the covariance matrix on the matrix of images, where each image is a column vector. We then find the top k eigenvectors of this covariance matrix, in order of the magnitude of their eigenvalues. These eigenvectors represent the eigenfaces of our training dataset. The images were then projected onto these eigenfaces, treating all faces as a linear combination of these eigenvectors—this reduced-dimensionality when we limited the number of eigenvectors we chose to use to represent each image.

Pre-processing (Mean Centering)

To properly apply PCA, the image vectors were mean-centered. The summation of all image vectors in the training dataset was done and divided by the magnitude of the training dataset to get the average image. This average subtracts every image in the training set. This ensures that the training set is centered at a mean 0. The images in the test dataset are all subtracted by the same mean image to ensure the same transformations are applied to the test dataset. As a sanity check, the average images are visualized from both the training and test sets, and it is found out that they are nearly identical

4. Results and Discussions

4.1 Mean Face

The average face is obtained by converting all the images in the training dataset into an array. The array of each image is then summed up to get the total summation of all the images in the dataset. The final summation of all the arrays is then divided by the total number of images, and in our case, we had 60 images for the training dataset. The mean array is then plotted using the matplot library in figure 6.

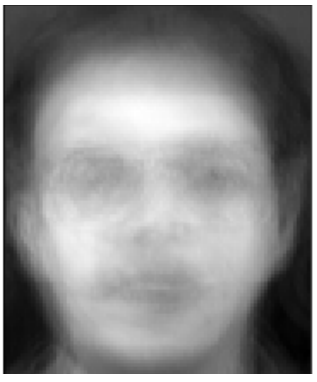


Figure 6. Mean Face

4.2 Mean Centering

The mean face subtracted every image in the training set. This ensured that the training set was centered at a mean 0. The images in the test dataset were all subtracted by the same mean image to ensure the same transformations were applied on the test dataset.

Figure 7. Training Images After Mean Centering

4.3 Covariance Matrix

The covariance matrix of the normalized training dataset is computed. The matrix helped us determine how similar the variances of the face features are.

```
Covariance matrix of X:
[[25.76481507  5.67350101  2.36306105 ... -1.54762144 -0.0806879
  -5.17057477]
 [ 5.67350101 21.22452574  5.01228367 ...  0.69290791  3.43353284
   0.23688211]
 [ 2.36306105  5.01228367 33.29665458 ... -0.79807283 -0.24953619
   0.14335801]
 ...
 [-1.54762144  0.69290791 -0.79807283 ... 15.58735801  9.63566816
   7.62289475]
 [-0.0806879   3.43353284 -0.24953619 ...  9.63566816 23.14454622
   9.90017353]
 [-5.17057477  0.23688211  0.14335801 ...  7.62289475  9.90017353
  17.51264716]]
```

Figure 8. Covariance Matrix of Normalised Training data set

4.4 Eigenfaces

The eigenvectors of the covariance matrix of all images were generated in the training set and sorted by descending magnitude. The top 8 rendered eigenvectors resemble faces. The next few rows of 9 also vaguely have facial characteristics, but by row 4 and beyond, the facial characteristics have severely degraded.

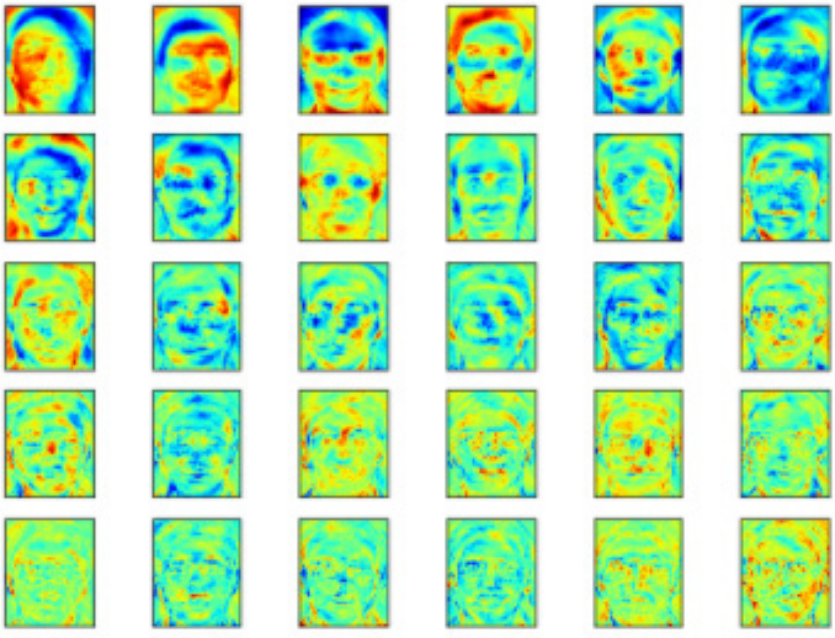


Figure 9. Eigen Faces

4.5 Testing all the Images

The testing image data set was normalized by subtracting the mean face from the vector. The testing images were then compared with the training dataset to see if the matching could be achieved and how many unknown faces matched with the one in the training dataset.

Figure 10. Face Recognition Results

The 44 faces from the testing dataset were matched with the ones in the training dataset, and out of 44 faces, 38 faces matched, and the rest did not match, which resulted in an accuracy of 86.3636%

5. Conclusion

Eigenface technique working at very high accuracy could reduce the rejection rate that most methods lack. The method's accuracy was calculated, and out of 44 faces tested, only 38 matched with the training dataset, resulting in an accuracy score of 86.3636%. The face triangle information that is always important can be incorporated with the eigenface technique to make the technique more accurate.

The information theory and linear algebra are the concepts behind the eigenface face recognition technique. This makes the method approximate the set of known face images using fewer face features, leading to a balanced tradeoff between computational complexity and accuracy. The eigenface approach helps in face recognition hence making the identification of faces easier and faster even though it does not give 100% accuracy. Also, it can be used to recognize people's faces since it balances the tradeoff between computational complexity and accuracy. In future experiments, the method can be compared with other face recognition techniques to conclude which method can be best used when face recognition problems arise.

In conclusion, the highest eigenvalues from the eigenfaces can be used to reconstruct faces, which helps in face recognition. The more the training faces are used with the eigenface approach, the more the technique becomes accurate. The euclidean distance is obtained by subtracting the test face weight from the train face weight. During prediction, the euclidean distance must be less than the threshold for a face to be classified to a particular class. Else the face is classified as an unknown person.

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Modifying Security Model for Detection of Insider Security Systems Threats for Public Universities

By Dennis Wapukha - Gretsa University

Abstract

The study recommends a predictive model for predicting the insider attacks was realized out of the need for a precise and better prediction model where different components of the insider threat issue could be easily understood and implemented. There were several elements that the model proposed. The pieces represent four areas; the motivator hereafter referred to as catalyst, actor characteristics (those of the potential insider threat), attack characteristics, and the institution features.

Keywords: Insider Threats, Security Model, Nurse Model, Security Systems, Systems Security.

1. Introduction

Institutions have always put forward the top-notch tools, procedures, and policies in the process of protecting their information systems from attackers and infiltration from outside. Despite the amount of investment channelled towards developing infrastructure and human resources in guarding against the external aggressors, the universities still experience significant attacks, causing greater losses. It is a common problem overlooked by system administrators and only realized years after employee termination or when an attack has occurred. Before the digital revolution, security experts were kept awake at night worrying about the danger posed by untrustworthy members of their companies who had privileges to classified information. These workers could easily usurp this opportunity to remove paper records from storage facilities and transfer them elsewhere.

The paper's objective was to modify a security mechanism model to detect insider security threats. The research question guided the article: Can a security mechanism model detect insider security threats?

Like many other institutions, universities have shifted to information system-based processes and procedures in their operations. Critical operations like examination and finance, information about clients and other stakeholders is stored on these information systems. Some universities have shifted to online platforms and networked systems within the organization. The purpose of information systems such as enterprise resource planning systems is to improve services. It is expected that employees and stakeholders would use the information systems in providing services as per the strategic plans and objectives of the universities. They have been facilitated with the information system resources and authorization to access the resources. Legal and proper use of the resources aims for ICT integration to universities. However, there has been an increasing trend where security threats and breaches of the information systems come from trusted employees. They are people with valid authorization but

have misused their privileges. This study sought to present a detection model that enables Kenyan universities to overcome the challenges posed by insider security threats. Universities should detect security breaches before they occur by having a security model. Currently, there are no models proposed or implemented at the university level.

2. Literature Review

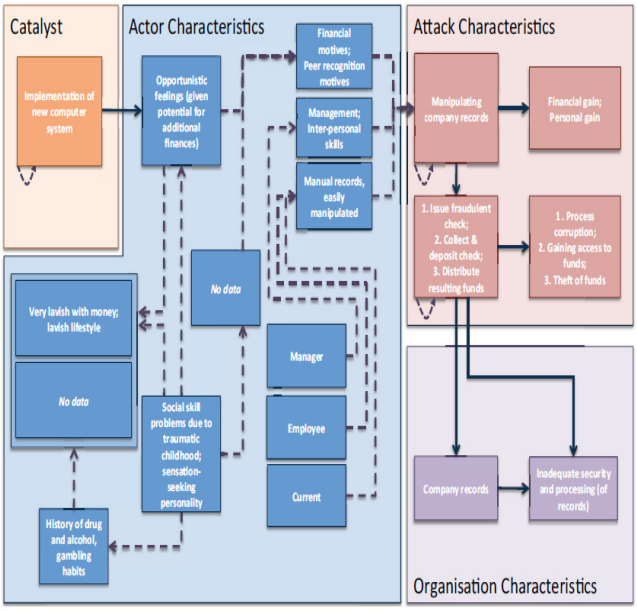
The Nurse Prediction Model

The elements of the model

The model presented in figure 2.3 below comprises several components referred to as elements. The elements represent four areas; the motivator hereafter will be referred to as catalyst, actor [insider] characteristics (those of the potential insider threat), attack characteristics, and the institution characteristics. As defined in the study, the insider will hereafter be referred to as an actor. The boxes represent specific elements while the solid arrows indicate the relation between aspects, with dashed lines indicating the potential associations. The study has further broken down the model into sections to simplify the discussion and implementation. The main areas of the models are; understanding the motivation to attack, observing the behaviour of trusted personnel, the actor, dissecting the attack, the resources (information systems) under attack, and their vulnerabilities.

i. Understanding the motivation to attack

To explain the security model elements, it is essential to understand the behavioural and psychological aspects of the actor/insider; it is viewed as the password to know the motivation behind the imminent information systems attack. The researchers and practitioners have given the behavioural and psychological aspects of the potential insider attention; hence the critical findings of those studies were used (Micki Krause Nozaki, 2011). The catalysts in the survey were cauterized as the leading causes. The individual characteristics, the psychological state, and the motivation to attack were the aspects that are modelled in the study. The elements are further discussed under each section, and their relationship is considered.



Source: (Nurse et al., 2014)

Precipitating event (Catalyst)

They are the catalyst that influences the insider, which can tip them to become threats to the information system. As per the literature, participating events are referred to as 'tipping points' (Moore et al., 2008). A significant aspect evident from the study was that most attacks were based on perception or rumours of something terrible that was about to happen, as indicated established by (Wallnau 2013).

Personality characteristics

Personality characteristics are the psychological traits and dispositions that make the personality of the insider both as self and work experience. The self-aspects are static and innate, while life experience is dynamic and more responsive. The personality traits include openness. The openness was measured by looking at the ability of the system users to share a password with others. As per Qutaibah & Panda (2008), there are other characteristics like social skill problems, superficiality, self-esteem, personal integrity, aggressiveness, and maturity that can be used to understand unique characteristics.

Historical behaviour

The historical behaviour was not the subject of the study, but the previous studies have extensively looked at it. According to Qutaibah & Panda (2008), the type of activities the insider has engaged in is likely to influence the personality characteristics. According to Rauthmann et al. (2015), issues related to carelessness and absent-mindedness were discovered to be sources of accidental, unintended insider threats.

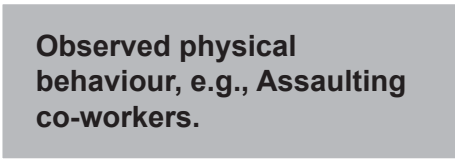


Figure 2.4 Behavioral Elements
Source: (Nurse et al., 2014)

Behaviour elements

Many behaviours are associated with personality characteristics. According to CMU-CERT, in their case, Caliendo, Fossen & Kritikos (2014) show the significance of this element where the systems administer who had a history of electronic crimes employed similar techniques on the employer through blackmail and sabotage. Although it could be argued that background checks can be done on potential insiders before they are given access to resources in the institutions, the challenge is that universities may not have sufficient investigative capacity for a proper background check.

Psychological state

The insider's psychological and emotional state, such as stress, depression, happiness, or anxiety, might influence the insider attacker (Qutaibah & Panda 2008). Nozaki (2015) states that this element can result from psychological makeup or environment-related, like stressful events, which explains the link between personality characteristics and catalyst events. Issue from the workplace or outside the environment can cause the state. As per the literature and the research results, the disgruntled employee was responsible for the attacks. However, disgruntlement was only one of the states established as strong to associate insider attackers in the research. The other factor from the study was the lack of reward or appreciation that can influence the insider to be a potential insider attacker.

Motivation to attack

The motivation to attack was categorized as a section to explore the relationship between the precipitating events and the other model elements. The study came up with findings on the motivating factors similar to the previous studies (Santos et al., 2008, Spitzner, 2003, Wallnau, 2013). Motivation can be financial, political, revenge, curiosity or fun, competitive advantage, or peer recognition. Insider attackers' primary motivators were financial gain, sabotage, revenge, and seeking attention based on study findings. As per the study, the psychological state significantly influences the motivation to attack.

Additionally, the psychological state can work together with Attitude Towards Work in further influencing the insider. The study findings (Bellovin 2008; Bishop, 2013) further explain the link between attitude and motivation. Motivation in the study was classified as deliberate or accidental to ensure that the model could capture all types of insider threats.

The skill-set is also critical for the study since insider attackers who know how to penetrate the system are not likely to initiate attacks where resources are protected. The attacker needs to have the requisite skills to carry out an attack (Boende et al., 2014). A case from CMU-CERT shows that the software development background enabled the insider to plant a logic code in the system software. The studies in the literature have also explored the concept of the chance to initiate an attack.

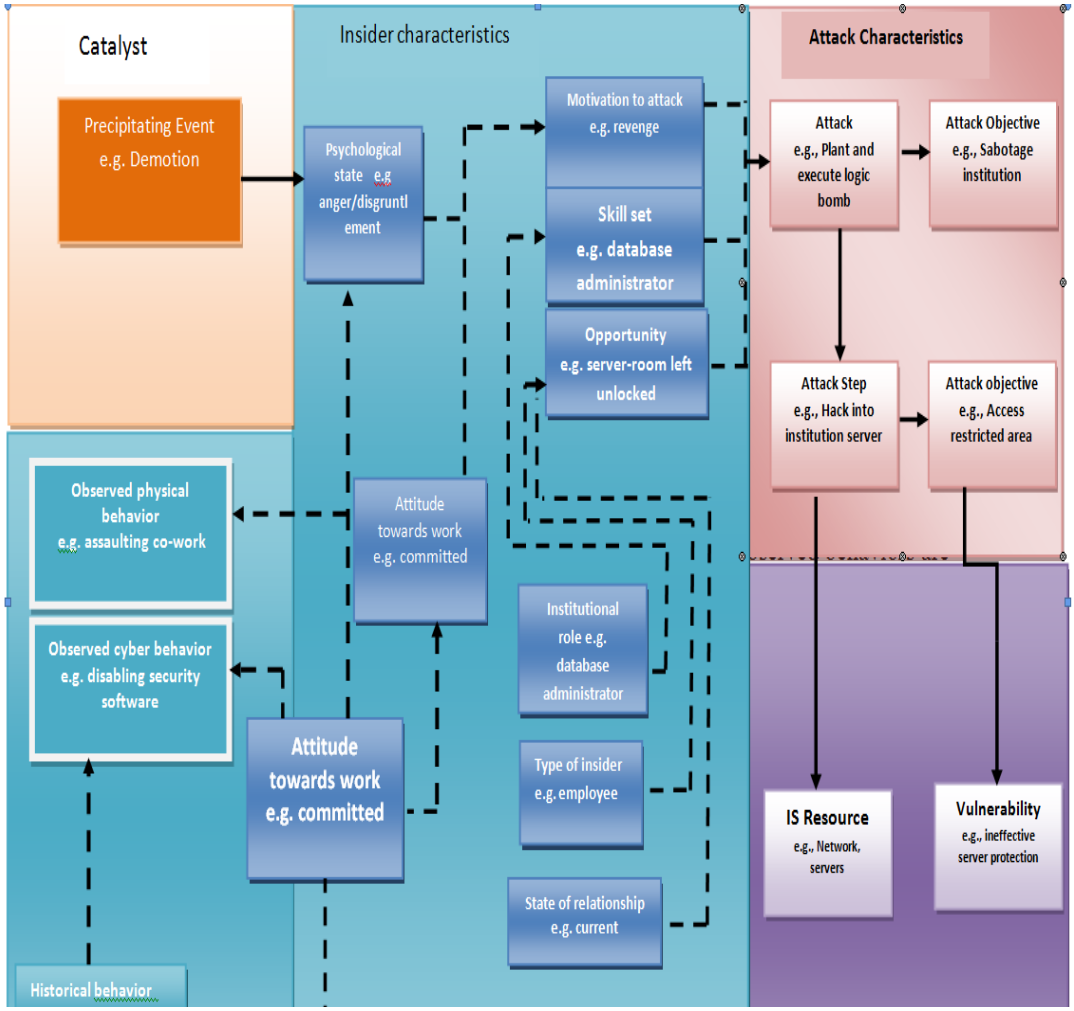


Figure 2.5 Motivation to attack
Source: (Nurse et al., 2014)

ii. Observing the behaviour of trusted personnel [insiders]

Observation in the model looks at monitoring the physical and cyber behaviour of the insiders. Observed physical behaviour might capture the insiders' physical behaviour, such as accessing the building and other resources. Observed Cyber Behavior monitors technology-related behaviour that an insider may show over the institution's information infrastructure like the internet, email, and workstations. The two observed behaviours indicate the potential attack either being done or about to happen.

iii. The Insider

The insiders can be employees, contractors, vendors, consultants, clients, and business partners. The external attackers should also be considered since they may recruit and work with trusted personnel to help conduct an attack on the institution. Financial gain was considered a motivator for a recruiter.

iv. Dissecting the attack

The attack is the activities done by the insider, either accidentally or deliberately, that will negatively affect the university. The attack outcome will be linked to the objective of the attacker. The attack steps are similar to those of the existing pre-defined notion of Attack Tree by Kammüller, Nurse & Probst (2016), where there is a precise sequence of events before an attack. The Intrusion Kill Chains Hutchins et al. (2011) has relevance when looking at the Attack Steps.

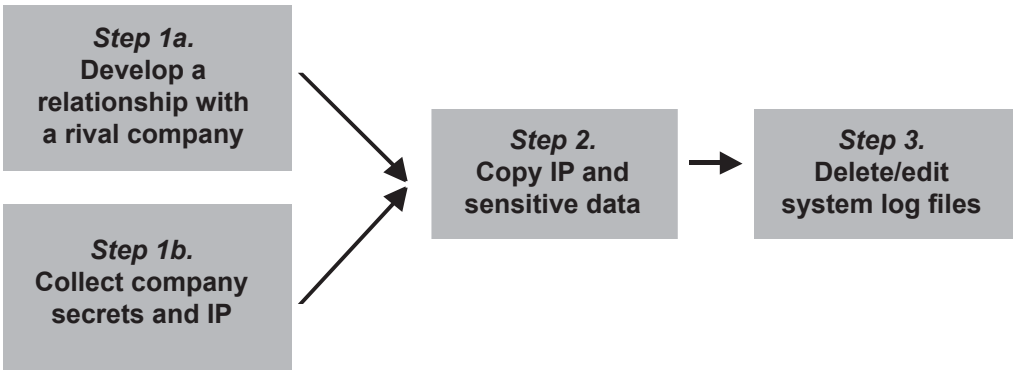


Figure 2.6 Steps of Attack
Source: (Nurse et al., 2014)

v. Resources under attack

The last two elements of the model are the resources; they are the information systems with value to the organization and the interest of attack by the insider attacker. The second aspect is Vulnerabilities, which are the weaknesses in the assets or controls protecting them, such as weak passwords, un-patched web servers, and inadequate physical security. The model linked the vulnerability in the system, such as management practices and technological protection techniques.

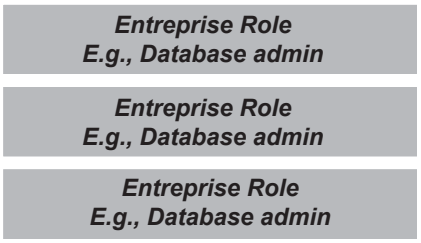


Figure 2.7 Actor Element
Source: (Nurse et al., 2014)

From the analysis of the elements, it is possible to bring together all of the features of; precipitating events, personal traits, observed behaviour, institution state and roles, targeted resources. With this model, it is possible to characterize the insider the author presented their model in the figure below.

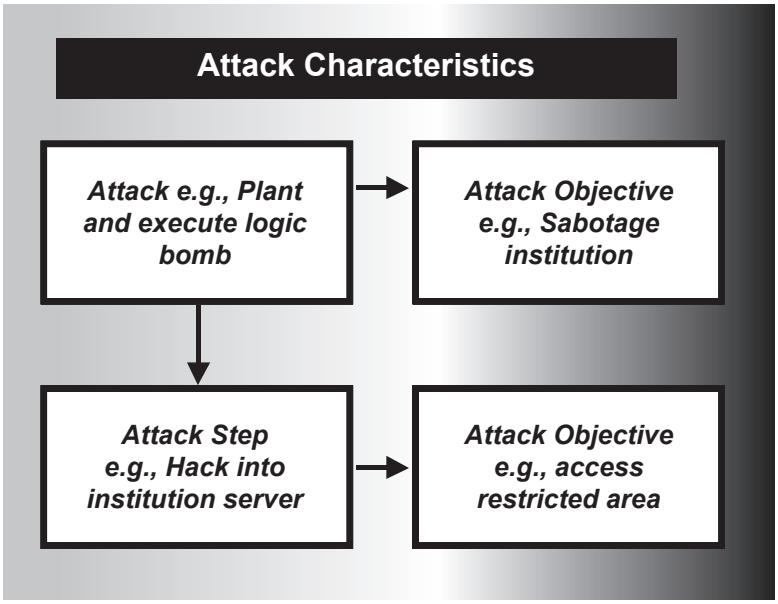


Figure 2.8 Attack Element
Source: (Nurse et al., 2014)

Proposed Insider Detection Model

The proposed model for predicting insider attacks was realized out of the need for a precise and better prediction model where different components of the insider threat issue could be easily understood and implemented. The study was guided by the research objective and the framework's scope. The study found that the motivation to attack describes the reasons for a personal attack on their institution. The cause element was analyzed in the research and the relevant literature that narrowed down the number of critical motivators to insider attackers.

After reviewing several models, the model by Nurse et al. (2014), with minimal modifications, meets the solution for predicting insider security threats in universities in Kenya as per the study findings. The most recent model also captures aspects from other older models with new perspectives.

Nurse et al. (2014) capture the most important indicators that the universities can use to predict insider threats. The Nurse et al. (2014) model presents some challenges; the scholars have also acknowledged their limitations. The study also observed the same difficulties: getting employees' background information from previous companies or the criminal investigation department. The study findings show that universities do not have pre-screening functions. Additionally, most information systems users are not required to have a certificate of good conduct. The study further established that individuals probed as insiders are not reported to the police, where inter-department transfers and Demotion are more common for the culprits. Therefore, the police do not have records to help decline to issue a good conduct certificate. Public Universities depend on referees to screen new employees, which is unreliable since many organizations do not report insider activities. Measuring the psychological behaviour and the mindset of the attackers in an organization requires specialized

personnel like a psychologist or technical HR personnel. This dynamic element of the model makes it difficult to act on some of the activities hence making the model ineffective. The emotional traits are complicated to map to the model. The study proposes eliminating the dynamic characteristics since they are difficult to identify and map and make the model ineffective. Eliminating the model element from the framework for public university model for insider security threat prediction makes it more effective.

3. Proposed Model

3.1.1 The Elements Recommended for Removal in Next Model

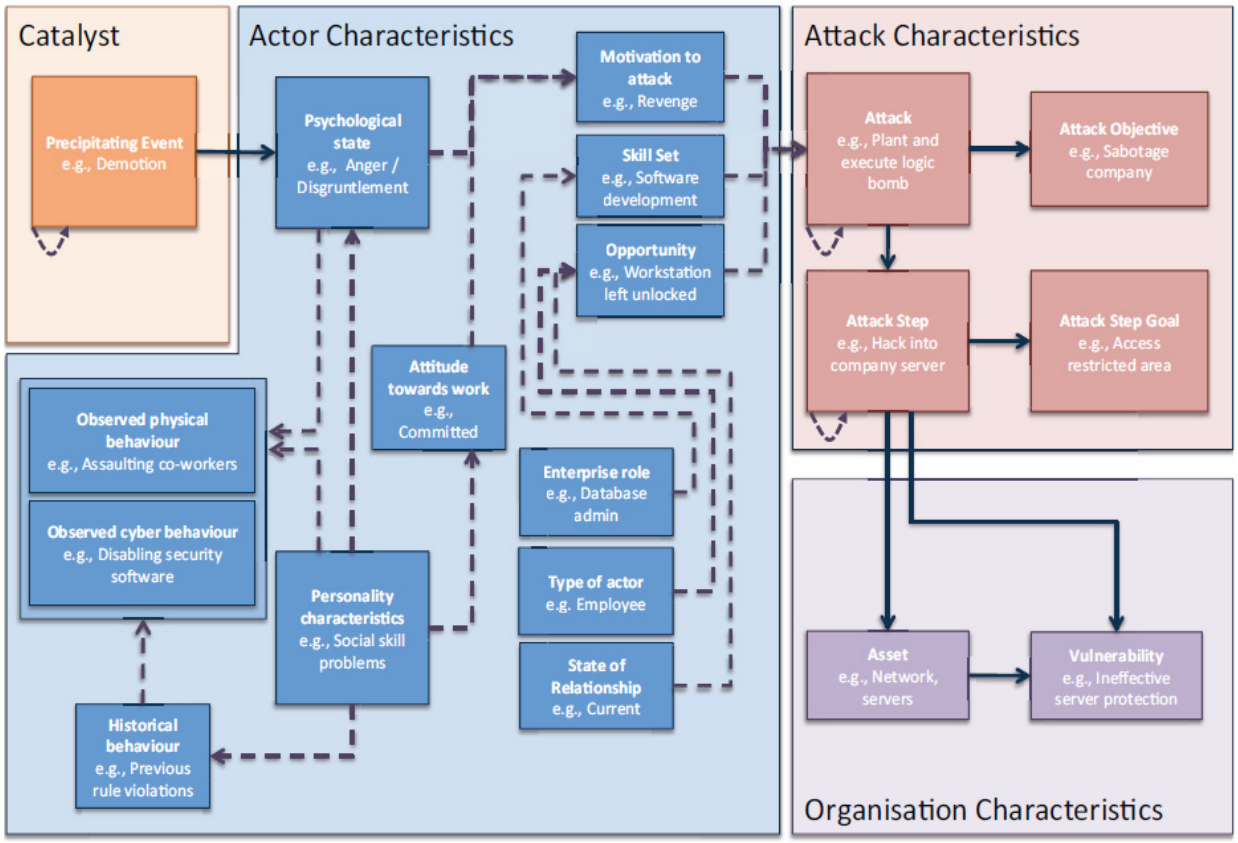
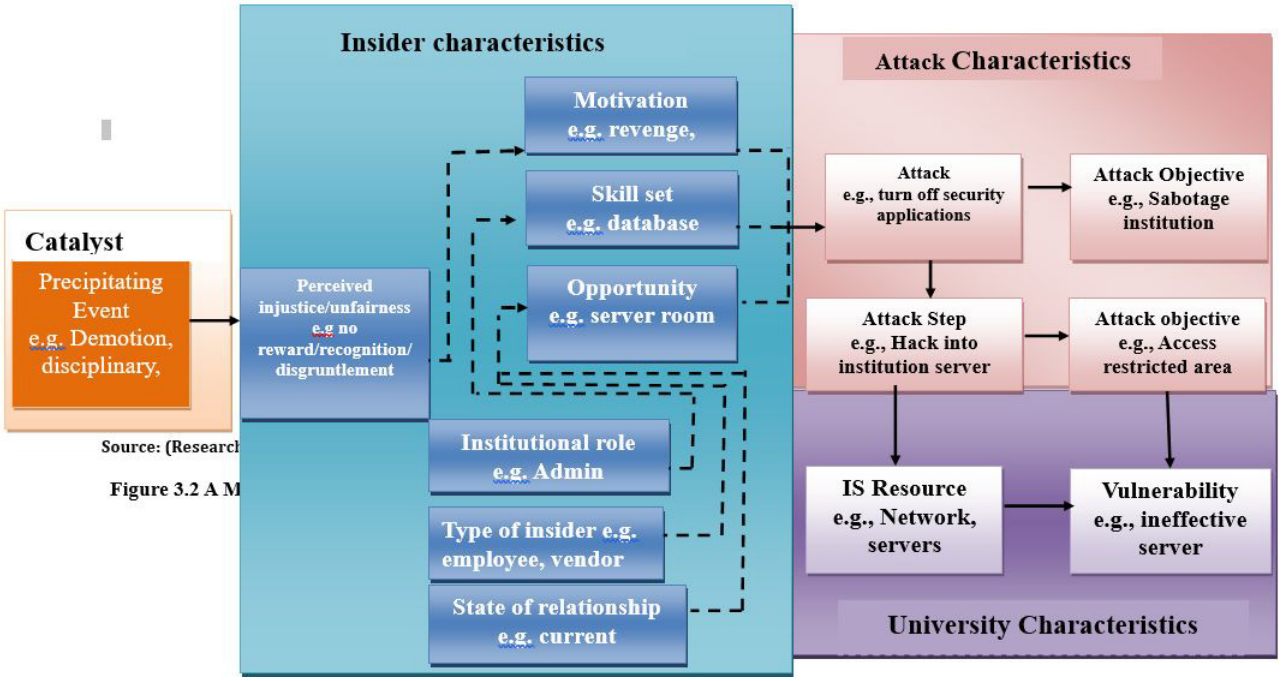


Figure 3.1 Insider Attack Prediction Model By Nurse and Others
Source (Nurse et al., 2014)

3.1.2 Recommended Model



Source: (Researcl

Figure 3.2 A M

Source: (Researcher, 2016)

3.1.3 The elements of the model

The model presented is made up of several elements. The elements represent four areas; the motivator hereafter referred to as catalyst, insider, attack, and institution. As defined in the study, the insider will hereafter be referred to as an actor. The boxes represent specific elements while the solid arrows indicate the relation between aspects, with dashed lines indicating the potential associations (Nurse et al., (2014). The study has further broken down the model into sections to simplify the discussion and implementation. The main areas of the models are; understanding the motivation to attack, dissecting the attack, the resources (information systems) under attack, and their vulnerabilities.

Precipitating event (Catalyst)

They are the catalyst that influences the insider, which can tip them to become threats to the information system. As per the literature, participating events are referred to as 'tipping points' (Moore et al., 2008). They are events such as employee dismissal, employee disciplinary actions, disputes with other employees, perceived injustices, company actions such as lay-offs, personal problems such as divorce, health-related issues, and new opportunities like getting a better paying job in another company. The study primarily based the human factors on participating events from the research in Counterproductive Workplace Behaviour (CWB). (Samnani, Salamon & Singh, 2014), evaluated the lack of promotion, inadequate or no rewards for committed employees, and financial gain that was used study area. It was established that most of the attacks witnessed in the public universities were tipped off or triggered by at least one of the participating factors.

A significant aspect evident from the study was that most attacks were based on perception or rumours of something terrible that was about to happen, as indicated established by (Wallnau 2013). Similar examples are examples of similar studies (Samnani, Salamon & Singh, 2014; Schneier, 1999)

where system administrators start to create a logic bomb based on rumours reducing allowances. The precipitating event elements are vast; this needs to be appreciated as many aspects can trigger an employee to an insider attacker.

Validation of the Insider Detection Model

Validation of the recommended model is essential for theoretical and practical purposes. The model presented gives the prediction ability to the universities' information systems in Kenya against insider threats. As per Yin (1994), the model's validity is about the relevance and meaningfulness of the model. Five aspects should be used in measuring the validity of a model, as suggested by Pederson et al. (2000): truth, internal logic, acceptance, applicability, and novelty value. The internal logic and the truth are about the basis of the study's results, which is based on existing theories; there should be a link between the starting point, research questions of the survey, and the final study outcome. It exploits the practical results and the theoretical applications in explaining the phenomena.

Two methods are used to validate the research findings and the recommended insider threat detection model. The data collection method used for the study was validated. The study used the pilot study and the actual research study, which validated the outcome. Additionally, a statistical test on the study's validity was carried out where a substantial reality for the items was recorded. A closed-ended questionnaire with a Likert scale was used to get the responses. The data was used to develop a model that had all the critical variables to the model tested. The research results formed the basis of coming up with the recommended model. Secondly, the researcher presented the model to the experts in information systems who were the supervisors. Since the model is a modification of the already existing model, experts explored the model's critical success factors without aspects dropped from the original model. It was further fine-tuned from the feedback to the current final model as recommended.

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Reviewing the Literature on Machine Learning and COVID-19: A Systematic Literature Review

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Abstract

Covid-19 has ravaged businesses and disrupted the usual way of doing things worldwide. It was discovered first in December 2019, and it has spread at high speeds worldwide. The vulnerable people are those who have prior illnesses or who are older than 60 years. There is a concerted effort to combat it from further spread. The healthcare and medicine fields have been looking for ways to curb this pandemic from causing more damage. While Machine Learning (ML) has been used in other areas of study, it now calls for machine learning-aided screening, diagnosis, tracking, and predicting further patterns to be expected. ML is also needed now to help find the cure for this pandemic. Objective: This paper aimed to undertake a systematic literature review of studies that have been done related to the use of ML in combating Covid-19 and future pandemics. Method: The paper will was written using the most common criteria for a systematic literature review in computer science and digital libraries. The studies focused on published articles from December 2019. The literature search for this paper was conducted through Google Scholar, IEEE, Elsevier, and Sagepub online databases. The keywords included COVID-19, artificial intelligence (AI), and machine learning (ML). Results: The results were categorized into four themes: a) Using ML in detecting COVID-19 b) Using ML in diagnosing COVID-19 c) Using ML, AI, and Deep learning neural networks for COVID-19 interventions and treatment d) Role of ML in COVID-19 management. Conclusion: AI-based tools can significantly change COVID-19 management and future management of pandemics in healthcare.

Keywords: Machine learning, COVID-19, pandemic, artificial intelligence

1. Introduction

On March 11, 2020, Dr. Tedros Adhanom, the World Health Organization director-general, declared COVID-19 a global pandemic. Since then, COVID-19 has impacted negatively on the world economy. The failure of the other healthcare systems to prevent damage that this pandemic has brought has called for the creation of new methods to combat this pandemic. The new techniques should help prevent the further spread of the pandemic and have the potential to shape the future of the reach of pandemics. For this reason, there has been the need to have new methods of tackling the pandemic using new techniques like ML.

According to (Poole et al., 1998), Artificial Intelligence (AI) is the study of "intelligent agents" which scan their environment and take action to maximize their chance of succeeding on a given task. According to (McCarthy, 2007), it is the science and engineering of making intelligent machines.

Machine Learning (ML) is a subset of AI and uses a trial and error approach to improve the results. ML has consistently and steadily shown significant potential in optimizing processes and resource sharing and allocation. ML has helped to prepare new data with the use of versatile methods.

On the other hand, deep learning, a subset of ML, uses neural networks. Neural networks and AI have the most significant potential to enhance healthcare research, especially in a pandemic where time is of great essence. There is a large databank from epidemiological, clinical, and genetic data that all have to be processed to come up with the best approach to diagnose, prevent, and manage a pandemic. This new approach will have to be extrapolated to the public arena to act as healthcare measures to curb the pandemic(Panesar, 2019; Vaishya et al., 2020). In order to tackle the high variance, precision and integration are essential. ML has the potential to solve this complex situation.

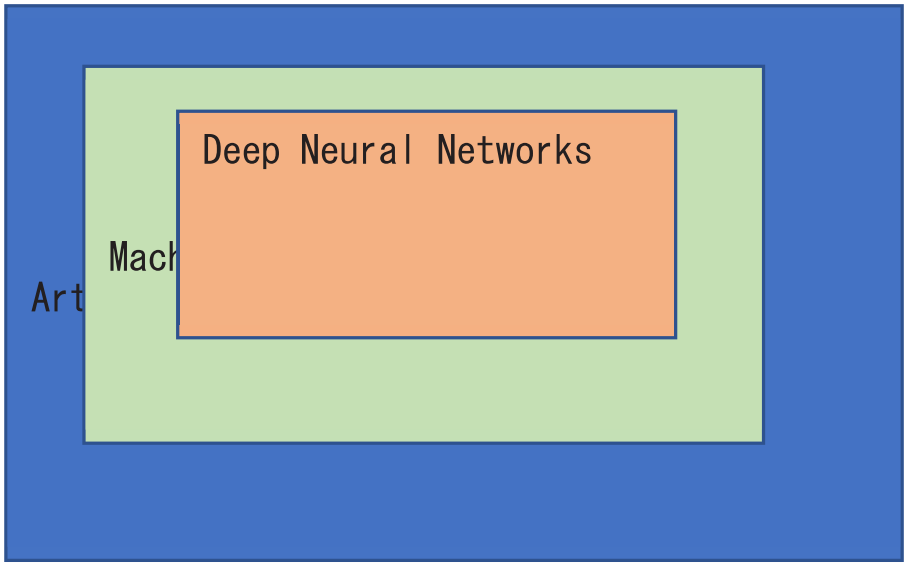

Figure 1: The relationship between AI, ML, and Deep learning

The COVID-19 pandemic has put immense pressure on authorities to collect epidemiological, clinical, and public health data and gather appropriate action plans to curb the spread with minimum disruption to the economy and the way of life. The use of AI promises to provide this urgent solution without much strain compared to human intervention. One of the obvious ways that AI has helped this pandemic is the sharing of data in dashboards which has helped prevent the spread of SARS-Cov-2 coronavirus and has aided authorities to take the necessary steps to help put to normal the lives of communities. It has seemed effortless because of the use of AI(Santosh, 2020). There has been the development of machine learning algorithms like CRISPR, which was used in virus detection, and proved to be fast compared to manual detection methods. It was done on SARS-Cov-2 assay(Broughton et al., 2020; M. Kumar et al., 2021). There are developments of Neural Networks classifiers for screening Covid-19 patients using the unique respiratory pattern of patients(Santosh, 2020). AI is not limited to screening only, but it is also used in the treatment and therapeutic processes of Covid-19. AI has been incorporated in the treatment of SARS-Cov-2, where a proposal using a deep learning approach is being made (Zhavoronkov et al., 2020).

2. Methodology

The drafting of the systematic literature review followed Preferred Reporting Items of Systematic Reviews and Meta-Analysis (PRISMA).

2.1 Search strategy

The search was done on Google Scholar, IEEE, and Elsevier databases using relevant search keywords. These articles were ideal as they were readily available. The papers were published in 2019. The search keywords used "AND/OR" which are Boolean operators. The search keywords were "Covid-19 and Machine learning" OR "AI and covid-19" OR "machine learning in covid-19". The search places in the documents included the Title, Abstract, and Keywords.

2.2 Inclusion/exclusion criteria

All articles related to Artificial Intelligence (Ai) or Machine Learning (ML) or Deep Neural Networks and clinical, epidemiological, or public issues regarding covid-19 were included. Any article that covered Covid-19 but did not mention the other terms of AI, Deep Neural Networks, and Machine learning were excluded.

2.3 Selection of sources of evidence

All the sources were selected and synthesized based on the PRISMA process. The articles were identified from the online databases, and the duplicates were removed.

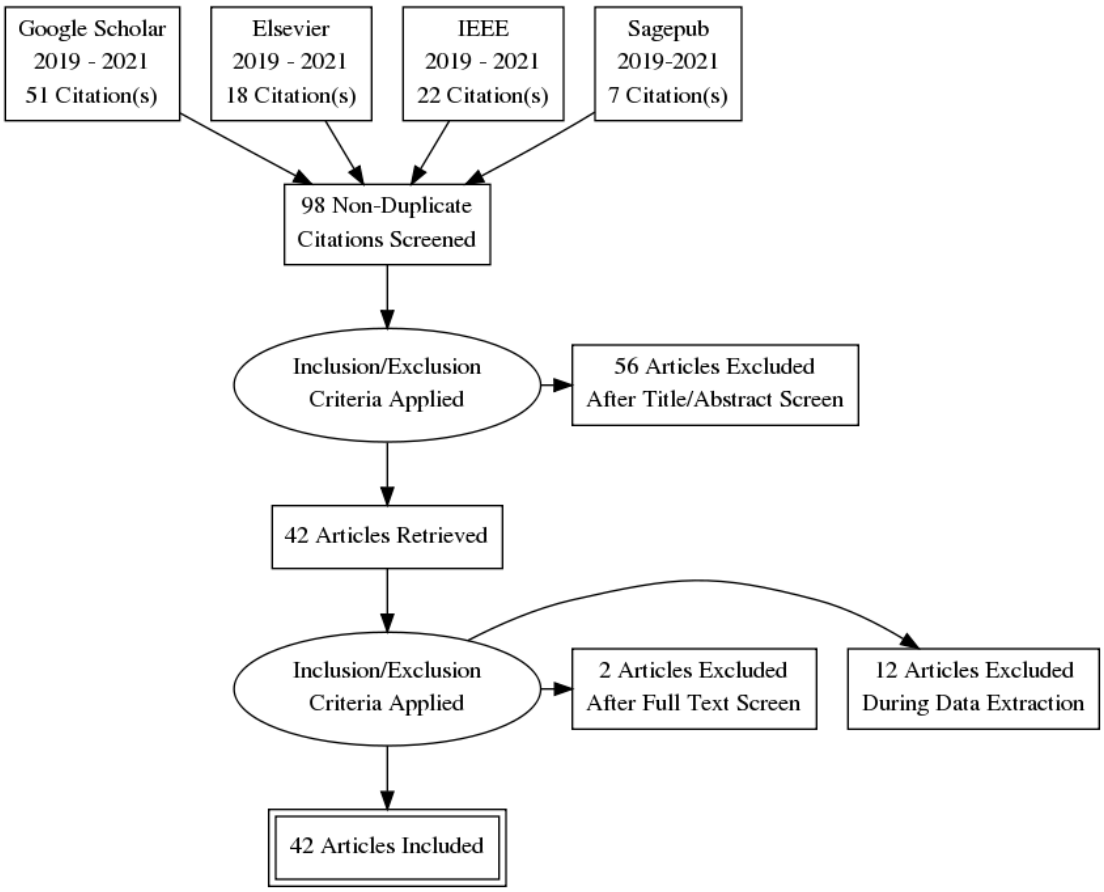

Figure 2: PRISMA flowchart

2.4 Data charting process

All the articles included in the study were listed in a table format. The title, the date of publication, the journal of publication, and the key findings were all tabulated (Table 1: Data sources). The following data items were extracted while undertaking the data charting process: study design, data sources used in AI evaluation, the category of AI, and the interventions used.

Table 1: Data sources

S/No	Author(s)	Citation	Title	Aim
1.	Hassan, A Shahin, I …, MB Alsabek - International Conference on 2020, Undefined	(Hassan et al., n.d.)	Covid-19 detection system using recurrent neural networks	Looking for ways of using deep learning to detect covid-19
2.	Bhargava, A Applications, A Bansal - Multimedia Tools and 2021, Undefined	(A Bhargava et al., n.d.)	Novel coronavirus (COVID-19) diagnosis using computer vision and artificial intelligence techniques: a review	Using machine learning to diagnose covid-19
3.	Irfan, M Iftikhar, MA Yasin, S Draz, U …, T Ali - International Journal of 2021, Undefined	(Irfan et al., 2021)	Role of Hybrid Deep Neural Networks (HDNNs), Computed Tomography, and Chest X-rays for the Detection of COVID-19	Use of deep learning, computer vision, and AI to detect COVID-19
4.	Goldstein, E Keidar, D Yaron, D …, Y Shachar - arXiv Preprint arXiv 2020, Undefined	(Goldstein et al., n.d.)	Covid-19 classification of x-ray images using deep neural networks	How deep neural networks can be used to classify COVID-19
5.	Asif, S MedRxiv, Y Wenhui - 2020, Undefined	(Asif et al., n.d.)	Automatic detection of COVID-19 using X-ray images with deep convolutional neural networks and machine learning	Using deep convoluted networks to detect COVID-19
6.	Khemasuwan, D …, JS Sorensen - European Respiratory 2020, Undefined	(Khemasuwan et al., n.d.)	Artificial intelligence in pulmonary medicine: computer vision, predictive model and COVID-19	How artificial intelligence can be used to predict COVID-19
7.	Zhu, Jocelyn Shen, Beiyi Abbasi, Almas Hochman-Kochi, Mahsa Li, Haifang Duong, Tim Q.	(Jocelyn Zhu et al., 2020)	Deep transfer learning artificial intelligence accurately stages COVID-19 lung disease severity on portable chest radiographs.	Using deep neural networks to detect transfer of COVID-19 to other body organs

8.	Bhargava, Anuja Bansal, Atul	(Anuja Bhargava & Bansal, 2021)	Novel coronavirus (COVID-19) diagnosis using computer vision and artificial intelligence techniques: a review	How computer vision and AI can be used to diagnose COVID-19
9.	Zhu, JS Ge, P Jiang, C Zhang, Y …, X Li - Journal of the 2020, Undefined	(JS Zhu et al., 2020)	Deep-learning artificial intelligence analysis of clinical variables predicts mortality in COVID-19 patients	The aim was to look at how AI can be used to predict mortality rates of COVID-19 patients
10.				
11.	van der Schaar, Mihaela Alaa, Ahmed M. Floto, Andres Gimson, Alexander Scholtes, Stefan Wood, Angela McKinney, Eoin Jarrett, Daniel Lio, Pietro Ercole, Ari	(Mihaela van der Schaar et al., 2021)	How artificial intelligence and machine learning can help healthcare systems respond to COVID-19	The aim was to assess the machine learning methods that could respond to COVID-19.
12.	Senthilraja, M.	(Senthilraja, 2021)	Application of Artificial Intelligence to Address Issues Related to the COVID-19 Virus	It focused on machine AI to address issues that came with COVID-19.
13.	Schaar, M van der Alaa, AM Floto, A Learning, A Gimson - Machine 2021, Undefined	(M van der Schaar et al., n.d.)	How artificial intelligence and machine learning can help healthcare systems respond to COVID-19	The study focused on how AI can be used in COVID-19 management.
14.	Rahmatizadeh, S …, S Valizadeh-Haghi - Journal of Cellular and 2020, Undefined	(Rahmatizadeh et al., n.d.)	The role of artificial intelligence in the management of critical COVID-19 patients	The study focused on COVID-19 management. The authors studied the management of COVID-19 patients
15.	Kannan, S Subbaram, K …, S Ali - Archives of Clinical 2020, Undefined	(Kannan et al., n.d.)	The role of artificial intelligence and machine learning techniques: Race for covid-19 vaccine	The study focused on the treatment of COVID-19, especially the role it plays in the entire process
16.	Schuller, Bjorn W. BW Coppock, Harry ArXiv:2012.14553, A Gaskell - arXiv preprint 2020, Undefined Nessiem, Mina A. Mohamed, Mostafa M. Coppock, Harry Gaskell, Alexander Schuller, Bjorn W. BW	(Schuller et al., 2021)	Detecting COVID-19 from breathing and coughing sounds using deep neural networks	The study implored to understand how COVID-19 detection could be achieved using deep neural networks.

17.	Lalmuanawma, S Hussain, J Chaos, L Chhakchhuak - Fractals, Solitons & 2020, Undefined	(Lalmuanawma et al., n.d.)	Applications of machine learning and artificial intelligence for Covid-19 (SARS-CoV-2) pandemic: A review	The study focused on the management of COVID-19 and other similar pandemics.
18.	Kumar, A Gupta, PK Syndrome, A Srivastava - Diabetes & Metabolic 2020, Undefined	(A. Kumar et al., n.d.)	A review of modern technologies for tackling the COVID-19 pandemic	The study focused on the general management of the COVID-19 pandemic
19.	Hassanien, AE Salam, A Preprint, A Darwish - EasyChair 2020, Undefined	(Hassanien et al., 2020)	Artificial intelligence approach to predict the covid-19 patient's recovery	The study intended to evaluate the use of AI in predicting the recovery process of COVID-10 patients.
20.	Gupta, BM Dhawan, SM …, KKM Ahmed - International Journal of 2021, Undefined	(Gupta et al., 2021)	Global Research on COVID-19 Disease: A Scientific Assessment of Publications during 2020-21	The study aimed at general research on COVID-19
21.	Muhammed, BT Awlla, AH Murad, SH Ahmad, SN	(Muhammed et al., 2021)	Prediction of CoVid-19 mortality in Iraq-Kurdistan by using Machine learning	The study focused on COVID-19 prediction in Iraq using ML
22.	Mohammed, MA Abdulkareem, KH …, AS Al-Waisy - Ieee 2020, Undefined	(Mohammed et al., n.d.)	Benchmarking methodology for selection of optimal COVID-19 diagnostic model based on entropy and TOPSIS methods	The study aimed at diagnosing the COVID-19 pandemic. The researchers were focused on diagnostic model using TOPSIS methods
23.	Shahid, O Nasajpour, M Pouriyeh, S …, RM Parizi - Journal of Biomedical 2021, Undefined	(Shahid et al., n.d.)	Machine learning research towards combating COVID-19: Virus detection, spread prevention, and medical assistance	The study aimed at using ML to detect COVID-19 and also in the mitigation process
24.	Nguyen, DC Ding, M Access, PN Pathirana - IEEE 2021, Undefined	(Nguyen et al., n.d.)	Blockchain and ai-based solutions to combat coronavirus (covid-19)-like epidemics: A survey	The researchers were focused on understanding how AI and blockchain technologies can be used in combating COVID-19
25.	Ong, Edison Wong, Mei U. Huffman, Anthony He, Yongqun	(Ong et al., 2020)	COVID-19 Coronavirus Vaccine Design Using Reverse Vaccinology and Machine Learning	The researchers were focused on the use of ML in the design of the COVID-19 vaccine

26.	Chakraborty, C On, AN Abougreen - EAI Endorsed Transactions 2021, Undefined	(Chakraborty et al., 2021)	Intelligent internet of things and advanced machine learning techniques for COVID-19	The study focused on the use of intelligent agents to combat COVID-19
27.	Joshi, A Dey, N Santosh, KC	(Joshi et al., 2020)	Intelligent systems and methods to combat covid-19	The study focused on the use of intelligent systems to intervene in COVID-19 treatments and the prevention
28.	Hashem, IAT Ezugwu, AE Al-Garadi, MA MedRxiv, IN Abdullahi - 2020, Undefined	(Hashem et al., n.d.)	A machine learning solution framework for combatting covid-19 in smart cities from multiple dimensions	The study focused on ML frameworks to help in the prevention and combating of COVID-19
29.	Tseng, VS Ying, JJC …, STC Wong - IEEE Computational 2020, Undefined	(Tseng et al., n.d.)	Computational intelligence techniques for combating COVID-19: a survey	The researchers were concerned about how AI could be used to fight COVID-19. It undertook a survey
30.	Santosh, K C	(Santosh, 2020)	AI-driven tools for coronavirus outbreak: need of active learning and cross-population train/test models on multitudinal/multimodal data	The study focused on how AI could develop cross-population models for combating COVID-19.
31.	Broughton, James P Deng, Wayne Fasching, Clare L Singh, Jasmeet Chiu, Charles Y Chen, Janice S	(Broughton et al., 2020)	A protocol for rapid detection of the 2019 novel coronavirus SARS-CoV-2 using CRISPR diagnostics: SARS-CoV-2 DETECTOR	The study's focus was on COVID-19 detection using CRISPR diagnostic model.
32.	Panesar, Arjun	(Panesar, 2019)	Machine learning and AI for healthcare	The study was a general overview of how AI and ML could be used in healthcare.
33.	Vaishya, Raju Javaid, Mohd Khan, Ibrahim Haleem Haleem, Abid	(Vaishya et al., 2020)	Artificial Intelligence (AI) applications for COVID-19 pandemic	Like other studies, the researchers wanted to find out how AI could be used in the COVID-19 pandemic

34.	Abir, SM Islam, SN Anwar, A Mahmood, AN IoT, AMT Oo - 2020, Undefined	(Abir et al., n.d.)	Building resilience against COVID-19 pandemic using artificial intelligence, machine learning, and IoT: A survey of recent progress	The study sought to find out how AI, ML, and the Internet of Things (IoT) could be used to build resilience on COVID-19
35.	Zhavoronkov, Alex Aladinskiy, Vladimir Zhebrak, Alexander Zagribelnyy, Bogdan Terentiev, Victor Bezrukov, D Polykovskiy, D Shayakhmetov, R Filimonov, A Orekhov, P	(Zhavoronkov et al., 2020)	Potential COVID-2019 3C-like protease inhibitors designed using generative deep learning approaches. ChemRxiv	Use of deep learning in the design of COVID-19 inhibitors
36.	Ozturk, T Talo, M Yildirim, EA …, UB Baloglu - Computers in biology 2020, Undefined	(Ozturk et al., n.d.)	Automated detection of COVID-19 cases using deep neural networks with X-ray images	The study wanted to establish the use of deep neural networks to detect COVID-19
37.	Naseem, M Akhund, R …, H Arshad - Journal of Primary 2020, Undefined	(Naseem et al., 2020)	Exploring the potential of artificial intelligence and machine learning to combat COVID-19 and existing opportunities for LMIC: A Scoping Review	It is a scoping review of studies that have been done on the use of ML and AI to combat COVID-19
38.	Dairi, A Harrou, F Zeroual, A …, MM Hittawe - Journal of Biomedical 2021, Undefined	(Dairi et al., n.d.)	Comparative study of machine learning methods for COVID-19 transmission forecasting	It was a comparative study on how ML could be used for tracing infections and predicting the trend
39.	Salman, FM Abu-Naser, SS Alajrami, E Abu-Nasser, BS	(Salman et al., 2020)	Covid-19 detection using artificial intelligence	The study focused on the use of AI in detecting COVID-19
40.	Shams, MY Y. Elzeki, O. M. OM Abd Elfattah, Mohamed Medhat, T. Hassanien, Aboul Ella …, M Abd Elfattah - … and artificial intelligence 2020, Undefined	(Shams et al., 2020)	Why Are Generative Adversarial Networks Vital for Deep Neural Networks? A Case Study on COVID-19 Chest X-Ray Images	This study primarily focuses on X-RAY images for COVID-19 using deep neural networks. The researchers were concerned about the role of generative adversarial networks

41.	Schuller, Bjorn W. BW Coppock, Harry ArXiv:2012.14553, A Gaskell - arXiv preprint 2020, Undefined Nessiem, Mina A. Mohamed, Mostafa M. Coppock, Harry Gaskell, Alexander Schuller, Bjorn W. BW	(Schuller et al., 2021)	Detecting COVID-19 from breathing and coughing sounds using deep neural networks	The study focused on the use of deep neural networks for detecting COVID-19.
42.	Keshavarzi Arshadi, Arash Webb, Julia Salem, Milad Cruz, Emmanuel Calad-Thomson, Stacie Ghadirian, Niloofar Collins, Jennifer Diez-Cecilia, Elena Kelly, Brendan Goodarzi, Hani Yuan, Jiann Shiun	(Keshavarzi Arshadi et al., 2020)	Artificial Intelligence for COVID-19 Drug Discovery and Vaccine Development	The study sought to find out how AI could be used to discover COVID-19 drugs

3. Synthesis of results

The study was synthesized and put in four themes based on the PRISMA guidelines. The four themes identified include *Using ML in detecting COVID-19, Using ML in diagnosing COVID-19, Using ML, AI, and Deep learning neural networks for COVID-19 interventions and treatment, Role of ML in COVID-19 management.*

3.1 Selection of sources of evidence

The literature of this study was done using Google Scholar, Sagepub, Elsevier, and IEEE based on the keywords Machine learning, artificial intelligence, Covid-19. After the duplicates were removed, a total of 42 articles were retrieved. A total of 98 pieces were recovered, where Fifty-six articles out of 98 were excluded because they were within the study's scope. The remaining 42 articles were screened based on the title and abstract.

3.2 Themes selected from the study

Four themes were identified in the selected articles:

1. Using ML in detecting COVID-19
2. Using ML in diagnosing COVID-19
3. Using ML, AI, and Deep learning neural networks for COVID-19 interventions and treatment
4. Role of ML in COVID-19 management.

Using ML in detecting COVID-19

The study done by (Hassan et al., n.d.) highlights artificial intelligence's role in the fight of Covid-19. In the study, there is a focus on speech recognition and how it can be used to screen and diagnose covid-19 incidences. The techniques identified in the study were those of Automatic Speech Recognition and deep neural networks. It can be related to the study (Irfan et al., 2021), where the hybrid deep neural networks could be used together with computed tomography to detect covid-19. However, another study (Asif et al., n.d.) showed how deep images could be used to detect Covid-19. They focused on using chest x-ray to detect COVID-19 in pneumonia patients. It is relatable to the study (J Zhu et al., n.d.) to understand how severe lung cancer disease was with Covid-19 using deep-learning convolutional networks. In the study (Shahid et al., n.d.), the general use of ML in detecting, diagnosing, and treating covid-19 has been done before. They are relatable to (Schuller et al., 2021) (Ozturk et al., n.d.)(Schuller et al., 2021). They have all shown how Machine learning techniques could manage covid-19.

Using ML in diagnosing COVID-19

In the study (A Bhargava et al., n.d.), procedures have been researched to understand how to use computer vision to diagnose covid-19. The motivation for the study was to check on the different ways in which computer vision could be used in the research. Another study (Mohammed et al., n.d.) indicated how a model could be developed that would be used to diagnose covid-19.

ML, AI, and Deep learning neural networks for COVID-19 interventions and treatment

A majority of other researches (Chakraborty et al., 2021; Hashem et al., n.d.; Joshi et al., 2020; Ong et al., 2020; Tseng et al., n.d.) focused on using machine learning techniques to combat covid-19. The researchers have focused on how the technologies could use Vaxign-ML for reverse vaccinology(Ong

et al., 2020). Such attempts have been to see how machine learning algorithms could be used to check and assess the effectiveness of covid-19. In yet another study (Hashem et al., n.d.), the aim is to develop a mathematical framework that would be used to diagnose, track, and treat covid-19. The study focused on small cities and how they could be vulnerable. The model was also used to trace the spread of the pandemic and provide a solution for real-world covid-19 problems.

Role of ML in COVID-19 management

The role of machine learning in Covid-19 has been another study area for many scholars. One of the study areas in Covid-19 is classifying images using machine learning(Goldstein et al., n.d.). The purpose is to provide a tool in which machine learning techniques could categorize the covid-19 cases. It is the same case with (Khemasuwan et al., n.d.), where machine learning is used in pulmonary medicine where computer vision is plausible. A study is commonly seen in [17], [20], which has shown how machine learning could respond to the Covid-19 pandemic. It has also been captured by (Kannan et al., n.d.; Rahmatizadeh et al., n.d.). In the works of (A. Kumar et al., n.d., Lalmuanawma et al., n.d.), the role of machine learning in the fight against the pandemic has been assessed and evaluated. The global impact of the pandemic has raised concern for many researchers. It is shown by (Gupta et al., 2021; Muhammed et al., 2021) where the global impact of the pandemic and the role of machine learning is assessed. In one of the studies, machine learning in predicting mortalities in Iraq has been exploited. A general overview of managing pandemics has been reviewed and how machine learning could be used in the future(Nguyen et al., n.d.). Other researchers have suggested developing AI-driven tools in managing covid-19 pandemics in the future(Santosh, 2020). Another study focused on how machine learning approaches could be used in broadcasting machine learning approaches(Dairi et al., n.d.).

4. Strengths and limitations

The study has focused on using machine learning, AI, and deep neural networks to manage the pandemic. The studies that have been done are the most recent as the pandemic is also the most recent. One limitation in the study is that the main focus has been on the popular articles found in IEEE, Google Scholar, and Sagepub. The fields of main focus were information technology and machine learning. The study might have missed some grey literature. With the popularity of AI and machine learning, the study aims to expand further.

5. Conclusion

AI and machine learning have helped diagnose, predict, and treat Covid-19. These technologies promise better management of Covid-19. It may help nations allocate their resources efficiently because they know the likelihood of occurrences using the tools in machine learning. The future of healthcare looks better with the emergence of AI-based tools that will help manage cases.

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Role of Libraries in Combating Spread of Fake News: A Case of Covid-19 Vaccines

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Abstract

Covid -19 outbreak was announced in December 2021. The outbreak had severe economic and social effects. Kenya government announced various measures to curb the further spread, such as handwashing, keeping social distance and sanitizing. In 2021 vaccines were rolled out, which was expected to reduce the health and economic effects of the disease. However, the vaccine uptake was met with severe resistance. The resistance indicated a deeper problem in society: the inability to evaluate information consumed critically. There was, therefore, the need for libraries to come in and mitigate the spread of fake news on Covid-19 vaccines. The study used a systematic review to find ways to combat the spread of fake news. It was established that social media were the leading source of fake news. Therefore, the libraries can become equally active in social media and partner with technological organizations to flag off wrong messages on Covid-19 vaccines. Libraries can provide open access to research work on Covid-19 vaccines to allow users to consume authentic information. Information Literacy was also identified as helpful because users are trained to identify false information and avoid sharing it. The study recommends financing libraries to implement the identified tactics effectively.

Keywords: Covid-19 vaccines, fake news, Libraries.

1. Introduction

Coronavirus emerged in Wuhan city of China in December 2019. The virus then expanded to other cities in China and eventually to the rest of the world. The WHO officially named the disease COVID-19 in 2020 (Wu eta al., 2020). The first case was formally announced in Kenya by the Cabinet Secretary for Health Hon Mutahi Kagwe on 13th March 2020. As of 31st April 2021, there were 159,318 confirmed cases and 2724 deaths (Ministry Of Health –Kenya, 2020).

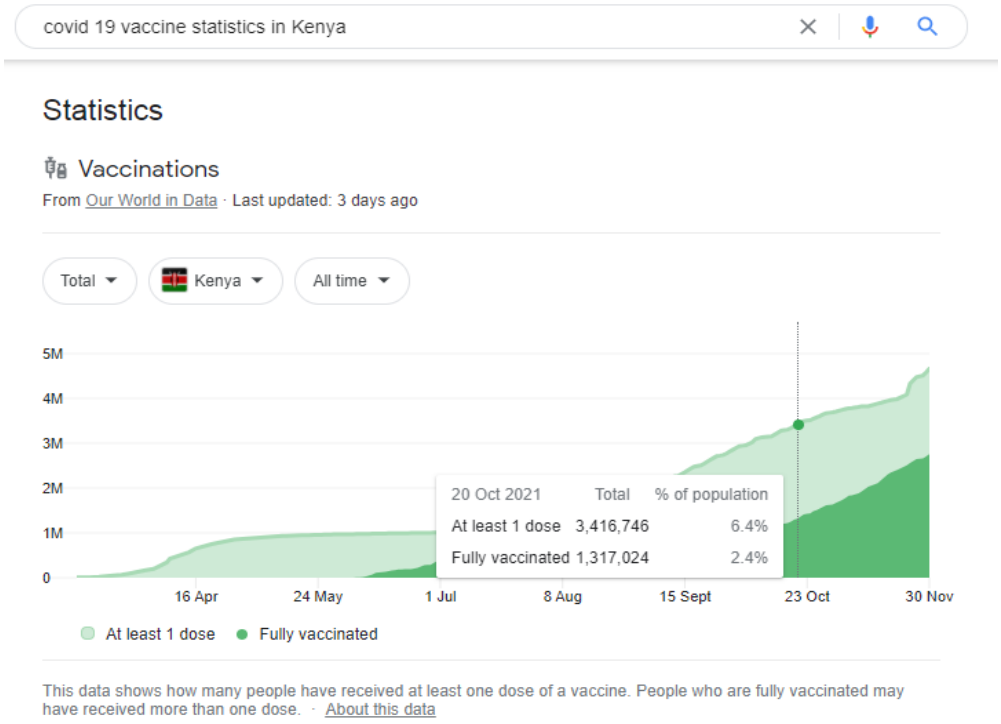
The pandemic was associated with severe socio-economic effects across the globe; according to WHO statistics, close to 4.95 million deaths were reported worldwide, with Kenya reporting over 5,000 deaths as of October 2021. Mofijur et al. (2021) denoted that the pandemic heightened human suffering, undermined the economy and turned the lives of people across the globe upside down. The socio-economic crisis reshaped energy investment and affected the energy sector significantly, with most investment activity facing disruption due to mobility restrictions.

According to a survey done by Josephson & Michler (2020) on Socioeconomic Impacts of COVID-19 in Four African Countries, 77% of the sampled population indicated the loss of household income after Covid 19 hit their countries. This subsequently led to cases of food insecurities and the inability

to access better healthcare. The study also showed that student-teacher contact dropped from 96% to 17% among households sampled.

To counter the effects of Covid 19, WHO and governments across the globe introduced interventions such as prohibiting public gathering, hand washing & sanitization and maintaining social distances. In Kenya, the government adopted several measures to curb the spread of the disease, such as the closure of borders and a ban on international travel, closure of school/learning institutions, dawn to dusk curfew, and closure of bars and restaurants, all of which affected the economy negatively (Barasa, 2021).

In 2021, Vaccines were rolled out to help fight against Covid 19 pandemic. The Kenyan government rolled out massive drives to have its population vaccinated as early as March 2021. According to statistics released by the ministry of health as of 20th October 2021, only 1.9 million Kenyans were fully vaccinated, which forms a total of 2.6% of the target population (Gavi- The Vaccine Alliance, 2021).



Source: (Our World in Data, 2021)
Fig. 1 statistics of the vaccinated population in Kenya as of 20th October 2021

Despite the devastating effects of the Covid-19 disease, many Kenyans remain unvaccinated. The World Health Organization and the government of Kenya to have citizens vaccinated has been met with fierce resistance. The resistance has been attributed to information consumption-about covid-19 vaccines- that is highly accompanied by rumours, fake news, and false information. Distorted and exaggerated news has been widely disseminated.

Fake news can be described as stories that are mere fabrication, falsehood, propaganda or hoaxes intended to misinform or deceive people. Most often than not, fake news aims to manipulate people's opinions and actions to create the wrong impression, which is sometimes dangerous to the people.

Libraries provide access to information and focus mainly on connecting users to information that they need. The types of libraries in Kenya include; academic, public, and special libraries. Academic libraries serve colleges and universities, public libraries serve cities and towns of all types, and Special libraries are found in specialized environments, such as hospitals, corporations, museums, the military, private business, and the government. These institutions can disseminate authentic information to the masses to curtail the spread of fake news concerning Covid -19 vaccines.

1.1 Covid -19 vaccine resistance

According to Orangi (2021), the level of COVID-19 vaccine hesitancy reported is high at (60.61%) compared to childhood vaccine acceptance in Kenya. A survey done across 19 countries reported 71.5% of the respondents were very likely or somewhat likely to accept an available COVID-19 vaccine that is proven safe and effective, with differences in vaccine acceptance ranging from 90% in China to 55% in Russia. In sub-Saharan Africa, surveys have reported 84.6% of Cameroonians, 52% of South Africans, and 50% of Zimbabweans to be hesitant or would reject the COVID-19 vaccine.

Osuri et al. (2021) studied the *Determinants of COVID-19 Vaccine Behavior Intentions among the Youth in Kenya: A Vaccine Pre-Introduction Study*. According to the study results, vaccine hesitancy in Kenya among the youth stood at 58%. The main reason for rejecting the COVID 19 vaccine was inadequate information on vaccine safety and effectiveness. Fallacies such as interference with women hormones and their menstrual resulted in low vaccine uptake by women. The youth feared presumed long term effects on their bodies, such as blood clots, infertility in men, and missed monthly periods. Osuri et al. (2021) also found that social media was the main source of fake news concerning Covid-19 vaccines. The internet and social media were littered with many controversial videos on the COVID vaccine. These included things such as it being a way to introduce microchips and other tracking devices into our bodies, a biotechnology weapon being used as a channel to kill Africans, and it is a form of antichrist (666) association with the devil. Another popular belief among the youth was that the vaccine weakened one's immunity making one susceptible to other diseases and could even cause death.

Roozenbeek, (2020) found out that the most viewed YouTube videos on coronavirus contained misleading information. Evidence suggested that exposure to misinformation on the virus was common. Exposure to fake news daily reduces the willingness of people to get vaccinated. It also reduced the probability of people recommending the vaccine to vulnerable people in society. According to Roozenbeek (2020), minimal effort has been made to prepare the public for the arrival of the Covid- 19 vaccine. The misinformation about the Covid-19 vaccine threatens public health and the national economy.

2. The problem

Covid -19 has had devastating social and economic impacts across the globe. Various vaccines supported by the world health organization were rolled out to the public to contain its effects. Despite the efforts by the World Health Organization and the government of Kenya to have citizens vaccinated, vaccine uptake has been met with fierce resistance. The resistance has been associated with information consumption-about covid-19 vaccines- which is highly accompanied by rumours and false information (Orangi, 2021).

The resistance might not be the issue, but it presents a deeper problem in society- the inability to evaluate information that is consumed critically. Libraries, therefore, need to step up to nullify the impacts of misinformation on Covid-19 vaccines.

3. Purpose and objectives of the study

3.1 Purpose

This review aimed to explore avenues that libraries can use to combat the spread of fake news regarding covid-19 vaccination.

3.2 Objectives

- To identify significant sources of fake news.
- To identify ways of combating the spread of fake news.

4. Methodology

This study adopted a systematic qualitative review as the study design. The review was guided by two questions which included;

i. What are the sources of fake news on the Covid-19 Vaccine?
ii. How can libraries combat the spread of fake news?

The search was conducted on both peer-reviewed and non-peer-reviewed sources. Peer-reviewed literature was conducted on emerald, Taylor& Francis, ResearchGate, and Google scholar databases. The sources mentioned above were preferred because they majorly publish literature in the library and information science. The search was extended to non-peer-reviewed sources, including web-based portals for governments and non-governmental organizations.

Keywords used for search included, Covid-19 Misinformation, Covid-19 Fake news, Covid-19 vaccination, Covid-19 vaccine hesitancy, combating fake news, sources of fake news, libraries and covid-19 misinformation and role of libraries in combating the spread of fake news. Time specification was 2017- 2021 to capture the most relevant and updated information.

The retrieved information was screened for eligibility. Inclusion criteria considered all articles that answered the research questions. Exclusion criteria deemed unrelated, duplicated and unavailable full texts. The researcher retrieved 70 articles, and 11 articles were selected for review through exclusion and inclusion criteria.

Data were analyzed under 2 subthemes: the sources of fake news and ways of combating the spread of fake news.

5. Findings

5.1 Literature on fake news

Source	Article	Author (s)	Findings
Google Scholar	Inoculating against COVID-19 vaccine misinformation.	Van der Linden et al., (2021).	1. Social media has the potency to spread fake news, which significantly affects society and people's decisions. 2. Fake news comes in various forms, such as comedy for fun, but they successfully convince people of wrong messages.
Emerald.com	Infodemic surrounding COVID-19: Can LIS students recognize and categorize "problematic information" types on social media? *Digital Library Perspectives*.	Yesmin & Ahmed, (2021).	1. Social media platforms are hotspots for sharing problematic information. Covid-19 information was being transmitted and shared quickly on social media platforms. 2. Verifying the accuracy of Covid-19 related information on social media platforms is challenging. 3. There is increased use of social media such as Facebook, Twitter, and YouTube to search Covid-19 related information. Facebook is the most significant single source for spreading fake news about Covid-19. 4. Facebook is the most frequently used media for sharing Covid-19 fake news. 5. Tweets on Covid-19 are enormous, but most shared links cannot be assessed for credibility. 6. There is an increase in state-sponsored propaganda among non-credible sources, spreading Covid-19 misinformation for political purposes.
Google Scholar	Covid19? Corona? 5G? or both?': the dynamics of COVID-19/5G conspiracy theories on Facebook.	Bruns et al., (2020).	7. Conspiracy theorists have used Facebook to spread fear to genuine Facebook users. Such processes are not limited to Facebook but on a variety of other leading social media platforms.

5.2 Literature on combating the spread of fake news

Source	Article title	Author(s)	Findings
Emerald.com	Arresting fake news sharing on social media: a theory of planned behaviour approach	Pundir, Devi,&Nath, (2021),	1. Informing and making users aware of unravelling real information from fake news acts as a defense in reducing the spread of fake news on social media. 2. Use targeted fake news awareness campaigns to persuade social media users to show restraint and self-control while sharing on social media. 3. Social media companies can run targeted ads towards users to develop a positive attitude towards news verification before sharing.

Source	Article title	Author(s)	Findings
Google Scholar	Managing the COVID-19 vaccine Infodemic	Horton, R. (2020)	1. Social media companies like Facebook, Twitter and YouTube should police their networks to eliminate false information on Covid-19 vaccines. 2. Trusted politicians and public figures need to speak in support of Covid- 19 vaccines. 3. Vaccine scientists and publishers should raise the standards of the published work. 4. Journalists should avoid the unwitting spread of misinformation and deny platforms to vaccine sceptics. 5. Lawmakers should regulate sources of misinformation as they have done with other health threats.
Google Scholar	Determinants of COVID-19 Vaccine Behaviour Intentions Among The Youth In Kenya: A Vaccine Pre-Introduction Study.	Osur et al. (2021)	1. Organizations should Design and implement a communication strategy on the Covid-19 vaccine to provide accurate information to the youth
ResearchGate .net	COVID-19 Pandemic and Social Media News in Nigeria: The Role of Libraries and Library Associations in Information Dissemination.	Ladan and Madu, (2020).	1. In Nigeria, academic, special and public libraries can share information quickly, efficiently and in real-time in response to the Covid-19 pandemic through their social networking pages such as Facebook, Twitter and Instagram. 2. Libraries can provide platforms for gathering and disseminating information to promote awareness of the current situation. 3. Special libraries at health and research centres can work with medical professionals to enlighten their communities about the coronavirus. 4. Libraries should provide access to databases, websites, e-books, and repositories. 5. Public libraries can provide current and reliable information sources for understanding and respond to Covid -19 on their website. 6. Public libraries can develop blogs to support learning from home, provide information on government announcements, provide accurate and updated information, and access a wide range of online resources and streaming videos to help people navigate the virus. 7. Library associations can enhance the dissemination of current and verified information in the community.

Source	Article title	Author(s)	Findings
ResearchGate .net	Inoculating against COVID-19 vaccine misinformation.	Van der Linden et al., (2021).	1. Confronting misinformation necessitates pre-emptive action to immunize the public against misinformation through psychological inoculation. It works by exposing people to weakened misinformation to help them resist encountered misinformation in the future. Inoculation requires regular booster shots such as message repetition.
Google Scholar	Effects of Fake News and Propaganda on Management of Information on Covid-19 Pandemic in Nigeria.	Odunlade et al. (2021)	1. Government should give public enlightenment on the effects of fake news and propaganda on Covid-19. 2. Governments should establish anti-fake news centres to censor and investigate fake news sources. 3. NGO's should engage in campaigns against fake news. 4. Institutions should work to reduce the visibility of misinformation. 5. Health organizations should partner with technology companies and other online influencers to promote accurate information about Covid-19.
Emerald.com	Infodemic surrounding COVID-19: Can LIS students recognize and categorize "problematic information" types on social media? *Digital Library Perspectives*.	Yesmin & Ahmed, (2021).	1. Government should have large scale awareness programs for the general public to educate them on various aspects of problematic information on Covid-19.
Emerald.com	Fighting fake news: exploring George Orwell's relationship to information literacy."	Haggar, (2020).	1. Ensure information literacy continues to evolve, and information professionals need to incorporate human behaviour into information literacy frameworks to help people understand how misinformation spreads.

6. Discussion

Based on the above findings, social media was identified as the leading source of misinformation on Covid-19 disease. Facebook, Twitter and YouTube were identified as key in spreading fake news. Political propaganda was also used to spread misinformation on Covid-19 for political gains.

The following tactics were found helpful in mitigating the spread of fake news. Libraries can equally use the same tactics to reduce the consumption of false information on the COVID-19 vaccine.

- Designing and implementing a communication strategy. A communication strategy entails a plan on what to communicate, who, and why. This will encourage mindset reset and prepare people to take up vaccines. Also, it will aid in the provision of accurate information among the users.

- Partnering with technological companies and being actively engaged in social media to constantly flag messages of Covid-19 vaccines that are erroneous and falsified.
- Encourage massive publication of journals and other sources with authentic information on Covid-19 vaccines and offer open access to these publications.
- Libraries should repackage scholarly work (on Covid-19 Vaccines) by simplifying the technical language used and publishing it using layman's language by writing reviews, summaries and abstracts.
- Academic libraries should include Information Literacy (IL) as a compulsory programme to equip users with the required knowledge and skills to ascertain and retrieve accurate information about COVID-19. IL also enable users to spot fake news and refrain from disseminating it.
- International organizations and associations such as the International Federation of Library Associations and Institutions (IFLA) should organize regular public webinars and press conferences that curb the spread of fake news on Covid-19 vaccines.
- Special libraries, especially those at health centres and research centres, can work extensively with medical professionals to enlighten their communities about the coronavirus vaccine via social media. They can provide access to databases, websites, e-books, e-journals and repositories to health workers, scientists and health agencies on Covid-19 vaccines.
- Public libraries can provide services to the public on coronavirus pandemics by providing current information and reliable resources for understanding and responding to the COVID-19 on their websites.

7. Recommendation

The identified tactics to curb the spread of fake news on the Covid-19 vaccine requires financing. The government and parent institutions to libraries should provide adequate finances to implement the identified tactics effectively.

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A Survey of Library Services Provision in Kenyan Universities during the Covid-19 Pandemic

By Mugambi Frankline – Gretsa University

Abstract

The purpose of this study was to document measures employed by Kenyan academic libraries in the provision of library services during the COVID-19 pandemic, noting the challenges and issues inherent in providing substantial services while physically closed. The study employed a descriptive survey research design and website investigation for data collection. The survey data collection was conducted between 15th May 2020 and 15th June 2020. In the research findings review, The study found that most of the surveyed libraries released timely COVID-19 information. To support users' learning and research during the pandemic academic libraries in Kenya shifted their services and content to electronic platforms with varying degrees of success. A majority actively worked with resource providers such as Emerald, IEEE, EBSCO, and Science Direct to remotely avail the subscribed and high-quality electronic resources through off-campus access. It summarized and provided links to accessible and open-access scholarly databases such as Pubmed. The study recommends academic libraries build capacity to enable the timely provision of information and services in a public emergency.

Keywords: Academic Libraries, COVID-19 pandemic, Library Services

1. Introduction

The year 2019 will remain a remarkable error in human history, with the coronavirus (COVID-19) outbreak in China, and eventually spread to the rest of the world, becoming a pandemic (Jena, 2020). The pandemic has impacted virtually every aspect of our daily life (Nicola, et al., 2020). To mitigate the spread of COVID-19, governments worldwide banned public gatherings, closed learning institutions, and places of worship, while others implemented partial or complete lockdowns (Morens, et al., 2020). Consequently, academic libraries were entirely or partially closed.

In Kenya, the first case of COVID- 19 was registered on 12th March 2020 (Kenya Ministry of Health, 2020). Immediately after that, to mitigate the spread of the disease, the Government banned all public gatherings and directed all learning institutions to be closed. Owing to the uncertainty on how long the pandemic would last, many universities reinvented themselves by shifting to e-learning platforms for teaching, examination, and research (Mbae, 2020).

In support of e-learning, academic libraries were forced to provide virtual services such as information resources in the form of e-books and e-journals, and chart reference services, among others (Jana & Rout, 2021). In more than three decades, academic libraries have been building digital content in the form of institutional repositories, creating awareness of electronic resources, providing

information literacy skills, and training librarians in the wake of Distance Learning and increased cloud-based systems (Owusu-Ansah et al. 2019). Therefore, offering virtual services was not new for many academic libraries. This study surveyed 73 Kenyan academic libraries to determine how they changed their library services in response to the COVID-19 pandemic. It also provided a reference for academic libraries worldwide in response to significant public health emergencies.

1.1 The Role of Academic Libraries in Universities

Traditionally, the academic library's role includes selection, acquisition, classification, cataloging, archiving, and supporting users with free and equal access to information resources. However, in the contemporary world, the role has shifted to supporting new services: scholarly communication, intensive delivery of digital resources to heterogeneous students, ICT-based and distance learning modes, and continuous demand for traditional services (Hossain, 2019).

The library offers resources that support critical and creative thinking to make learning more productive. Another library's role is to provide textbooks, reference sources, and current research work to students, faculty, and researchers (Bhagvanhai, 2018).

Libraries also have an emerging role in data curation and e-science. The process of curating is no longer painstaking, and by use of computers, academic libraries can collect, curate and disseminate vast volumes of scientific data promptly (Bryan, 2011). Academic libraries also have the responsibility of developing information literacy programs for their clients. Skills acquired through information literacy enable students to become lifelong learners (Hassan, & Mansor, 2009).

1.2 The role of Libraries in Public Emergencies

Libraries are critical information hubs at a community level that provide the community with ports of the public workplace, learning, and even leisure (Young, 2018). The libraries become more significant during and in the aftermath of a disaster. Individuals are trying to understand the disaster and cope with the disruptions brought by the disaster. Libraries become a central point of access to reliable information. Information services are essential for disenfranchised individuals who might have experienced significant disruptions such as loss of personal equipment such as laptops and smartphones during the disaster (Kosciejew, 2020).

2. Objective

To examine the library services provided during COVID -19 period by Academic Libraries in Kenya.

3. Methodology

The study employed a descriptive survey research design and website investigation for data collection. The survey period was between 15th May 2020 and 15th June 2020. First, the researcher visited the official websites of the 73 academic libraries in Kenya using a computer to find out the library services provided during the COVID-19 pandemic. A pre-designed questionnaire was used where the researcher recorded each library service being offered by each of the 73 academic libraries. Finally, the researcher corresponded with the studied libraries using online chart services or phone calls to ensure the validity of the survey data. Data analyses were done using descriptive statistics.

4. Results and Discussions

Most of the surveyed libraries released COVID-19 information timely; of the 73 libraries, 84% of them released COVID-19 information on their websites. 66 (91%) of the academic libraries gave temporary physical closure a few days after 15th March 2020, when the Kenyan Government announced the closure of learning institutions. Two libraries had a dedicated "COVID-19 Prevention and Response" column on their websites.

Information dissemination is one of the critical library services; it involves providing information services to library patrons. Libraries usually employ two strategies to disseminate information; one of these is Selective Dissemination of Information. In this strategy, information is sorted out, and library users receive only relevant information (Okike, 2020). In the second strategy, libraries use the Current Awareness Service. This strategy entails providing the library users or the public with information on the latest developments in a specific subject or a subject of general interest (Fourie, 2003).

In any crisis, such as war, pandemic, or disaster, libraries have a role to play in ensuring that library users and the general public have continuous access to reliable information to avoid misinformation and fake news (Okike, 2020). According to Benecke et al. (2020), the roles of librarians and information specialists in a pandemic are to promote health awareness by creating and disseminating information relating to preventive measures; support research teams, researchers, and faculty by providing information regarding the latest developments, research and literature; and meeting the core needs of regular library users.

From the research findings, it is evident that Kenyan academic libraries actively informed the public on new developments in the COVID-19 pandemic by providing timely authoritative information to promote health awareness. However, 10 (14%) of the academic library's websites did not publish any information about COVID-19, which indicates that they did not pay enough attention to the information needs of their users and those of the public.

The study's findings agree with those of a similar study carried out in Nigeria by Omeluzor et al. (2021). On the dissemination of information in the COVID-19 era by university libraries which found out that 98 % of the university libraries in Nigeria disseminated information on personal hygiene (hand-washing, cleanliness, and use of hand sanitizers) to library users and the general public during the COVID-19 pandemic.

Another finding of this study was 66 (91%) of the academic libraries provided digital library services to their users. These services included: off-campus access guide, resources utilization guide, e-reference services, online renewal of borrowed physical books, digital repositories, access to past examination banks, and online information literacy sessions. The study found that 62(67%) academic libraries actively worked with resource providers: Emerald, IEEE, EBSCO, and Science Direct, to avail the subscribed high-quality electronic resources remotely through off-campus access. This strategy made faculty and students obtain suitable teaching and learning materials from home.

To support users' learning and research during the pandemic, many database providers launched free academic resources for a limited time. To enhance access to this quality information, 34(47%)

of academic libraries summarized and provided links to free and open-access scholarly databases such as Pubmed. A similar study carried out in China by Guo et al. (2020) on the provision of patron services in Chinese academic libraries during the COVID-19 pandemic; found out that 80% of the 137 surveyed academic libraries had put in place a mechanism for off-campus access to subscribed electronic resources within two weeks after the lockdown.

During the COVID-19 pandemic, the libraries were closed, and suspended the book circulation service. One of the key findings of this study is that; 71% of the libraries stated that borrowed books are not counted as overdue during the closing period, which relieved patrons' concerns about borrowed books being overdue. Interestingly 12(16%) academic libraries still provided print materials services during the COVID-19 pandemic through non-contact delivery methods. For example, in Gretsa University library, when a client needed to borrow a book, the client was required to submit a request online. After which, the librarian would retrieve the book, issue it to the user and place it at the library security office for the patron or courier service to pick.

5. Conclusion and Recommendations

5.1 Conclusion

The research findings show that Kenyan academic libraries actively responded to Covid 19 pandemic. They continuously updated the library services on offer, and libraries used websites to provide users with emergency information services on Covid 19 and prevention measures. The study findings have also demonstrated that libraries can provide credible sources to avoid rumors and educate the public in times of public health emergency.

5.2 Recommendations

1. After learning of public health emergencies, libraries should immediately start the emergency plan and ensure that they promptly avail relevant authoritative information.
2. Libraries should also ensure that all electronic resources and services are accessible off-campus.

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CLUSTER 2

Sub-Theme 3: Hospitality and Tourism Management &
Sub-Theme 4: Business

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Risk Transfer Strategy and Competitiveness of Small and Medium Enterprises in Kenya

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Abstract

The purpose of the study was to the influence of risk transfer strategies and competitiveness of small and medium enterprises in Kenya. Specifically, the study sought; to determine the influence of adoption of outsourcing, contract with stakeholders and uptake of insurance policies on competitiveness of Small and Medium Enterprises (SMEs) in Kenya. Risk transfer strategy for this study was viewed as the contractual shifting of a pure threat from one party to another. The existing literature showed that research has been done on risk management. However, very few studies were done on risk management and competitiveness of SMEs in Kenya having in mind the scope of Kisumu County and specifically the risk transfer strategy. Therefore, the study sought to address this gap. The success of an organization depends upon the risk management strategies put in place. The strategies adopted can reduce earnings volatility, maximizes value for shareholders and promotes job security and financial security in the SMEs. This study adopted a descriptive research design. The target population was SMEs registered by the County Government City of Kisumu, with the category permit fee of between Ksh 5000 and Ksh 200,000 as of December 2018 and employing between 1 to 99 employees. Stratified random sampling was used then simple random sampling was used to pick a total sample of 375 respondents from each stratum. The study achieved 78% response rate. The study used linear regression model to establish the relationship between risk transfer strategy and competitiveness of SMEs in Kenya. The strata representation was selected using the proportional allocation method for each one in the target population to have an equal chance of participation. Tool for data collection was a standardized questionnaire. The study established that risk transfer has a significant influence on SMEs competitiveness yet very few SMEs indicated that they transfer risk through insurance.

Keywords: Risk, transfer strategies, Competitiveness

1. Introduction

Risk management is evolving and taking a center stage in how organizations run their businesses (KPMG Limited, 2017). Although risk is generally considered the possibility of outcomes deviating from what was expected, primarily firms are concerned with negative outcomes since their negatively affect the business operation and thus require proper management (Crouhy, Galai, & Mark, 2013).

Therefore, it is important for a business to manage its risk exposure. Particularly, SMEs competitiveness is handicapped by inadequacies in risk management with lack of appropriate response to risk facts affecting small firms more compared to large firms (Şenera, Savrulb, & Aydına, 2014). Firms develop strategies to enable them to seize strategic initiatives and maintain a competitive edge in the market (Porter, 2007). The Scope of the study was Kisumu County. This was guided by the fact that, Kisumu County is one of the Kenya's 47 counties. Specifically, Kisumu County is mainly volatile to political challenges. Small Medium Enterprises (SME) in Kisumu have been hard hit with political stalemate in the region with most of them getting to the brink of dying (Juma, 2019).Juma in his report further noted that some of the SMEs had closed for 4 months as political temperature continued to mount in 2017. The study hypothesized that different business environments expose firms to risks and the firms therefore need different strategies which have different requirements for success. SMEs in Kenya has faced a number of challenges and has used a number of strategies including risk transfer strategy to enable them survive in the competitive environment. It is due to these that the study evaluated influence of risk transfer strategy on SMEs competitiveness in Kenya. The findings will help SMEs in Kenya to assess their current and future strategic positions, identify critical factors and find methods of assuring success (Kithinji, 2012).

2. Problem Statement

Engaging in risk management strategies approach to SMEs competitiveness requires a certain budget and human resource. This hampers SMEs ability to set up and invest in a comprehensive risk management program. This is so as SMEs are characterized with scarcity of resources-both financial and human resources. SMEs therefore have little option left and as a result, they have to absorb most uncertainties and risks confronting them. However, they are unable to absorb most of these uncertainties and risks. According to the Kenya agribusiness and agroindustry alliance report for 2016, in 2014, 80 percent of jobs created were dominated by these enterprises. Despite their significance, SMEs in Kenya are faced with the threat of failure with past statistics indicating that three out of five fails within the first few months and two thirds of SMEs fail within the first few years of operation (Ng'ang'a, Muthus, & Nassiuma, 2015). The SMEs however continue to grow and has attracted both local and international into Kenya. In the Kenyan economy, various studies have been done on risk management strategies across various contexts and sectors with limited focus on risk transfer strategy and SMEs based in Kisumu. In his study, Elahi (2013) focused on risk faced and mitigation strategies employed by SMEs in Nairobi, Kenya. Muchiti, (2021) in her study, focused only on risk management strategies adopted in lending to SMEs in Kenya.In his study, Spikin (2013) states that the increasing volatilty and competition which organizations have faced in this era, have forced them to implement at least some level of risk management.He continues to state in the same study that risk management is not only an instrument to prevent organization damaging events but a force to see opportunities.Since risk transfer strategy is influences firm's economic success, this study sought to investigate risk transfer strategy and SMEs competitiveness in Kisumu County, Kenya.

3. Research Objectives

General Objective:

The general objective of this study was to evaluate the influence of risk transfer strategies and competitiveness of small and medium enterprises in Kenya

Specific Objectives:
Specifically, the study sought; to determine the influence of adoption of outsourcing, contract with stakeholders and uptake of insurance policies on competitiveness of Small and Medium Enterprises (SMEs) in Kenya.

4. Rationale of The Study

This study will be of importance to the SMEs as it brings out the role of adoption of outsourcing, contract with stakeholders and uptake of insurance policies on competitiveness of SMEs. The results of this study will also be valuable to policy makers as it provides empirical evidence to direct policy formulation and implementation. The results of the study will also be useful to researchers and academicians as it acts as source of reference for future studies.

5. Literature Review

Risk Transfer Strategy
Risk transfer is a risk management and control strategy that involves the contractual shifting of a pure risk from one party to another. Risk control requires an organization to settle on choices to lessen and additionally acknowledge dangers. At this phase about the organization's convention, past therapeutic experience and writing survey the satisfactory dimension of hazard ought to be characterized which can be utilized as a threshold to raise a trigger. Leaders utilize different processes, including advantage cost examination, for understanding the ideal dimension of hazard control and in the long run choose to either hold or exchange the risk. Incorporating danger move systems into your choice hazard plan will decrease the probability and seriousness of disappointments amid the recuperation process (Waldron, 2010). The hazard procedure involves, Risk identification. Assessment and hazard displaying are an intricate movement that requires multidisciplinary approaches in various parts of science or learning of the financial, mechanical, sociological, or political. Hazard evaluation results and achievement systems conclusively impact choices taken at full scale and micro (Florescu, Barabaş, & Barabaş, 2015).

In this context risk, can be looked at as a hazard which an organization needs to exchange for competitiveness. This exchange involves a broad and control technique that includes the legally binding moving of an unadulterated hazard starting with one gathering then onto the next. To realize what needs to be contracted to the third party, organizations need to carry out an assessment. After the effective distinctive confirmation that indeed threats exist in the and before the significance of alleviation exercises, it is first essential to perceive the risks that genuinely matter and to develop needs (Food and Agriculture Organization of the United Nations, 2013).This can be achieved through an examination stage that ought to be assessed to approve if the dangers are recognized according to the criteria that have been setup by the different organizations. The underlying advance is to evidently understand the methods and results which really matter with an explicit true objective to achieve organizational goals.

In identifying the best transfer strategy, Organizations need to assess the distinctive portfolios accessible before settling on the choice on which to put resources into. Portfolio theory is the formalization of risk management from a modernistic empirical approach. In the context of this study, risk transfer

strategy was guided by the portfolio theory. Portfolio theory encourages asset diversification to hedge against market risk as well as risk that is unique to a specific organization (Omisore, Munirat, & Nwufo, 2012). The theory is an extension of the old sayings 'don't put all your eggs in one basket'. It explains the risk reducing effect of spreading investment across a range of financial assets. Markowitz hypothesis breaks down different portfolio resources and dangers required before settling on the correct portfolio. This will help SMEs in understanding the choices available in the marketplace as they choose to transfer risk to a third party and the return rate thus enable SMEs make an informed and settle on the best available strategy to incorporate for SMEs competitiveness.

To make the best choice organizations undertakings depend on various factors including managerial and stakeholder involvement in decision making. Various strategies are available to organizations including contractual risk transfer. Contractual risk transfer is the ability to transfer a risk/loss from one party to another party through the language written in a contract. This may include exchanging internal activity of express creation to an outer gathering, or gatherings. The reason could be that the venture does not have required procedure, required foundation, individuals and aptitudes, innovation, and measurements capacities to suitably convey the action yet the other party has the muscle to do so (Mweru & Muya, 2015). Contracting/redistributing is one of the hazard exchange strategies that enables associations to use an incentive from for all intents and purposes anyplace in the world (Fang, 2016).

In straightforward terms, an organization may protect it is representatives from damage if this is true, if a specialist is harmed, the insurance agency pays the expense. In the event that the organizational structure is protected against flame and a structure burns to the ground, the insurance agency pays to supplant it. Insurance agencies charge an expense, or a protection premium, for tolerating this hazard. Furthermore, there are deductibles, stores, reinsurance and other money related understandings that alter the monetary hazard the insurance agency expects. Hazard exchange can likewise be practiced through non-protection understandings, for example, contracts (Aolin, Guangyuan, & Weiguo, 2015).

6. Research Methodology

The study adopted a descriptive research design. The target population was the 16,164 SMEs registered at the Kisumu County paying trading licence of between Ksh 5,000 and 200,000 and employing employees between 1 -99. This study collected quantitative data from sample 293 SMEs using a self-administered questionnaire with a five-point Likert scaled questions. A pilot study was conducted on 40 SMEs in Kisumu County in Kenya. The purpose of the pilot testing was to establish the validity and reliability of the research instruments (Mugenda & Mugenda 2008). According to Cooper and Schindler (2011), as a rule of thumb, 1% of the sample should constitute the pilot test. Thus, the pilot test was within the recommendations. A construct composite reliability co-efficient (Cronbach alpha) was used to determine reliability. Makgosa (2006) notes that Cronbach‟s Alpha of less than 0.5 indicates unreliability of the variables hence cannot be used to deduce findings. Cronbach alpha of 0.6 or above, for all the constructs, was considered adequate for this study. Overall Cronbach‟s alpha test for dependent and independent variable was (0.929). While alpha values for the individual variables were between (0.732) and (0.855) which registered acceptability. Validity was tested using factor loadings with Varimax rotations to identify the test items which belonged together and seem to say the same thing. The advantage of which is to ensure that the finding conclusions are focused. The

criterion for element inclusion was that only those which had factor loadings of 0.50 and above were considered (Makgosa, 2006). Since all the factors scored above 0.5 for the two components under each individual independent variable, the items were considered valid for evaluation based on the different components. Data collected was analyzed by descriptive analysis. In addition, the researcher conducted a multiple regression analysis.

7. Results and Discussions

The study achieved a 78% response rate with most of the respondents being male [58%]. Majority of the respondents [37%] had university education level as their highest education. The respondents were either SMEs owners or senior managers in the organization's that responded.

Risk Transfer Strategy

The objective of the research study was to analyze the influence of risk transfer strategy and competitiveness of SMEs in Kenya.

Types of Insurance Policies

The respondents were asked to indicate whether their companies took up insurance policies as part of competitive in the dynamic business environment. The results were as shown in Table 4.4

Table 4.4: ***Insurance Policies***

Insurance Policy	Percentage (%)
Goods	25%
Fire	9%
Terror	2%
Automobile	0%
Data Breach	3%
Officers Insurance	19%
General Liability	25%
Business Interruption	1%
Cyber Risk	1%
Professional Liability	1%
Product Liability	6%
Work man injury	9%
None	39%

Source: Survey Data (2021)

Outsourced Services

The respondents were asked to indicate whether their companies outsource services as part of competitiveness. The results were as shown in Table 4.5

Table 4.5: ***Outsourced Services***

Outsource Services	Percentage (%)
Supplies	37%
Administration	8%
Customer Service	20%
Accounting/Finance	28%
Marketing	29%
Operations	4%
Human Resources	0%
None	14%

Source: Survey Data (2021)

Portfolio Risk Assessment

The respondents were asked to indicate whether their companies took part in portfolio risk assessment. The results were as shown in Figure 4.9.

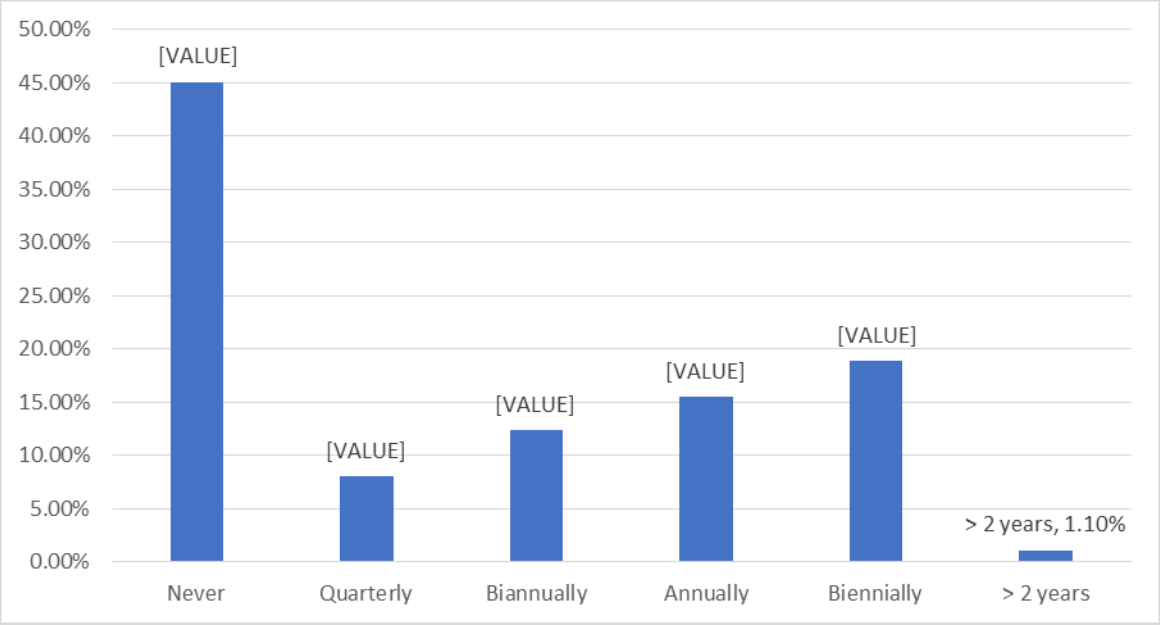

Figure 4.9: **Frequency of portfolio risk Assessment**
Source: Survey Data (2021)

Risk Transfer and Competiveness

The findings show that risk transfer strategy significantly predicted sustainable competitive advantage (B_1=0.350, p<.05). The regression results further indicated that considered individually, risk transfer strategy explained 29.6% variance in sustainable competitive advantage (adjusted R^2 = 0.296, F (1, 291) = 123.99, p<.001).

Table 4.6: Model for Hypothesis Testing

Model Summary				**Number of obs**	=	**292**
Source	SS	df	MS	F(1,291)	=	123.995
Model	44.131	1	44.131	Prb > F	=	0.0000
Residual	103.570	291	.356	R-Squared	=	0.299
Total	147.701	292		Adjusted R-Squared	=	0.296
				Std Err. Estimate	=	0.597
SCA	Coefficient	Std. Err.	t	P>|t|	[95% Conf. Interval]	
_cons	2.050	.116	17.648	.000	1.821	2.278
Transfer	.350	.031	11.135	.000	.288	.412

From the regression analysis results, the predicted model is as follows;

Y= 2.05 + 0.350 x Risk Transfer Strategy + ε

8. Conclusion

The study confirms that risk transfer has a significant influence on SMEs competitiveness yet very few SMEs indicated that they transfer risk through insurance.

9. Recommendation

The study recommends that they are encouraged to take up insurance to grow their capital base in case of risk occurrence. Since the study focused only on Kisumu County other studies can be done in other counties and generalized to confirm the study.

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COVID-19 Effects on Reverse Logistics In Kenya

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Abstract

The adverse effects of the COVID-19 pandemic are widely visible in the economic structure, while the principal feature is the disruption of the supply chain process that leads the economies into a global depression. The purpose of this article is to show how COVID-19 has influenced reverse logistics that influence the global sustainable supply chain, specifically here in Kenya. This article consolidates related research by offering an overarching systematic literature review that provides insights into the effects of COVID-19 on reverse logistics in Kenya. The publication also outlines challenges influencing reverse logistics and insights on mitigating the challenges brought on by the impact of the pandemic.

Key Words: Reverse logistics, COVID-19, Supply Chain Disruptions, e-commerce, and Supply Chain Sustainability

1. Introduction

Reverse logistics is termed as the flow of surplus or unwanted material, goods, or equipment back to the organization through its logistics chain, for reuse, recycling, or disposal (Gupta, 2019). In other terms, reverse logistics is the management of any type of return from any customer with a specific purpose. Products can be returned from any player within the supply chain or end-user for different reasons (Waqas, Dong, Ahmad, Zhu & Nadeem, 2018). Also, reverse logistics have been defined as that part of the supply chain that plans, implements and controls the efficient, effective reverse flow and storage of goods, services and related information between the point of consumption to meet customer requirements. Paras and Pal (2020) define reverse logistics as the planning, implementing and controlling the efficient, cost-effective flow of raw materials, in-process inventory, finished goods and related information from the point of consumption to the point of origin to capture value or proper disposal.

The major reasons leading to the emergence of reverse logistics are poor product quality, increased use of environmentally conscious policies among manufacturing firms, product variety causing a rapid shift in consumer tastes and preferences, more products being purchased over the internet and shortened product life cycles (Ravi & Shankar, 2015). There are various reverse logistics implementation approaches which include; outsourcing, collaborations, adopting green strategies, or using a product-life cycle perspective to implement reverse logistics. Outsourcing has been associated with encouraging organizations to remain focused on their key competencies. It also allows firms to share risks with third parties and improve flexibility (Hsu, Tan & Zailani, 2016). Collaborations facilitate reverse logistics integration among supply chain members in the industry through associations.

Reverse logistics is the process of retrieving the product from the end consumer to capture value or proper disposal. Activities include collection, combined inspection/ selection/sorting, re-processing/ direct recovery, redistribution, and disposal. Management of wastes in the outbound function such as reverse logistics and waste exchange can lead to cost savings and enhanced competitiveness. Increased globalization has greatly increased competition and this has brought about growing demand flexibility and cost-efficient systems by companies. Through the management of wastes in reverse logistics and waste exchange, companies can enhance their competitiveness as their environmental efficiency is enhanced (Prakash & Barua, 2015).

Traditional logistics operations differ from reverse logistics activities. Reverse logistics networks share several common characteristics, such as the need for two markets to coordinate, supply unpredictability, returns disposition decisions, procrastination, and speculation. The practices of reverse logistics differ from one industry to the next. Returns account for a bigger part of operating costs in industries with superior reverse logistics systems and procedures. Organizations must work with the government, suppliers, consumers, and even rivals to enhance their environmental supply chain performance. For companies to close the supply chain loop, collaboration with suppliers and consumers has become critical.

1.1 Rise and Adoption of Reverse Logistics

The term Reverse Logistics (RL) was first published by James R. Stock by the Council of Logistics Management in 1992 (Bouzon et al., 2015). It is the process of backward flow of moving goods to capture value, proper disposal, remanufacturing, and refurbishing activities. Reverse Logistics (RL) is an emerging trend in Supply Chain Management to gain more competitive advantage in terms of their value, profitability, sustainability and provide an additional advantage in any type of industry, Reverse Logistics can be applied in the industrial practice under logistics management. This concept mainly focuses on the recovery of the product through 3R (Reuse, Remanufacturing and Recycle) concepts (Sathiyagothai & Saravanan, 2017).

Traditionally, the product flow in a distribution channel happens from the industry towards the final consumer. However, some factors such as defective products, or damages, expired dates, order errors, among others, cause a flow in the opposite sense which generate the need for a logistics operation called reverse logistics (Somuyiwa & Adebayo, 2014) as well as the minimization of the consequences on the environment that is environmental logistics. According to Pei and Paswan (2018) customer returns due to buyer's remorse or defects, are generally the largest category of returns. Key reasons for customer returns include; defective/unwanted products, liberal return policies/customer dissatisfaction, incorrect products, warranty returns and damaged products.

According to Govindan and Bouzon (2018), environmentally friendly practices and the need to maintain sustainable development are important aspects of the debate surrounding reverse logistics. By not embracing sustainability, organizations face consequences in terms of increased economic and social liability. Sustainable development embraces the "triple bottom line" philosophy of not compromising the future needs of society, the economy and the environment. Reverse Logistics is an issue that has received growing attention, above all, in the last decade, given the confluence of several situations. Reverse logistics is becoming a key initiative today, this is due to several factors for example, of all the products sold, an average of eight to twelve percent is returned (Nyarega, 2015).

In Kenya, the development of the practice of reverse logistics has been relatively low with only a limited number of industries having tried it. However, increased global warming and environmental degradation, it has caused concerns for governments, societies and business organizations all over the world. The competitive business environments have led to a short product life cycle for many consumer goods. This has led to complex environmental challenges especially in developing countries like Kenya. However, in the past decade, business organizations, governments, regulatory institutions and researchers/scholars alike have become increasingly interested in how business operations are impacting the environment, society and economy in general. Environmental regulations have pushed companies to be more responsible and accountable for environmental effects which take place from their day-to-day operations even after product sales. Managers in the various sector firms in Kenya have begun to recognize the need to be environmentally accountable for their activities.

Various studies have proved that organizations that have embraced reverse logistics as an opportunity for enhanced business tend to prosper through customer support and the ultimate issue for profitability. According to Obisa and Josphat (2014), the adoption of RL in Kenya Power has enabled efficient use of materials and reduced overall costs. This has also contributed to additional revenue for the company, improved the working environment and enhanced the company image through disposal and cleaning. Also, Wainaina (2014) noted that Kenyan manufacturing companies have adopted reverse logistics practices to achieve reduced costs in their operations: purchasing costs of raw materials, holding costs, transport costs and stockout costs. This is a clear indication that reverse logistics operations in a supply chain may therefore be considered as an introduction to innovative services of an organization's portfolio, and this may have an important impact on an organization's strategic performance in terms of market effectiveness, as well as, internal cost efficiency.

According to Omwenga (2019), reverse logistics operations in a supply chain are considered as an introduction to innovative services of an organization's portfolio. This may have a significant influence on an organization's strategic performance in terms of market effectiveness, as well as, internal cost efficiency hence an enhanced competitive position. Their findings showed that reverse logistics significantly contributed to profitability. Consumers' satisfaction with green reverse logistics leads to increased levels of loyalty to the firm.

Chege, Ngui and Kimuyu (2014) posit that the Kenyan manufacturing sector has remained an important contributor to the Kenyan economy. The sector is predominantly agro-processing, with the manufacture of food, tobacco, beverages, and textile accounting for over 34.0% of total sectoral value-added. This is in contrast to newly industrialized countries where their food manufacturing sector constitutes only a small share. Manufacturing firms are perceived to play an important role in the implementation of sustainable options. This requires a comprehensive means to reduce pollution through identification and eliminating the sources of pollution at every stage of the product life cycle including raw material extraction, transportation, manufacturing, product use, recycling, and disposal. In this case, reverse logistics "closes the loop" of a typical forward supply chain and includes reuse, remanufacturing, and/or recycling of materials into new materials or other products with a value in the marketplace. When suppliers are encouraged to take back packaging materials it is a form of reverse logistics that is capable of greening the supply chain and this reduces the number of packaging materials that enter into the waste system (Anne, Nicholas, Ithinji & Bula, 2016).

2. Impact of COVID-19 on logistics systems and disruptions in supply chain

As retailers navigate operationally and supply chain disruption exacerbated by COVID-19, new reverse logistics challenges emerge, and traditional pain points intensify. In the current world, with a dramatic increase in online purchasing and returns, return rates could increase to as high as 30%, especially when only online channels are operational. A high impact of the COVID-19 outbreaks on supply chain and manufacturing operations and predicts the consequences of the global supply chain during the second quarter of 2020 (Haren Simchi-Levi, 2020). On the other hand, Hobbs (2020) points out that lockdown gives rise to a shortage of labour force and logistics disruptions eventually resulted in supply-side shocks to the food supply chain. According to the author, numerous challenges are faced in a pandemic and strict lockdown period by public distribution system networks at both operational and transportation levels due to travel restrictions and labour shortages. Moreover, it brings a sudden surge in the demand-side of food supply chains due to the panic buying and hoarding behavior of the people. Lockdown resembles an essential decision in the short run to slow down the growth of infection and restrict in a local transmission rather than community spread. Besides it, lockdown severely crippled the economy and carries the world at a screeching halt scenario.

Further, Sarkis (2020) assessed supply chain sustainability amid the COVID-19 pandemic. The research aimed to provide research guidance for investigating sustainability in supply chains in a post-COVID-19 environment. From the study results, COVID-19 pandemic events and responses were unprecedented to modern operations and supply chains. The study further established that short-term environmental sustainability gains occur, while long-term effects are still uncertain and require research. Sustainability and resilience are complements and jointly require investigation.

In China, Yu, Sun, Solvang and Zhao (2020) point out that the outbreak of an epidemic disease poses a significant threat to human beings and may further lead to a global crisis. The authors further indicate that to control the spread of an epidemic, the effective management of rapidly increased medical waste through establishing a temporary reverse logistics system is of vital importance. From the study findings, recommended that installing temporary incinerators may be an effective solution for managing the tremendous increase of medical waste during the COVID-19 outbreak in Wuhan, but the location selection of these temporary incinerators is of significant importance. However, the study established that due to the limitation on available information at the present stage, more real-world information was required to assess the effectiveness of the current solution.

All sectors are connected through a complex network of supply chains and logistics, but hardly any activities were evidenced during the COVID-19 pandemic. Singh, Kumar, Panchal and Tiwari (2021) established that the COVID-19 outbreak led to the suspension of logistic activities. This in turn influences the demand and supply of various products as a result of restrictions imposed on retailers. According to their study findings, difficulties have been increased in matching supply and demand in a vast network of public distribution systems due to the changing scenarios with the growth of infected cases and recovery.

According to Arunmozhi, Kiran Kumar and Srinivasa (2021), the COVID-19 pandemic outbreak is an exceptional shock to global supply chain management. From the findings, it was clear that firms should be prepared for sudden hazards, disasters and emergency conditions for the seamless running

of the supply chain. Firms should be proactive and face the challenge by planning and introducing new methods and technologies. Also, the study established that the outbreak of COVID-19 helped in the adoption and incenting new strategies to be faced in the future without breaking the supply chain.

3. Research Methodology

A systematic literature review of studies is conducted. According to Linnenluecke, Marrone and Singh (2020), literature reviews play an essential role in academic research to gather existing knowledge to examine the state of a field. A systematic literature review as indicated by Dewey and Drahota (2016), identifies, selects and critically appraises research to answer a formulated question. Further, the two scholars argue that systematic review should follow a clearly defined protocol or plan where the criteria are clearly stated before the review is conducted. On the other hand, Lame (2019) posits that systematic literature reviews are a way of synthesizing scientific evidence to answer a particular research question in a way that is transparent while seeking to include all published evidence on the topic and appraising the quality of this evidence.

In this article, the papers were analyzed with a particular focus on their definition of reverse logistics, rise and adoption of reverse, challenges affecting the reverse logistics and the effect of Covid-19 on reverse logistics. The screening of the studies was conducted by the researcher. The first round of screening was based on titles and abstracts. Further, the researcher conducted a second round of screening where full-text articles and journals were reviewed for selected studies. After screening of titles, abstracts and full-text articles, all the sources combined, the researcher identified a total of twenty-nine studies were identified, including seven duplicates that we later excluded. The search for the documents was done in Google Scholar, ProQuest, EBSCOhost and different universities' online libraries. The researcher limited the publication date between 2013 and 2022 (articles published in the past 9 years). This was done to build the review in the recent literature considering information retrieval and synthesis in the digital age.

4. Challenges Affecting Reverse Logistics

The implementation of reverse logistics is necessary to achieve the goals of sustainable development which focus on both environmental and economic goals. The increase in awareness of environmental issues and the benefit of recycling places more pressure on companies to create a better reverse logistics strategy. Firms that comply with regulations and stress environmental protection have been able to achieve good goodwill or corporate citizenship among their customers. However, even with all the benefits associated with the implementation of reverse logistics, numerous challenges have been associated with reverse logistics. Mogaka (2015) notes that reverse logistics differ from forwarding logistics hence posing challenges to many companies on how to handle product returns and recalls.

A study by Hall, Huscroft, Hazen and Hanna (2013) indicates there are various barriers, both internal and external that could impede reverse logistics activities. The internal barriers included lack of expertise, lack of top management commitment, absence of informational and technological systems and high costs in financial and human resources; the external barriers included the reluctance of the government, customers, social actors, competitors and the perception of a poorer quality product.

In Canada, Biswas and Abdul-Kader (2018) outline a few major noteworthy features of Reverse Logistics in e-commerce, which are slow processes to recover value and poor predictability. Also, Biswas et al., (2018) point out that in comparison to forward logistics, Reverse Logistics has multiple beginning points. A more general study on over one hundred Singapore-based companies identified six key barriers to reverse logistics implementation: legal issues, competitive issues, financial constraints, lack of sufficient information systems, low commitment from management and human resource efficiencies (Hosseini, Rameezdeen, Chileshe & Lehmann, 2015).

Another research on e-commerce by Landin and Harrysson (2015) in UK and Germany and established that cost of return to the distribution center is much higher as compared to dropping at the store. However, the German market is not popular due to credit issues. Some of the limitations encountered include; reselling the same products was difficult. Also, there were some system issues, such as, the receipt copy did not have the price of a few return goods bought online and therefore, the collector used to have a hard time determining price, by making a call to the call center.

Govindan, Soleimani, and Kannan (2015) state in their review that reverse logistics management is considered as playing a vital role in practically every area of supply chain management. However, it faces many obstacles, including high rates of product and brand depreciation, which affects the return period. It also cuts down on the time it takes to recondition and repackage the Company's goods. Many organizations, according to Tatek (2015), have weak or missing feedback systems, resulting in incompetence in reverse logistics without tracking the true difficulties influencing reverse logistics.

There are also many ways for returning the merchandise, resulting in pricing differences.

The retailer-manufacturer dispute has a significant impact on reverse logistics. There is currently no structure in place for reverse logistics practices. The following are some of the most common points of contention between the retailer and the manufacturer: product condition or status, value evaluation of the item/products, and response time. When a merchant returns a product to the manufacturer, the assumption is that it is in good shape, but this is not always the case because defects might emerge during transit. In other circumstances, suspicion may emerge because the manufacturer suspects that the return rights are being abused. The product value on the return must also be agreed upon, contrary to expectations, because the retailer may anticipate the initial product value for the return, whilst the manufacturer may not, resulting in a disagreement between the two (Uriarte-Miranda, et al., 2018).

5. Reverse logistics amid COVID-19

Reverse logistics is a vital part of the growing e-commerce sector and efficient management of returned goods is necessarily for e-retailers. Market estimation indicates that nearly 30% of purchased items on e-commerce platforms are returned. However, the Covid-19 pandemic brought new challenges in managing reverse logistics and market players needed to adopt all safety precautions and devised strategies to reduce the waste. With remote working as a new way of carrying out most of the businesses, the burden on IT adoption increased considerably. Reverse logistic firms needed to handle the influx of returned or replaced products during the pandemic.

Lockdown across many nations disrupted the reverse logistics chain. The majority of the consumers held back their products awaiting the reopening of the chains. This disruption ended up causing havoc once the chain began due to the easing of the lockdown restrictions. To effectively manage the overloaded returns, retailers needed to deploy the practices and technologies they deployed. Retailers and warehouses owners needed to deploy data-driven technology that could scan and assess their returned items.

In addition, Wang, Dang and Nguyen (2021), posits that there were concerns over disinfecting and cleaning of those items to prevent infection as it was established that the virus could live on surfaces for long. In warehouses, safety was made a priority for the employees. Safety guidelines and recommendations by the various governments were followed and procedures were laid down accordingly. Workers were also reallocated from stores to warehouses to handle the work efficiently. As many workers have been reluctant to return to work, retailers demonstrated safety precautions and educated workers on safety practices.

To summarize, e-commerce was already increasing rapidly each year, but COVID-19 forced it to accelerate even further. Brands and merchants who were behind in their online shopping offerings had no choice but to catch up, and given the pandemic's long-term effects (not to mention the behavioral shifts it prompted), the e-commerce advancements we've witnessed are here to stay. As a result, it makes sense for businesses to keep improving the customer experience they provide online buyers, particularly when it comes to returns.

6. Curbing the Challenges affecting Reverse Logistics

Returns put significant pressure on warehouse management. As reverse logistics is unpredictable, it complicates warehousing by making standard handling processes redundant or difficult to implement. This, in turn, leads to rising per-item processing costs. According to Landin et al., (2015), incentivize dropping at the store, improving the information technology system at the store, promoting pre-registration of the return good by the customer online and thereby reducing the gate-keeping time are some improvements which can bring down the total cost substantially.

Adoption of Reverse logistics management system is necessary to get visibility and control in your reverse supply chain. Companies must ensure end-to-end visibility of forward and reverse delivery processes to manage returns efficiently. Control over logistics processes is key when it comes to orchestrating returns and without complete visibility, it's impossible to gain control.

Another key option for companies to enhance returns management is to use digital control towers. On top of heterogeneous systems, a control tower can integrate data from all platforms, such as Customer Relationship Management (CRM), and transform it into a single pane of glass that supply chain stakeholders can utilize to understand every granular aspect of forward and reverse logistics. A control tower may be thought of as the sole source of truth required to make accurate and timely judgments. Companies may use digital control towers to drill down planning to the point where each order and return can be optimized individually. It also guarantees that supply chain stakeholders work together effectively and that everyone has access to the correct information at the right time.

In addition, machine learning-powered logistics solutions can sift through past data and spot patterns in transactions that include returns. Companies may better plan for returns by using past data on a customer's buying behavior and the quality of a specific product. Reverse logistics cannot be overlooked any longer and therefore the financial effect of returns should be closely studied by supply chain stakeholders across sectors (manufacturing and e-commerce) and how it might be exploited to improve customer experience. Businesses may benefit from an advanced logistics infrastructure combined with solid returns planning to become more competitive and profitable.

7. Conclusion

Reverse logistics as a research topic has evolved in the last three decades. Numerous studies have been carried out both in developed nations and developing nations. Reverse Logistics is not only an interesting issue for scholars but also for firms and professionals who are considering experiencing customer loyalty in full. Also, Reverse Logistics remains key to those taking these activities into account in their strategic process of decision-making in their businesses. It is essential to take into account reverse logistics because if handled correctly, it brings excellent benefits related to customer satisfaction, reduction on environmental impact, savings in production costs, allows us to offer a more competitive after-sales service, moderation of storage costs, generation of new sources of income, recovery of defective parts, among others. This review also concludes that to tackle reverse logistics difficulties in supply chains, it's critical to use the proper technology. The technological solution should be able to follow a product's entire route from the producer to its final destination, including after it has been returned by a consumer. Because there are so many complexities in managing reverse logistics with manual labor, it's better to employ sophisticated inventory management software that is set up to make client returns as simple as possible.

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Influence of COVID-19 Pandemic on Sustainable Marketing Strategies in selected Star-rated Hotels in Nakuru City, Kenya

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Abstract

The hotel industry is arguably one of those industries that were seriously affected by the COVID-19 outbreak. As the world is gradually recovering, hotels lag behind in the recovery process, owing to people's perceptions of safety and a new, more cautious behavior when purchasing non-essential goods, such as hotel products. A qualitative research was developed to assess sustainable marketing strategies for the industry and to estimate the influence of COVID-19 outbreak on consumer perceptions and purchasing behavior. The study utilized semi-structured interviews to collect data from six managers of selected star rated hotels within Nakuru City, Kenya. The results indicate that the COVID-19 pandemic has influenced consumer purchasing patterns and habits. Psychological factors, primarily the fear of contamination, affect consumers' willingness to travel and the conditions and preferences for hotel decisions. Hygiene and health conditions in the hotels influence consumer decisions. Confronted with a cautious clientele, hotel businesses should further enhance their hygiene conditions to restore confidence. Moreover, communication is essential to allay guests' fear and concerns. The findings of this study call for creativity and innovativeness in designing sustainable marketing strategies to ensure business continuity.

Keywords: COVID-19; hotels; sustainable marketing strategies; sustainability;

1. Introduction

The emergence of COVID-19 global health crisis has placed the hospitality industry in "a fight for survival" according to (Jiang & Wen, 2020). The stay at home orders and restrictions placed on travel issued by governments led to a sharp decline in hotel revenue and occupancies (Scott& Hall, 2020). However, the reopening procedure has gradually started; authorities have begun to ease limitations, such as, allowing dine-in restaurants to reopen at a decreased capacity through strict social distancing guidelines; and slowly decreasing restrictions on international and domestic travel (Tsai *et al..,* 2021). Effective strategies are necessary to boost travelers' confidence and to help businesses recover in a timely manner. The hotel industry's resilience and sustainability can be increased by encouraging diversification in consumption patterns, and thus transforming adversity into opportunity.

According to Wen *et al.,* (2020), health will be a crucial element in the recovery of the tourism and hospitality industry. The aftermath of the COVID-19 outbreak was residual fear of this pandemic and similar disease. Hotel-based health-care facilities can reassure guests in the event of an emergency

during travel. In the midst of the COVID-19 pandemic, many people have begun to reconsider their lifestyles and focus on physical and mental well-being. Considering this new consumer need, helping guests lead a healthy lifestyle could become a post-pandemic trend for hotels. This could take the form of, meditation programs, digital detox programs, fitness programs, healthy diet programs and sleep hygiene. Such programs are likely to become more popular in hotels' marketing mix.

Marketing strategy is a management discipline which focuses on the organization's mission, searches for unique opportunities, determines whether they fit the organization's strategic direction, defines the measures for success, and continually reassesses opportunities. The term competitive marketing strategies refer to both radical and incremental changes in thinking, things, and processes or in services (McAdam and McClelland, 2002). In many fields, something new must be substantially different to be innovative, not an insignificant change, in the arts, economics, business, and government policy (Throsby, 2010). In economics, the change must customer and/or producer value. Marketing strategies leading to increased productivity is the fundamental source of increasing wealth in an economy (Ireland et al. 2001). The competitive strategy provides a clear direction and focuses the effort of the entire organization on a common competitive strategies goal. Management needs to develop the strategy and communicate the role of competitive marketing strategies within a company; decide how to use technology and drive performance improvements through the use of appropriate performance indicators (Parmenter, 2015).

Due to global health crisis caused by COVID-19, travelers are now likely to pay more attention to the availability and quality of medical facilities, hygiene and safety issues when making travel decisions (Wen, 2020). This consumption need is especially pertinent for hotel properties in cities, particularly those receiving frequent convention businesses. Key areas to be addressed include how hoteliers design marketing communication content and tactics to showcase their abilities to protect guests from public health crises, assure guests of health and safety during their stay and make them feel more at ease (Hao et al. 2020).

It is important to strengthen knowledge in hospitality sector to help hotels become more resilient and achieve effective post-disaster recovery. Therefore, effective sustainable marketing strategies are necessary for boosting users' confidence and to support business recovery in a timely manner after this public health crisis. The hospitality industry's sustainability can be solidified by addressing diverse sustainable marketing strategies; green marketing orientations and taking phases to change adversity into opportunity (Ho, Tsai, Chen, & Lu, 2021). The need for examining consumer behavior during the COVID-19 outbreak and more specifically how consumers perceive hospitality firms' reactions to the pandemic and on this basis, the study explored sustainable marketing strategies in the COVID-19 pandemic in selected star-rated hotels within Nakuru city, Kenya.

1.1 Objective of the study

The study sought to assess the influence of COVID-19 pandemic on sustainable marketing strategies in selected Star-rated Hotels within Nakuru city, Kenya.

1.2 Research question

How has COVID-19 Pandemic influenced sustainable marketing strategies in selected Star-rated Hotels within Nakuru city, Kenya?

2. Literature Review

2.1 The Hospitality Industry and COVID-19 Pandemic

The COVID-19 pandemic has restricted interpersonal interaction, and many industries, including hotels and tourism, have been severely affected (Seyitoğlu & Ivanov, 2021). The uncertainty of economic recovery and the continuous spread of COVID-19 have caused millions of people to suddenly lose their jobs; the hospitality industry was one of the first industries to do so. Hospitality and tourism industries have been affected in a manner unseen in half a century (Baum, Mooney, Robinson & Solnet, 2020). Many hospitality businesses face existing global challenges (Sharma & Nicolau, 2020). Some of these are significantly detrimental to international hotel industry operations, including the long-term inflict of the COVID-19 pandemic (Filimonau, Derqui, & Matute, 2020). While the hospitality industry is slowly recovering, the COVID-19 crisis continues to exert profound impacts on how hospitality businesses operate. Hospitality businesses are expected to make substantial changes to their operations in the COVID-19 business environment in order to ensure employees' and customers' health and safety, and enhance customers' willingness to patronize their business (Gössling et al., 2020).

2.3 The Hotel industry and the COVID-19 Pandemic

The hotel industry is one of the sub-sectors that is heavily affected by the consequences of the COVID-19 pandemic. The effects are largely attributed to containment measures implemented to curb the spread of COVID-19 such as: the new norm of social distancing, which has reduced the hotel's holding capacity; suspension of international flights such that the number of foreign tourists has declined; new norm of working from home, which has reduced the demand for hotel services especially the restaurant and conferences services; daily curfew hours, which has reduced the number of working hours; partial lockdowns within the country, which has reduced inter-counties' tourists; and costly requirements for a COVID-19 compliance certificate to re-open businesses. These measures have slowed down the operations of the hotels and forced them to work under reduced capacity, or worse still close-down.

The contraction of the hotel industry was marked by a decline in the proportion of operational hotels during the COVID-19 pandemic period. For instance, operational hotels declined to 72 % in March 2020 and further to 35 % in May 2020 reflecting pressure on the industry due to COVID-19 measures. However, with the easing of COVID-19 measures and the opening of the economy in July 2020, the industry has been on a recovery journey, although slow until when a partial lockdown was announced in April 2021. On average, 97 % of the hotels were operating in January 2021 compared to 89 % in October 2020 and 71 % in July 2020. Despite the notable recovery until January 2021, the number of operational hotels is projected to have reduced further to below 97 % in March-April 2021 following the COVID-19 protocols for hotels in Nairobi, Kajiado, Machakos, Nakuru, and Kiambu to provide only takeaway services.

Despite the rebound in operating hotels, utilization of hotel facilities such as bed occupancy rate, restaurant services, and conference facilities has remained low. For instance, there was a decline in utilization of conference services from 60 % in February 2020 to 40 % in March 2020, when the

first case of COVID-19 was reported. This dropped further to an average of 6 % between April and June 2020. The contraction in the utilization of conference facilities prevailed to July 2020 when it began to grow marginally, rising to 17 % in November 2020. Similarly, both the utilization of restaurant services and bed occupancy rate declined from 66 % in February 2020 to 37 % in March 2020; and further to an average of 11 % between April and May 2020. The utilization of restaurant services and the bed occupancy rate registered negligible growth from July 2020 to 28 % and 22 % in November 2020, respectively. This implies that the tourism sector is unlikely to attain the projected hotel-room revenue growth rate of 12.1 % and 9.4 % in 2020 and 2021, respectively, as forecast by PricewaterhouseCoopers (PwC). A comparison of local and foreign clientele showed domination of local clients during the pandemic compared to pre-COVID-19 period when the difference between the local and foreign clients was marginal. The decline in the number of foreigners from 127,087 in January 2020 to an average of 6,080 between April and September 2020, 47,406 in December 2020, and 35,052 in February 2021 during the pandemic presents an opportunity for the hotel industry to re-think their business model, including enhancing their focus on the domestic market.

While hotel is one of the world's largest industries, hotel industry in Nakuru is one of the fastest growing forms of tourism, with a marked increase over the last decade. It represents one of the main sources of revenue for the county and regions. Meanwhile, many developing countries are planning for tourism to be the backbone of their future development prospects, (KTB 2011). However, a desire for economic profit from the tourism industry, if it is to be achieved at any cost, leads to a constant, often uncontrollable growth of tourism activity. In this context bringing tourism growth to a sustainable level, whilst enhancing the tourism product, attracting diversified clientele and upgrading the quality of the offer and services, are seen as priorities allowing for tourism development to satisfy both visitors and those who make a living out of it (Hall, 2010). The Rift valley region and Nakuru forms an important part of our nation's appeal as a world class tourism destination.

2.4 Theoretical framework: Stakeholder Theory

The study was guided by the Stakeholder theory. This theory is widely used in management in examining organizational environment, strategic management, ethical issues, and business planning process, e-government, project management and environment management (Mishra & Dwivedi, 2012). The core concept of the Stakeholder theory is that a corporation enables people to come together to create economic value. A stakeholder is an organization or person that affects, or is affected by, the corporation's purpose. A company's directors, managers, employees, shareholders, customers and vendors are its primary stakeholders. For many companies, other entities including governments, nonprofit organizations, communities and even competitors are also stakeholders. The Stakeholder theory challenges corporate leaders and small-business owners to rethink their usual approaches to management (Wilson & Post, (2013). It advocates managers shifting the primary focus of their businesses away from short-term profits and toward long-term success. In a business world defined by advancing globalization, economic uncertainty and increased concerns about corporate responsibility, the core principles of stakeholder theory can serve as a model for startups and help turn around failing companies. By recognizing their company's values and its relationships with stakeholders as critical to success, managers can achieve profits, motivate employees and benefit society (Hitt et al. 2011).

3. Research Methodology

The study adopted a descriptive research design to assess sustainable marketing strategies in selected Star-rated Hotels within Nakuru city, during the COVID-19 Pandemic. This design is used in preliminary studies to allow researchers to gather information, summarize, present and interpret for the purpose of clarification (Orodho, 2002). The study was conducted in Nakuru City. The city is home to a number of star hotels which made it ideal to conduct the study. The study targeted 40 star rated hotels, where a sample size of 6 marketing managers was used to represent the target population. The six marketing managers were purposively selected for the study. They were interviewed via over the phone with audio interviews recorded using audio recordings which were then transcribed .Important concepts and common themes in individual transcripts were identified In order to increase the likelihood of face validity, piloting was conducted to identify those items that could be misunderstood or misinterpreted. Those items found that needed adjustments were modified accordingly. The researcher compared the transcripts to observe the similarities and differences in answers.

4. Results and Discussion

4.1 Analysis of In-depth Interviews.

The study sought to understand how the hotel industry is ensuring customer interaction with the hotel so as to trigger an effect on the sense of trust and loyalty of the guests, especially post-COVID-19. One of the interviewees responded:

"*COVID-19 has hit businesses of just about every shape and size hard, but few have felt the effects quite as strongly as those in the hospitality industry and especially the hotels. Bars, restaurants and hotels in many parts of the world have been forced to close as restrictions to limit the spread of the Coronavirus have taken hold. One of the key ways to retain and attract the customer is by ensuring you instill some sense of trust especially during this era of COVID-1. By providing all the necessary hand washing and sanitizers and ensure that there is enough spacing for the guest."*

The same sentiments were made by other respondents who instated that providing enough space for the guest would build their trust.

The study also determined how the hotel industry is creating a customer value marketing in order to keep up with the changing customer preferences.

"We are doing a lot of social media and mainstream media marketing. That is the only way to show the world that we are up and going. Many are noticing our continued delivery of services through the platforms I have mentioned"

A majority of the respondents indicated that through social media they are able to reach large a clientele. This has kept them going despite the disruption caused by the COVID-19 movement restrictions.

The study also sought to know the innovative marketing strategies being developed by the hotel industry.

A majority of the respondents indicated that social media is most commonly used method in keeping in contact with the clientele.

"*We mainly use social media and sending personalized text to our guest. We also use emails to reach out to them".*

Furthermore, the study wanted to assess how the hotel planned to deliver experiences and service that meets the needs of customers with care and concern.

A majority of the respondents indicated that through surveys and research they get to know needs of the respondents, and hence provision of the services required by the respondents.

On asking new marketing strategies the managers, the managers stated that there was need to incorporate sustainable marketing mix so as to keep up with the trends in the market.

"*Given this increasingly prevalent consumer requirement, assisting visitors in leading a healthy lifestyle may become a post-pandemic trend for hotels. We anticipate becoming more popular in the marketing mix of hotels where healthy diet programs, exercise programs, digital detox programs will need to be incorporated"*

Another respondent stated:
"We will design personalized products to enhance guests' well-being and improve the guest experience through leveraging guests' behavioral data and their consumption history (e.g. types of food ordered, visits to hotel fitness areas, use of in-house spa/wellness services) and harness predictive analytics to develop customized, health-focused amenities"

Finally, on asking about the best way to reshape the strategy in order to meet sharp shifts in customer behavior, most of the managers pointed out:
"There is need to quickly shift to new sales channels now by building a virtual selling curriculum, then scale new services created through e-commerce/digital channels as stand-alone or sell-with proposition. This is done by looking for quick virtualization of products and services (e.g. virtual workout classes) and prioritizing products in portfolios highly relevant during the crisis (e.g. remote/ home working, health/safety)"

On exploring emerging technologies to best serve customers, one of the managers said:
"We will build field safety protocols in the hotel for on-site service, for services that cannot be virtualized and even design virtualized service model including self-service kits, content, remote service delivery models, help desk, and collaboration tools."

From the sentiments above, it is evident that business-to-business brands have also quickly moved to remote sales calls via new technologies, forging the path to higher margins and more self-service integration.

4.2 Summary

The hotel industry is one of the sub-sectors that have heavily been affected by the consequences of the COVID-19 pandemic. The effects are largely attributed to containment measures implemented to curb the spread of COVID-19 such as: the new norm of social distancing, which has reduced the hotel's holding capacity; suspension of international flights such that the number of foreign tourists has declined; new norm of working from home, which has reduced the demand for hotel services especially the restaurant and conferences services; daily curfew hours, which has reduced the number of working hours; partial lockdowns within the country, which has reduced inter-counties' tourists; and costly requirements for a COVID-19 compliance certificate to re-open businesses. These measures have slowed down the operations of the hotels and forced them to work under reduced capacity, or worse still, close-down. The hotel industry is working towards getting things back by adopting marketing strategies that will make them sustainable during this period.

4.3 Conclusion and Recommendations

COVID-19 pandemic is shaping irreversible changes in consumer values, habits and consumption patterns and spending behaviors. To stay relevant, hotels need to act now and set up a growth strategy focused on what they should do now, next and beyond COVID-19 to reframe their future around evolving consumer behaviors. Hotels that act immediately will build lasting and meaningful relationships with consumers. Those who fail to respond and continue with their business-as-usual pre-pandemic approach will risk being left behind. This study concludes that use of effective marketing strategies will keep the star rated hotels in operations.

Future research can be carried out in different types of tourism sector, such as tourism destinations. This is expected to provide more comprehensive perspectives on the resilience of stakeholders in various types of tourism sectors. The government is still considered far below the lines on supporting tourism industry players during the COVID-19 pandemic. Therefore, a new strategy from the government is required to dealing with the impacts of the COVID-19 pandemic on the tourism sector.

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Assessment of Income Coverage on Financial Performance of Insurance Companies Listed at the NSE During Covid-19 Pandemic Era, Kenya

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Abstract

The performance is useful to any business and insurance business is not an exceptional. The overall performance of insurance has declined in performance from the year 2015 to the 2021. This is due to microeconomic conditions. The increasing rivalry in the protection sector has culminated in the formation of micro-insurance deviation from the traditional standard insurance products. A variety of insurance providers such as Jubilee Insurance, CIC and Britam insurance are among the companies that have developed agricultural micro insurance. Insurance has gained traction in recent years past few years. The purpose of this study was to assess effects of micro-insurance on insurance companies' financial performance. The independent variables were total premiums, claims and the total cost based on annual basis. Financial insurance companies' financial performance was the dependent variable which the study seeks to explain and it was measured by the annual return on assets (ROA). The secondary data was collected on the annual basis. The study employed an explanatory cross-sectional research design and multiple linear regression model to analyze the relationship between the variables. Statistical package for social sciences version 23 was used in analyzing data collected.

Key Words: Income Coverage Financial Performance, Insurance, Nairobi Securities Exchange

1. Introduction

It has been noted that without the insurance sector, the economy and the wealth creation associated with it can be adversely affected (international accounting standards board, 2007). The insurance industry forms an integral part of the country's financial sector and its benefits cannot be over-emphasized. if this crucial sector was missing, the consequence on the economy would be devastating, knocking off billions of shillings from the gross domestic product (gdp) index. During this Covid 19 pandemic Era, a number of insurance companies have closed shop and eventually liquidated. most of these companies have gone under with billions of shillings, in cash, belonging to policy holders, pension schemes and life funds.

While it is critical to develop micro insurance in order to tap the potential market of low-income earners, most insurance companies face significant challenges in developing products that are appropriate for the targeted market Downsized Formal insurance sometimes overlooks the poor's more frequent and stressful shocks, in comparison to positive aspects of the informal risk-management strategies they

already employ (Sebesta and Cohen, 2001). Micro insurance's growth can be measured in terms of looking at product awareness and client satisfaction. Analyze coverage ratio, renewal ratio, or growth ratio to accomplish this. The knowledge and satisfaction success metrics assess how quickly the target group enrolls in and retains coverage under the microinsurance scheme (Wipf and Garand, 2010).

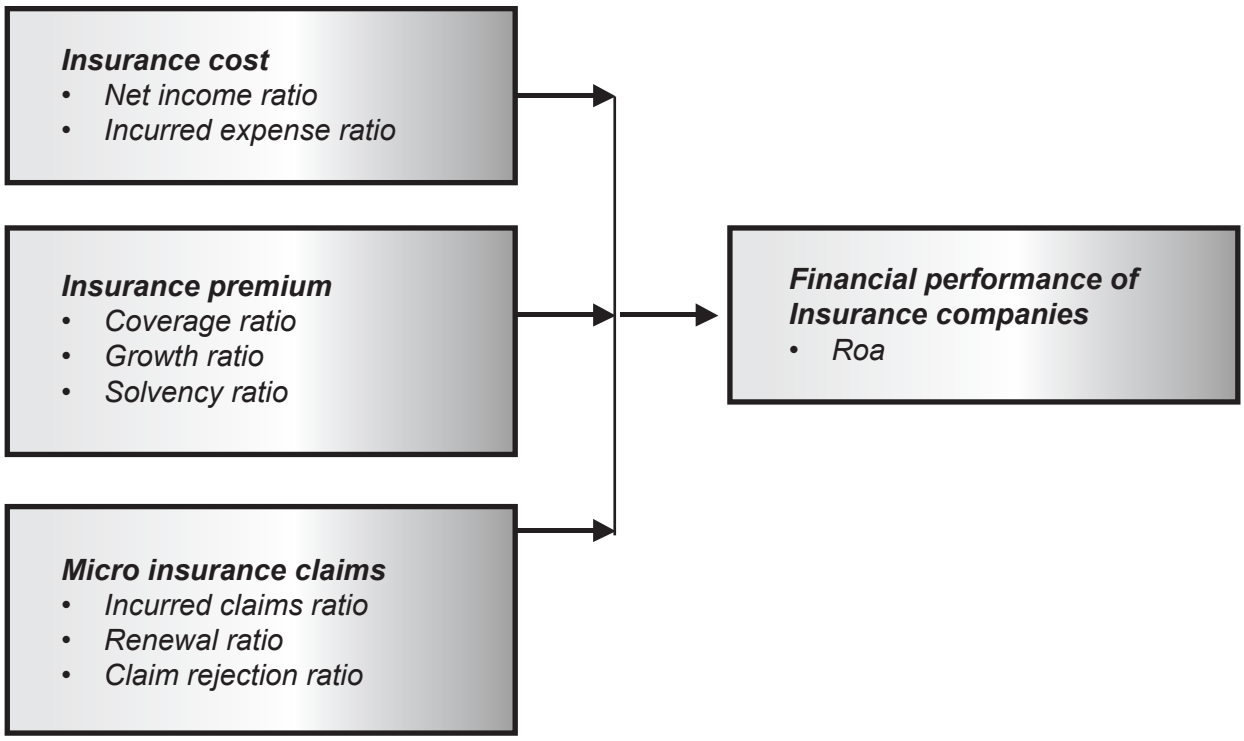

Figure 1: 1 A conceptual Framework of the relationship between income coverage and the financial performance of the NSE listed insurance companies during the Covid 19 Pandemic Era.

According to Smith (2011) two third of the people living in what can be termed as poverty are classified to be women mostly living within financial rage of less than dollar a day. These population of people are mostly prone to accidents and life risk situations. In this regard the provability of these group of people landing themselves into the edge of extreme poverty is very high if there are no set measures to curb the risk. Micro-insurance therefore serves as a good mitigation measures which has made impact on most of the group of population discussed above. Jamii Bora, CIC group, are examples of insurance companies that have enhanced micro insurance with an aim of helping the less privileged group living under a dollar a day. According to their annual report they are able increase the number of members from 50,000 to 160,000 people. In this relation they are able to grow when it comes to premium and insurance penetration level.

In connection to the above there is need to lower insurance rates to make it affordable to the poor. The need for the affordable insurance rate has a significant point of discussion in African continent. As it is well known that growth of an industry is realized when a common person is involved in the operation of that industry. This can be made possible through lowering rates and an opportunity can be created when price is lowed and micro-insurance products considered. Additionally, skills required, regulation and a reasonable pricing are the forecast of improvement and profitability of any insurance firm growth with focus on expending their target market.

As it is seen micro insurance agenda can't be ignored as a form of financial inclusion and avenue of increasing penetration of insurance companies to the low-level person. Most of people who have bought policies comes from formal sectors whose is only accounts for 25% of people living in Kenya today. This is an indication that most of the population in Kenya is not insured at all given the sense that most of Kenyans are in employed people raises alarm for the insurance companies to refactor in their expansion of services and in order to lease the opportunity that is lying out there.

Researchers have concluded there an impact of insurance on the lives of the poor and more specifically less fortunate in our communities. For instance, health insurance may reduce save spending on saving on health while there is need for health services. Additionally, insuring property will allow entrepreneurs to make more risks and invest in other businesses. In relation, other studies have demonstrated that their causal link between the growth of insurance companies and national economic growth through impacting price on risk and supporting entrepreneurship. Therefore, it is impossible for economy to grow without micro insurance.

Risk management is practiced in nearly every field of the economy. Underwriting these uncertainties decreases the pressure and provides flexibility for most companies, encouraging them to focus on their core competencies and contributing to economic growth. In order to satisfy their commitments, insurers must have a structure in place that helps them to handle claims rapidly and effectively (Duompos et al., 2012).

As a result, the insurance sector's growth leads to an economy's overall stability. Assessing necessary expense to cover a risk by calculating and analyzing it. According to Dowd et al., (2007), benefit is provided loses could arise to the insured person protected under the insurance policy whereas an insurance claim is a benefit paid whose lose could arise to the number of people buying insurance policies. IRA-U (2014, IRA-U, IRA-U, IRA-U. The claims processing process offers a perfect opportunity for insurers to impress policyholders and boost their image for improved results (Batesand Atkins, 2007). General insurance dominates insurance industries dominance is as result of gross premiums included, therefore performance of the insurance companies is critical (IRA, 2014).

Underestimated liabilities resulting unpaid or sometimes expired policies in businesses, inaccurate and unreliable assumptions about the rate of losses increase frequency, and so on, or factors completely beyond the underwriter's control can all affect an insurer's total claims. Furthermore, it's possible that a crucial part of the total written premiums remains uncollectible for an extended period of time (Shiu, 2004). The A property and casualty insurer's claims-to-premium ratio partially represents underlying results, which in return influences the business quality, and it is an essential indicator of insurer is profitable firm's pricing policy is correct. Loss is owned by an insurer's key claims management efforts, and is thus critical to the company's long-term profitability (Yusuf & Dansu, 2010).

2. Objective of the Study

The purpose of the study was to examine the relationship on income coverage on financial performance of insurance companies listed at the Nse during covid 19 pandemic era, Kenya. The research hypothesis was as follows:

- **$H_{01:}$** There is no relationship between the income coverage and the financial performance of NSE listed insurance companies during the Covid 19 era
- **H_{02}:** There is no relationship between cost and the financial performance of NSE listed insurance companies during the covid 19 pandemic era
- **H_{03}:** There is no relationship between premium insurance and financial performance of NSE listed insurance companies during the covid 19 pandemic era
- **H_{04}:** There is no relationship between claims and the financial performance of NSE listed insurance company during the covid 19 pandemic era

3. Methodology

The research design used in this study was descriptive in nature. According to Kothari (2012) a census was defined as a complete enumeration of all the items in the "population". It can be presumed that in such an inquiry when all the items are covered no element of chance was left and highest accuracy was obtained hence all the 6 insurance Firms were selected banks as stated by the Nairobi Securities Exchange. This was to ensure that the sampling frame was current, complete and relevant for the attainment of the study objectives. The ratios to be used in the studies will be calculated from in the secondary data which was audited financial accounts of six years' period (2015, 2016, 2017, 2018, 2019, 2020 and 2021) for all quoted banks. These six years was deemed to be long time enough to observe consistent trend in the variables. The financial statements used were obtained from the Nairobi Securities Exchange, (CMA) and websites of the respectful Insurance companies

The multiple linear regression equation used was took into consideration three independent variables for the 10 companies from 2015 to 2021 period. It was presented as follows;

$Y = \alpha + \beta 1X_1 + \beta 2X_2 + \beta 3X_3$

Where;

Y = The performance of the insurance companies measured by the net profit for the last 6 years

α = intercept

$\beta_1, \beta_2, \beta_3$ = Coefficients of determinations/The slope of the curve

X_1 = The insurance premiums of the 10 companies for the past 6 years

X_2 = The claims figures of the 10 companies for the past 6 years

X_3 = The insurance cost of the 10 companies for the past 6 years

4. Results and Discussion

4.3.1 Components of Income coverage

Table 4.3.1: Results of multiple regression between financial performance and the combined effect of the selected predictors

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.884	0.781	0.706	0.593

(Author, 2020)

The three independent variables that were being investigated 70.6% of insurance companies' financial performance in Kiambu as represented by the adjusted R. The results show that independent variables contribute to over 70% of financial performance of insurance. The remaining percentage is attributed by other factors.

Regression coefficients of the relationship between financial performance and the three predictive variables.

		Unstandardized Coefficients		**Standardize Coefficients**		
Model		**B**	**Std.**	**Beta**	**t**	**Sig.**
1	(Constant)	0.903	0.168		2.021	0.035
	Micro-insurance cost	0.623	0.115	0.584	3.593	0.024
	Micro-insurance Claims	-0.536	0.145	0.304	-1.872	0.031
	Micro— reinsurance premium	0.739	0.126	0.225	3.872	0.016

(Authors, 2021)

4.3.2

According to the model, all the variables were significant as their significance value was less than 0.05. However, insurance premiums and insurance cost were positively correlated with insurance companies' financial performance . Besides, micro-insurance claims were negatively correlated with insurance companies' financial performance.

Table 4.3: Summary of One-Way ANOVA results of the regression analysis between financial performance and predictor variables

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	5.352	3	2.065	8.563	0.0019
Residual	16.89	6	0.421		
Total	22.242	9			

(Author, 2020)

From the ANOVA statistics in table 4.3, the processed data, which are the population parameters, had a significance level of 0.0019 which shows that the data is ideal for making a conclusion on the population's parameter. The F calculated at 5% Level of significance was 8.563. Since F calculated is greater than the F critical (value = 4.76), this shows that the overall model was significant i.e., there is a significant relationship between financial performance and micro insurance.

5. Conclusion

This The results have major policy consequences. Insurers should employ financial analysts to help them decide whether reinsurance rates are acceptable their favor in increasing their income. This would enhance their financial performance hence they would be able to settle all claims irrespective of the amount of risk involved. In comparison, the analysis indicates that insurers without performance indicators should adopt some. This way, they would know when to invest or not and place them in a better financial position. Besides, appropriate systems should be instituted for policy administration. In the long run, technology is more cost-effective and reliable in tracking client information than manual entries.

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Effect of Financial Sector Liberalization on Financial Development in Kenya

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Abstract

Financial liberalization has been part of financial reform packages in many countries as stabilization for financial development tools of respective economies. One of these countries is Kenya which has been undergoing various financial sector reforms since 1980 to improve economy mainly on the ease of financial sector, equity market and capital account. This research was conducted to establish the effect of financial sector liberalization on financial development in Kenya in relation to various financial liberalization effects and measures adopted from 1985 to 2018. The principal component analysis method was used in the calculation of the index required data for all the years since the liberalization process started in Kenya to calculate the financial liberalization index required for the study period. The research first identified events dates of major policy changes or reforms and their effect on financial development and population of study were from various financial sector institutions operating in Kenya. The Secondary data was sourced from Central Bank of Kenya reports and statistical bulletins. Pearson correlation coefficient was used to establish Multicollinearity while Durbin Watson statistic was used to test for normality of the study variables. Log-linear model was used to estimate the model parameters while the granger causality test to test the hypotheses. The findings revealed that, interest rate liberalization did not influence the financial development in Kenya. However, capital account liberalization facilitated financial development. On the other hand, financial institutions are adequately developed such that credit liberalization contributes to financial development. As well, equity market liberalization is beneficial to the financial development in Kenya. When moderated with business risk, interest rate liberalization negatively impacts on financial development while capital account liberalization brings about a decline in financial development. Similarly, business risk negatively moderates the relationship between credit liberalization and financial development. However, business risk does not moderate the relationship between equity market liberalization and financial development. The study recommended that, in a bid to promote capital inflows and enhance better risk-sharing, there is a need to reform financial rules, strengthen the banks and promote the business sector. Also, policies regulating credit liberalization need to be reviewed with the intention of integration with the regulation of other economic determinants. Finally, it is essential for equity market liberalization to be embedded within a sound institutional framework to enhance financial development.

Keywords: Financial Liberalization, Financial Development, Capital Account Liberalization, Equity Liberation, Interest Rate Liberalization and Business Risks.

1. Introduction

Both financial theory and practical experience suggest that financial liberalization can stimulate economic development. Until the 1980s, extensive government intervention was the norm in the financial markets of developing countries. Ceilings were imposed on bank interest rates; credit was allocated by administrative decision rather than market criteria; and inflows of foreign capital were strictly controlled. Over the last twenty years, however, many developing countries persuaded by both the theoretical arguments made in support of liberalization and the experience of many of the rapidly growing countries have begun to liberalize their financial markets by abolishing these types of controls (Pill, 1997)

Led by the seminal papers of McKinnon (1973) and Shaw (1973), a significant number of studies have pointed out that financial liberalization can exert a positive effect on growth rates as interest rate levels rise towards their competitive market equilibrium, while resources are efficiently allocated. Accordingly, eliminating controls on interest rates and allowing them to increase could stimulate a higher level of savings. According to Taylor (1983), the reserve requirements of the formal sector may reduce the total supply of funds to the whole economy as credit flows from the informal to the formal sectors. Just as importantly, the higher real interest rates would result in greater firm distress and a contraction in investment and aggregate demand.

According to Kaminsky and Schmukler (2003), A fully liberalized domestic financial system is characterized by lack of controls on lending and borrowing interest rates and certainly by the lack of credit controls, i.e. no subsidies to certain sectors or certain credit allocations. Also, deposits in foreign currencies are permitted and full financial liberalization occurs when at least two of the three sectors are fully liberalized and the third one is partially liberalized.

In developing countries like Kenya, domestic financial sector was liberalized along with capital account in the 1970s, when controls were re-imposed that remained in place until the late 1980s (especially capital account controls) when a liberalization wave took place in Asia and then in Latin America. By the early 1990s, the domestic financial sector and stock market had been jointly deregulated in developing countries which predates capital account liberalization, which only commences in the early 1990s.In early 1970s, Government intervention in the determining of the price and allocation of credit was termed as ‘financial repression’ by McKinnon and Shaw. Interest rates control by government, credit controls, barriers to entry to financial sector, state control of banking sector, government ownership of banks and restrictions on capital flows.

Caprio et al., 1999, Proponents of financial liberalization argue that financial repression is the cause for lower growth rates that otherwise would be higher if open market would decide the flow of capital to projects. Therefore Assumed costs associated with repression are described as follows

(1) deteriorating growth rates for countries with high levels of financial repression;
(2) widespread bank insolvencies as the result of low quality lending;
(3) limited access to financial resources for individuals and small firms, whereas wealthy elites take advantageous position in financial repressed system;
(4) increased dependence on external financing because of negative real interest rates which results in capital flight;

(5) Excessive use of capital-intensive production techniques, because artificial low real interest rates makes those projects attractive;
(6) reduced monitoring and financial resource allocation functions of financial intermediaries as the result of state allocation of financial resources to inefficient state-owned enterprises;
(7) increased risk for external crises, as the result of deteriorating fiscal balances, increased external financing or money printing.

1.1 Statement of the Problem

The issue of importance in this study is whether the level of financial sector development of a country depends on adoption and implementation of financial liberalization measures which has been identified to be strategic to financial development as postulated by the Financial Development Report 2012 which says that improvement efforts need to be driven by national level reforms so as to ensure that appropriate financial systems are in place which helps in improving the economy as a whole. Kenya planning blue prints, vision 2030 identifies the financial sector as one sector which can spur economic growth and investment as it projects to double rate of financial access, depth, stability and efficiency. There are doubts whether liberalization indeed improved the efficiency of credit allocation and the Major concerns have been raised which show that the financial system is still operating in oligopolistic manner.

The problem that this study seeks to address is how embracing and execution of financial liberalization measures affect financial sector growth and its impact on Kenya economy growth over the period 1985-2018 considering the role of central bank major policy interventions to establish its independence and avoid being vulnerable to government influences and inadequate supervision in regulation and determination of interest rates, financial access and credit creation if are policy or market determined Therefore, it is against this backdrop that this research work was conducted to address the research gap to know if there is effect of financial sector liberalization measures on financial development in Kenya in the face of financial crisis.

Specific Objectives

The specific objectives are:

a) To investigate the effect of interest rate liberalization on financial development in Kenya.
b) To determine the influence of capital account liberalization on financial development in Kenya.
c) To determine effects of credit liberalization on financial development in Kenya.
d) To determine effects of equity market liberalization on financial development in Kenya.
e) To ascertain the moderating effect of business risk on the relationship between financial development and financial sector liberalization

2. Literature Review

Legal Theory of Financial Development

According to La Porta et al (1997, 1998, 2000a), the legal policy view highlights the importance of some macroeconomic policies, role of legal institutions in facilitating and explaining differences in financial liberalization and financial development in promoting financial development.

Institution Theory of Financial Development

By applying the settler mortality hypothesis of Acemoglu *et al.* (2001) to financial development, Beck *et al.* (2003) address how institutions matter for financial development. Greenwood and Jovanovic (1990) and Saint-Paul (1992) document that as the economy grows, the costs of financial intermediation decrease due to intensive competition, inducing a larger scale of funds available for productive investment.

Financial Intermediation Theory

According to Andrieş (2009, the financial intermediation theory analyses the functions of financial intermediation and how they influence an economy, therefore highlighting the roles of financial intermediaries, their controls, supervision and impact of financial intermediaries' regulation to stimulate an economy.

The Conceptual Framework

3. Methodology

Research Design: The study adopted causal design approach because it is quantitative in nature as well as structured in design. The suitability of adopting this design is that it explains the cause-and-effect relationship between study variables to determine the study objective.

Population: The data employed in this study is secondary data. The study employed annual time series data of the variables from 1985 to 2018.

There are basically two sources of data collection; namely, primary and secondary sources of data collection (Olaogun, 2010). For this study, only secondary method of data collection was utilized. According to Kothari (2004), secondary data defined as data that is already available or which have already been collected and analysed by someone else while Polit and Beck (2003) sees it as the use of data gathered in a previous study to test new hypotheses or explore new relationships.

The data was obtained from various international compilations such as, UN Statistical Yearbooks by the United Nations, World Development Indicators by the World Bank, Global Development Finance data base, International Financial Statistics by the International Monetary Fund (IMF), ADB Key Indicators by the African Development Bank (ADB), and Kenya publications such as Statistical Projections by Kenya Bureau of Statistics, CBK and Kenya Economic Surveys by the Kenya Government, covering the period 1980 to 2018 which includes 34 annual observations.

4. Results And Discussion

Table 4.1: Descriptive for Study Variables

Stats	FD	CAL	EML	IRL	CL	BR
N	34	34	34	34	34	34
Min	26.68	0.005	-3.72E+09	10.31	1.312	0
Max	43.25	3.457	7.75E+08	36.24	18.4	1
Mean	36.4	0.812	-1.15E+08	18.4	8.217	0.206
p50	36.74	0.472	1.89E+07	16.54	6	0
Sd	4.341	0.867	6.76E+08	7.001	5.048	0.41
Kurtosis	2.568	4.538	25.23526	3.167	2.074	3.116
Skewness	-0.57	1.571	-4.577063	1.077	0.553	1.455

FD = Financial development measured using broad money as percentage of GDP
CAL = Capital account liberalization measured using Foreign direct investment, net inflows (% of GDP)
EML = Equity market liberalization measured as gross Investment as Share of GDP
IRL = Interest liberalization measured as Lending rate Control
CL = Credit liberalization measured using Cash Reserve Requirement
BR = Business Risk as measured using inflation rates

In all the six variables were utilized in this study to achieve the research objective both the independent and dependent variables. From table 4.1, the number of observations used in this study are 34 in number, that means covering the period between January 1985 to December 2018 and this shows that all the intended data was collected and analysed as per the study objective. It also shows that the mean total of financial development as a measured using broad money as a percentage of GDP stood at 36.4 having the highest percentage being 43.25 and lowest being 26.68 with variability of 16.57 and a standard deviation of 4.341 and a skewness of -0.57. on capital account liberalization as measured using FDI, net flows (%of GDP) shows that the mean statistics of 0.812 having maximum of 3.457 and a minimum of 0.05 hence a standard deviation of 0.867 and skewness of 1.571

The equity market liberalization measured as gross investment as share of GDP had a mean of -1.1 billion and a minimum of -3.72 billion and a maximum of 7.75 billion and a standard deviation of 6.76 and a positive kurtosis of 25.23 while IRL had a mean results of 18.4 with a min of 10.31 and a maximum of 36.24 , a standard deviation of 7.001 and a positive kurtosis of 3.167. credit liberalization had mean results of 8.217 with minimum being 1.312 and a maximum being 18.4, standard deviation of 5.048 while business risk had a mean result of 0.206 with min being 0 and a maximum being 1 with a standard deviation being 0.41.

Further, the study provided summary statistics for transformed data. The data was converted to their natural logs to deal with the problem of large numbers and eliminate heteroscedasticity.

In table 4.2 shows that all the variable measures which represents both the dependent independent variables and moderating variables have been tested. From the table 4.2, the mean broad money was having natural log of 3.587 with a standard deviation of 0.125, credit liberalization mean being 1.886 with a standard deviation being 0.728, capital account liberalization mean being -0.807 with a standard deviation being 1.322, lending interest rate mean being 2.850 with a standard deviation of 0.348 and business risk mean being -0.501 and a standard deviation of 1.266.

Table 4.2: Descriptive statistics

	ln_FD	ln_CL	ln_CAL	ln_IRL	ln_BR
Mean	3.587	1.886	-0.817	2.850	-0.501
Median	3.604	1.792	-0.751	2.806	-0.357
Maximum	3.767	2.912	1.241	3.590	1.668
Minimum	3.284	0.272	-5.356	2.333	-2.303
Std. Dev.	0.125	0.728	1.322	0.348	1.266
Skewness	-0.792	-0.617	-1.144	0.548	-0.209
Kurtosis	2.823	2.868	5.446	2.378	1.756
Jarque-Bera	3.597	2.183	15.888	2.247	2.440
Probability	0.166	0.336	0.000	0.325	0.295
Sum	121.967	64.138	-27.765	96.904	-17.028
Sum Sq. Dev.	0.516	17.471	57.689	3.998	52.862
Observations	34.000	34.000	34.000	34.000	34.000

Table 4.3 Serial correlation Test

Breusch-Godfrey LM test for autocorrelation			
F-statistic	1.341419	Prob. F(2,18)	0.2864
Obs*R-squared	4.02111	Prob. Chi-Square(2)	0.1339
H0: no serial correlation			

The output of table 4.3, The Breusch-Godfrey LM test confirms that there was no serial correlation in the error correction model since the probability chi-square value of the observed Squared 0.1339 was greater than 0.05 therefore we accept the null hypothesis that there is no serial correlation in the model.

Granger causality Test

One importance of the application of distributed log models is to provide evidence about the direction of causality in economic relationship (Studenmund, 2017). Such a test is useful when we know the two variables are related but we don't know which variables cause the other to move. Granger causality, or precedence, is a circumstance in which one-time series variable consistently and predictably

changes before another variable (Granger, 1969). Granger causality is important because it allows the researcher to analyze which variable precedes or "leads" the other.

Table 4.4 shows that the data was lagged by two periods before the error correction to see whether changes in the independent variables in the previous periods would have implications on broad money in the subsequent years.

Table 4.4: Engle-Granger Error Correction Model (ECM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D_CL	0.036021	0.020492	1.757781	0.0941
D_CL(-2)	0.056371	0.018861	2.988817	0.0073
D_IRL	0.129081	0.04027	3.205412	0.0044
D_IRL(-2)	0.064438	0.033984	1.896144	0.0725
D_CAL	0.014631	0.004007	3.651633	0.0016
D_CAL(-2)	0.017496	0.004848	3.608819	0.0018
D_EML	0.03585	0.012058	2.973056	0.0075
ERRORTERM	0.319346	0.141589	2.255443	0.0355
C	-0.00346	0.006824	-0.507209	0.6176
R-squared	0.785852	Mean dependent var		0.006926
Adjusted R-squared	0.678778	S.D. dependent var		0.064805
S.E. of regression	0.036729	Akaike info criterion		-3.49906
Sum squared resid	0.026981	Schwarz criterion		-2.99022
Log likelihood	65.23538	Hannan-Quinn criter.		-3.33319
F-statistic	7.339323	Durbin-Watson stat		1.473938
Prob(F-statistic)	0.000086			

5. Conclusion and Recommendations

Summary of Findings

The primary objective of the study was to establish the effect of financial sector liberalization on financial development in Kenya. The study period was between 1985 and 2018. The study utilized data from the Central Banks statistical bulletin for several years and the World Bank development index. Basing on the findings in the previous chapter, financial development measured by broad money to GDP had an average natural log of 3.587. On the other hand, credit liberalization was at a mean of 1.886, lending interest rate averaging at 2.850 while business risk at a mean of -0.501. Furthermore, the mean broad money was having a natural log of 3.587.

Also, after highlighting the profile of trend in financial sector liberalization and financial development in Kenya, diagnostic tests were performed. To start off, normality test indicated that the assumption of normality was met. Besides, there was no presence of heteroscedasticity. As well, there was no serial correlation, as indicated by the Breusch Godfrey test. Besides, the ADF unit root test indicated that credit liberalization, capital account liberalization and equity market liberalization were found to be stationery at level. However, broad money and lending interest rate were stationary after the first difference. As such, the assumption of constant variance, normality, no serial correlation and stationarity were met for the panel cointegration test.

The vulnerability of Kenya economy, which present constraints to growth and financial development can be attributed to the relying heavily upon external trade and foreign investment to overcome inherent scale and resource limitations hence living the nation vulnerable to external economic shocks. Since domestic inflation is largely influenced by landed prices of imported goods, ranging from food to capital goods results to findings of fixed exchange rate regime. Uncontrolled inflation strangles financial growth, hurting entire populace and international trade hence high inflation creates higher business risk resulting into various relationship like: Unstable growth creates risk for investors and investors require compensation for risk, so interest rates will be higher, then higher interest rates mean lower levels of borrowing by businesses resulting to lower levels of borrowings hence mean fewer resources for companies to invest resulting to less financial growth.

Conclusion

In conclusion, interest rate liberalization did not influence the financial development in Kenya. The findings suggest that the policy towards interest rate was not sufficient to stimulate savings to the extent of placing more funds in the hands of banks to intermediate to investors seeking funds. As such, the study is not in support of laissez-faire version of interest rate liberalization. Besides, it appears that the conditions of interest rate liberalization, such as an effective regulatory and supervisory system had not been met. Consequently, liberalization took place without taking into consideration the requirements for reforms. The eventual outcome is that interest rate liberalization did not influence financial development. However, in the face of business risks, interest rate liberalization negatively impacts on the financial development in Kenya.

capital account liberalization positively influenced the financial development in Kenya. The findings imply that capital account liberalization facilitates portfolio diversification for both foreign and domestic investors, thereby contributing to financial development. As well, it appears that the financial institutions in Kenya are appropriately regulated and supervised such that they meet the requirements for capital account liberalization. Consequently, the results align with the neoclassical approach, which elucidated that the liberalization of the capital account is likely to contribute to the development of the domestic financial sector (Summers,2000). It appears, however, that the gains of capital inflows may not lead to long-run financial development in light of business risks.

As well, credit liberalization contributed to an improvement in the financial development in Kenya. The implication is that financial institutions are in a position to extend credit and at the same time, diversify the risk of credit concentration. Besides, the results suggest that financial institutions are adequately developed such that credit liberalization brings about a significant increase in the financial

credit flow, thereby contributing to financial development in the country. Nevertheless, with business risk, credit liberalization negatively impacts on financial development in Kenya.

Finally, equity market liberalization is beneficial to the financial development in Kenya. The findings imply that the financial sector in Kenya is reaping from greater diversification of the portfolio, higher market liquidity, as well as an avenue for risk-sharing.

Besides, the enhanced development in the equity market could be attributed to freeing capital accounts. As well, the findings are in support of the notion that equity market liberalization leads to not only an increase in equity prices but also promotes investments which have the potential to impact on financial development positively. As well, business risk does not change the direction of relationship between equity market liberalization and financial development.

Recommendations

The study has shed light on the positive link between capital account liberalization and financial development in Kenya. It is therefore vital for the country to ensure there is a stable macroeconomic framework as a prerequisite for capital account liberalization. There is also a need to develop both the private sector and the institutional environment. Furthermore, in a bid to promote capital inflows and enhance better risk-sharing, there is a need to reform financial rules, strengthen the banks and promote the business sector. In so doing, the positive contribution of capital account liberalization on financial development is enhanced.

Since credit liberalization enhances financial development in the country, financial institutions need to consider lowering the interest rate and increase their efficiency in allocating credit especially to key players of the economy, such as the private sector. Also, the policies regulating credit liberalization need to be reviewed with the intention of integration with the regulation of other economic determinants. Finally, equity market liberalization is vital in enhancing the financial development in Kenya. It is instrumental in lowering interest rates and fostering the inflow of foreign funds. It is therefore essential for equity market liberalization to be embedded within a sound institutional framework to enhance financial development. Further, it is vital to encourage equity flows by allowing foreign investors to have access to the domestic stock markets. To further benefit from equity market liberalization, it is necessary to have a well-developed financial structure.

Limitations of the Study

The study contributes to significant insights on the effect of financial sector liberalization on financial development in Kenya. Nevertheless, the study suffers from some weaknesses. First, the study relied on annual time series data for empirical investigation, which has the potential to reduce the accurateness of the parameters. As such, quarterly data is most appropriate. However, since quarterly data is not readily available, annual data was utilized. Secondly, the study only relied on interest rate liberalization, capital market liberalization, equity market liberalization and credit liberalization as measures of financial liberalization.

Further Research Recommendations

The study contributes vital insights on the effect of financial sector liberalization on financial development in Kenya. There is thus need for further research to ascertain the validity of the study findings. As evident, in the literature, few studies have highlighted the benefits of financial liberalization on financial development. It is essential to conduct further research in this field to compare financial development, pre- and post-financial liberalization in Kenya. Besides, future scholars could delve into the implication of implementing interest rate restraints policy on financial development. Also, the study recommends future studies on the influence of microeconomic determinants on the link between financial liberalization and financial development. Finally, there is a need for future studies to formulate policies to change the insignificant influence of interest rate liberalization on financial development. Similarly, the study proposes further research on how interest rate impacts on financial deepening.

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Influence of Technology Orientation in Performance of Small and Medium Animal Feed Manufacturing Enterprises in Kenya

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Abstract

The objective of this study was to establish the influence of technological orientation in performance of small and medium animal feed manufacturing enterprises in Kenya. The study adopted cross-sectional survey design using both quantitative and qualitative approaches. The target population was 65 small and medium enterprises in animal feed manufacturing in Kenya that were members of Association of Kenya Feed Manufacturing (AKEFEMA) that are based in Kiambu and Nairobi City County in Kenya. The study used census approach and respondents were 65 managers/owners and 65 directors. Data was collected using open and ended questionnaire. The data was analysed using descriptive and inferential statistics. Descriptive statistics produced frequencies, pie charts mean, standard deviation and percentages. Inferential statistics produced correlation and PLS Structural Equation Modelling (PLS-SEM) results, which showed the causal relationship among the variables. Findings showed that technology orientation had a positive and significant with the small and medium animal feed manufacturing in Kenya. Based on findings, the study conclude that SMEs in animal feed manufacturing in Kenya regularly upgrade technology, inculcate culture of adopting new technologies and also possess of technological skills. Also, the study conclude that SMEs under survey are owned/ managed by individuals who possess knowledge about firm's field of operation and also relate well with stakeholders such customers and suppliers. The study recommends management and entrepreneurs of small and medium animal feed manufacturing enterprises should possess technical capabilities of the firm and embrace culture of continuous learning in respect to new knowledge and skill this would lead to better performance.

Key Words: Technology, Orientation, Performance, SMEs, Kenya

1. Introduction

1.1 Background of the Study

Small and medium enterprises (SMEs) are business sectors that play an important economic role in many countries world over. Their activities contribute to job creation; contribute to Gross Domestic Product (GDP) and enhancing industrial base in a country. Small and medium enterprises constitute about 90 percent of the business in the leading and developing economies (Murithi, 2017). In European Union (EU), more than 90 percent of enterprises are SMEs employing more than 50 percent of workforce (SMEs European Report, 2018) as cited in Wanambisi, Namusonge and Nambuswa (2020). The report defines SMEs as enterprises employing 10-250 workers and having annual turnover ranging from 7 to 40 million Euros. Thinji (2017) indicates in middle income countries SMEs contribute 70% employment and 95% GDP and also 60% employment and 70% GDP for least developed nations.

Technology orientation (TO) refer to firm behaviour towards use and development of new technologies or new ways of carrying out operations, aimed at higher firm performance. It can be viewed as the firm; entrepreneurial strategy that fosters competitive advantage to an enterprise over competitors. Technology orientation is a strategic aspect in a business that facilities in development and utilization of knowledge embedded in an organization to achieve a competitive edge (Del-Brio & Junquera, 2012). In today's environment SMEs are facing stiff competition because of globalization, change in customer's tastes and preferences and inevitably, adopting and applying new ideas and methods in a firm is the solution. Cabral (2016) observed that adopting technology posture is vital especially due to rising trends in emerging markets and impact of globalization.

Thus, to emphasizes the value of adopting and utilizing technology in the firm. Technology has been identified as instrumental in enhancing innovation and fostering new knowledge, transfer and accepting and application of every latest business practice **(**Urbani & Heydenrych, 2015). In the view of Schumpeter's (Schumpeter, 1934) argues that the theory of creative destruction, entrepreneurs disrupt the market price through new combination such product innovation, process innovation, organization innovation through embracing technology and ultimately an entrepreneur becomes market leader (Urban & Heydenrch, 2015). Based on the foregoing argument, it can be concluded that TO enhance firm performance. Empirical studies have demonstrated that technology orientation contributes to firm performance (Ibrahim, Keat & Abd Rani, 2017; Mwaura, 2018; Odondo, Okibo, & Odhiambo, 2017; Ali,Leifu & Rehman,2016;Urbani & Heydenrych, 2015).

1.2 Statement of the Problem

Small and medium manufacturing enterprises such as animal feeds are experiencing low performance in Kenya despite having the greatest potential to contribute to economic growth and addressing the ever-raising challenges of unemployment. Kenya Bureau of Statistics (2019) report indicated that the growth rate of manufacturing sector was 4.2 percent in 2019 which was arise from 3.7 percent in year 2018. A growth rate of an average of 3.9 % is very low given that the Kenya Vision 2030 envisages that the manufacturing sector will grow at the rate of 10 per cent annually. Manufacturing stands tall as a key pillar in the Big Four development agenda by the National Government in Kenya (Muigua, 2019). Therefore, the low performance of manufacturing SMEs implies that realization of a robust manufacturing sector by the Kenya Government will remain a pipe dream. The poor firm performance

among SMEs is attributed to a number of factors as: poor management, access to finance, technology, market access, lack of entrepreneurial spirit, politics and poor business environment (Were, 2016). Recommendation by Ali,Leifu and Rehman (2016) indicates that improvement of technology orientation by the enterprise owners enhance performance of SMEs. Despite the increasingly importance of technology orientation in the recent times in determining enterprise success, few studies have given a considerable attention. The majority of the studies on technology orientation have been done in developed studies (Ibrahim, Keat & Abd Rani, 2017; Odondo, Okibo, & Odhiambo, 2017; Ali,Leifu & Rehman,2016;Urbani & Heydenrych, 2015). This study sought to narrow this knowledge gap by examining the influence of technology orientation on the performance of small and medium animal feed manufacturing enterprises in Kenya.

1.4 Hypothesis

There is no relationship technology orientation and performance of small and medium animal feed manufacturing enterprises in Kenya.

2. Literature Review

2.1 Theoretical Review

The study relied on theory of stage development (Churchill and Lewis Model (1983))

2.1.1 Theory of Stage Development (Churchill and Lewis Model (1983)

The study adopts the Churchill and Lewis Model (1983) also known as theory of stage development. The theory of stage development uses a model relevant to small and growing businesses that delineates five sages of firm development (Gupta, 2013). Each particular phase of the enterprise faces certain challenges that require intervention through technology and innovation. The first stage the enterprise is the existence stage (start-up) which characterized with low customer base (Churchill & Lewis, 1983). At the start up stage is the appropriate point of an entrepreneur to advance technology to attract customer through addressing their needs (Chege, Wang & Sunto, 2019).The second stage is known as survival which is characterized by a workable enterprise process with key questions being on how the firm can break even and remain in business. Technology is the key to the success of SMEs at the survival stage as argued by Tidd and Bessant (2010), in their viewpoint technology contribute to innovation which give them a competitive advantage in the market place. The third stage of the business is successes which dictates to the entrepreneur to either exploit the firm's progress and expand or keep the firm profitable and provide alternative business activities (Churchill & Lewis, 1983). Likewise,firms that embrace technology have been found to expand market share and new ideas for expanding their enterprises. Stage four is take-off or growth which is concerned with how to make the firm grow quickly and how to finance this growth (Favaretto & Meirelles, 2015). In the argument of Favaretto and Meirelles, growing SMEs, the technological innovation strategy is particularly paramount as the technology matures and is constantly updated at this stage. The fifth stage is resource maturity where the firm enjoys advantages of size, managerial talents, and monetary resources (Runyan, Huddleston & Swinney, 2007). It could be concluded that technology is catalyst and oil to foster performance of firm.

This study has factored in technology as a key tool for animal Feed manufacturing SMEs in Kenya as avenue to exploit change as an opportunity for a different business or a different service. Technology

foster innovation that lead to creative destruction as emphasized by Schumpeter theory of innovation in the firm and ultimately an entrepreneur enjoy monopoly in the market. Inculcation of technological innovation among the SMEs under survey would ultimately have a base of economic growth and consequently economic growth in Kenya and lastly challenges of unemployment especially among the youth will be minimized.

2.2 Empirical Review

Technology orientation (TO) refers to firm behavior towards use and develops new technologies or new ways of doing operations, consequently contribute to firm performance. Technology is strategic aspect that guide in development and use of technological capabilities in firm (Junquera, del Brío, & Fernández 2012). A study by Ibrahim, Keat and Abd Rani (2017) investigated the moderating role of government support policy on the relationship between entrepreneurial orientation, technology orientation and performance of small and medium enterprises in Northeast Nigeria. The methodology adopted was quantitative survey method, stratified random sampling and a sample size of 240 SME owners/manage in Northeast Nigeria. The findings indicted that technology orientation correlated strongly and positively with small and medium enterprises in Northeast Nigeria. The study recommended managers/ owners of SMEs to nurture and support technology orientation through applying technology in products and operation procedures.

Mwaura (2018) explored the influence of strategy orientation on performance of medium manufacturing firms in Kenya. The study variables were market orientation, technology orientation and innovation. The methodology include cross-sectional design, questionnaire and target population was all 179 registered medium Manufacturing Firms in Kenya. The findings indicated that technology orientation had positive significant to performance of medium manufacturing firms in Kenya. The study emphasized that managers and owners of the SMEs should possess technology capabilities pertaining to enhance firm performance.

Another study by Ali, Leifu and Rehman (2016) examined influence strategic entrepreneurship and performance of SMEs in China. The independent variables were technology and customer orientation. The study used a sample size of 158 Chinese firms was clustered on their bases of their mix of technological and customer focus. The results revealed both technology orientation and customer orientation had a positive influence on firm performance. Further, the results found that firms combining technology orientation and customer orientation effectively performed better than those with one of the strategic orientation factor.

2.3 Conceptual Framework

The conceptual of the study presented technology oriented and performance of small and medium animal feed manufacturing enterprises in Kenya.

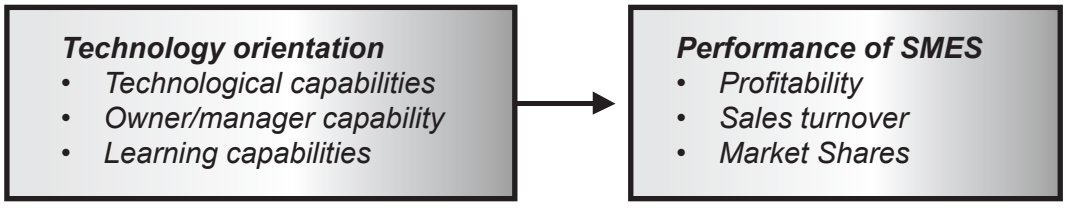

Figure 2.1 Conceptual Framework

3. Research Methodology

This study was anchored on positivism research paradigm as an element of epistemological research philosophy and cross-sectional research design. The target population was small and medium animal feed manufacturing enterprises that are members of Association of Kenya Feed Manufacturing (AKEFEMA) that are based in Kiambu and Nairobi City County in Kenya.

Table 1: Sample Size

County	Target population	Sample Size
Nairobi	33	66
Kiambu	32	64
Total	**65**	**130**

Source: Association of Kenya Animal Feeds Manufacturing (2017)

Celsius sampling technique was used and thus, 65 managers/CEO and 65 directors were selected as respondents (see Table 4.1). This study used a self-administered, open and closed-ended questionnaire to obtain primary data.

The study employed descriptive statistics and inferential statistics. Inferential statistics involved use of correlation and PLS Structural Equation Modelling (PLS- SEM). PlS SEM was used for model analysis and hypothesis testing. The model used was as indicated below:

4. Results and Discussions

4.1 Response Rate

The study administered a total of 116 questionnaires to selected respondents and 102 of the questionnaire were dully filled and returned which represented a response rate of 87.9 %. This response rate was considered adequate for this study basing on the criteria provided by Babbie (2004) who suggested that for a descriptive study response rate of above 50% should be accepted for analysis.

4.2 Pilot Study Results

Reliability analysis was evaluated using Cronbach's alpha was used and Bougie (2013) argued that coefficient greater than or equal to 0.7 is acceptable for basic research. The Cronbach's Alpha for technology orientation was 0.834 as indicated in Table 4.2 which was above the threshold of 0.7 adopted in this study hence the nine items were reliable in measuring technology orientation.

Table 4.2: Summary of Reliability Statistics of Technology Orientation

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.834	.842	9

The test for validity of the data collection instrument was more qualitative than quantitative where the indicators used in the conceptual framework and in the questionnaires were based on thorough literature review to ensure that the indicators also used by other scholars who have used these variables. Content validity was done through the use of experts from entrepreneurship and supervisors. After confirmation that the questionnaire had met the threshold of reliability and validity actual data collection was carried out.

4.3 Descriptive Statistics

The study sought to determine the influence of technology orientation in the performance. To achieve this the respondents were requested to indicate the level of agreement on five point Likert scale with '1' indicating 'strongly disagree',2 'disagree', 3 'neutral ',4' agree' and 5'strongly agree'.The respondents were asked to fill questionnaire that had statements on the level of technology orientation within their firms. The results of the descriptive statistics was shown by Table 4.3.

Table 4.3: Measurement of Technology Orientation

Technology Capability	Mean	Std Dev
Our enterprise is one of the leaders in our industry to upgrade technology standard	2.65	1.10
Our enterprise has strong technological skills in various field	3.11	1.22
Our enterprise is skillful in applying new technologies to problem solving	2.85	1.34
Owner/Manager Capability		
Our enterprise's manager/owner has knowledge about firm's field of operation	4.20	0.61
Our manager/owner has required technical capabilities for the industry in which we operate	2.09	0.96
Our manager/owner is in good relation with customers , suppliers and employees	4.37	0.49
Commitment to Learning		
In light of the new knowledge, if necessary our enterprise revises routine and procedures	2.10	0.74
In light of the new knowledge, if necessary, our firm revises current technical infrastructure elements (e.g. production line)	2.25	0.71
In light of the new knowledge, if necessary, our firm revises current practice to reach better working approaches	2.02	0.82

From the results of the descriptive statistics respondents agreed with statements on technology capability and owner/manager capability, however disagreed with statements on commitment to learning. This implies not all aspects of technology orientation are embraced by the SMEs under survey.

4.4. Diagnostic Test

In this study, test for normality, multicollinearity and homodescasticity were carried out.

4.4.1 Normality

Table 4.4, indicates the test results for normality, using skewness and kurtosis.

Table 4.4: Univariate Normality for Technology Orientation

constructs	Statistic	Std. Error	Statistic	Std. Error
Technology orientation	0.351	0.239	-0.564	0.474

Based on the results presented in Table 4.4, shows skewness values are below 3.0 and kurtosis values are below 8.0. The data therefore, adhered to the regression assumption of normal distribution

4.4.2 Multicollinearity

Table 4.5, shows the test results for multicollinearity, using both the Variance Inflation Factor (VIF) and tolerance

Table 4.5: Multicollinearity Test of Study Variables

2nd order constructs	VIF	Tolerance
Technology orientation	1.621	0.617

Based on Table 4.5, VIF values were less than 5. It was thus concluded that there no presence of multicollinearity. The VIF shows how much the variance of the coefficient estimate is being inflated by mulitcollinearity.

4.4.3 Heteroscedasticity Test

Breuch-pagan / cook-weisberg test was used to test null hypothesis that the error variances are all equal versus the alternative that the error variances are multiplicative function of one or more variables. Table 4.6shows the results of test of heteroscedascity.

Table 4.6: Heteroscedasticity Test of study variable

Ho	Variables	Chi2(3)	Prob Chi2
Constant Variance	TO	2.409	0.121

Based on Table 4.6, shows that the constant variance (Chi-square= 2.409) is insignificant (P = 0.121). A large Chi-square value greater than 9.22 would indicate the presence of heteroscedasticity (Sazali , Hashida, Jegak & Raduan, 2009).Thus we fail to reject the null hypothesis and conclude that the error variance is equal thus heteroscedasticity is not a problem in the data.

4.5 Correlations of Study Variables

The study found that technology orientation had a positive significant linear relationship with firm performance in small and medium animal feed manufacturing enterprises in Kenya. With Pearson correlation coefficient of 0.802 at 0.01, significance level as shown in Table 4.7 . This implied that there was a strong positive correlation between technology orientation and firm performance. Thus,

firm performance must be enhanced through the application of technologies in both products and operational procedures (Song & Jing, 2017).

Table 4.7: Correlation Matrix

	TO	Per
TO	**1**	
PER	0.802**	**1**

4.6 Measurement Model

The measurement model assessed the relationship between the observable variables and the theoretical constructs that represent. Three stages were undertaken in testing measurement model, namely; assessment of suitability of data, exploratory factor analysis and lastly confirmatory factor analysis. Based on the Table 4.8 technology orientation yielded a KMO statistics of 0.712 exceeding the KMO threshold value of 0.50 (Hair et al., 1998) for factorable items. On the other hand, Bartlett's test of Sphericity showed a p value of 0.000, showing that there were sufficient relationships among the variables to investigate. Table 4.7, factor loading found out that none of the items was removed because all of them had a factor loading of greater than 0.4 (Rahim & Magna, 2005). Table 4.8, show that communalities show that the communalities ranged from 0.523 to 0.729 thus showing that all were above the 0.5 cut-off points as posited by Pallant and Tennant (2007) hence this shows the variables fitted well with other variables in their factor. Based on the criteria, three factors were imputed. Amongst themselves, they were able to explain 71.980 % of the total variance in the data.

Table 4.8 : Exploratory Factor Analysis for Technology Orientation

Item	KMO	Bartlett's (df)	Sig.	%Variation	Factor loadings	Communalities
TC1	0.712	χ^2 =434.406 (d.f.=36)	0.000	36.670	0.682	0.659
TC2					0.850	0.800
TC3					0.685	0.704
OMC1				23.566	0.919	0.334
OMC2					0.739	0.595
OMC3					0.952	0.937
CoL1				11.744	0.835	0.799
CoL2					0.864	0.816
CoL3					0.898	0.834
			cumulative %	71.980		

Confirmatory factor analysis (CFA) involves evaluating the measurement model on multiple criteria such as internal reliability, convergent and discriminant validity. Prior, testing reliability and validity CFA loadings was done for the purpose of validating confirmatory factor analysis (Kock, 2015). All

of the item loadings for Technology orientation were above 0.50 and were statistically significant as pvalues were less than 0.05 . Construct reliability for the variable was assessed by computing the composite reliability and internal consistency of the items. Table 4.9, shows the output of construct, composite and convergent reliability.

Table 4.9: **Construct Reliability and Convergent Validity**

Constructs	First order constructs	Cronbach's Alpha≥0.6	Composite Reliability ≥0.7	Average Variance Extracted (AVE) ≥0.5
Technology orientation		**0.894**	**0.7623**	**0.663**
	Technological capabilities	0.803	0.880	0.710
	Owner/manager capability	0.794	0.752	0.586
	Commitment Learning	0.916	0.947	0.856
		0.796	**0.744**	**0.619**

Composite reliability of indicator items was all above the acceptable 0.6 threshold which means all the variables in the study exhibited construct reliability. Cronbach's Alphas (α) as a measure of internal consistency its indicator items were all above the 0.7 threshold (Hair et al., 2006) indicating average to good reliability. Convergent validity was also assessed using average variance extracted (AVE). The overall Average Variance Extracted for all factors were above 0.5 as indicated in table 4.10 which exceeded the cut-off value of 0.5, thus confirming convergent validity.

Table 4.9: Results of Discriminant Validity

	Per	To
Per	**0.905**	
To	0.802**	**0.814**

The discriminant validity was confirmed as the square root of a construct's Average Variance Extracted AVE was greater than the correlation between the construct and other constructs in the model as indicated in Table 4.9.

4.7 Structural Modelling and Hypothesis Testing

The statistical objective of PLS is to show coefficient of determination (R-squared), coefficients (βs) and t-values. R^2 coefficient was used to determine the variation in firm performance that was accounted by the independent variable (latent variable). Coefficients (βs) was meant to show direction and strength and t-values the basis of rejecting or accepting the null hypothesis of no effect.

Hypothesis Testing

To examine the influence of Technology orientation in performance of small and medium enterprises in animal feed manufacturing in Kenya.

Test for outliers and model fit indices were carried out before testing the hypothesis. From Table 4.11 normality test on the factors produced values between -1 and +1. There were no outliers detected

because the values obtained in testing the model fit indices were within the thresholds. Model Fit Indices for technology orientation in performance of small and medium enterprises in animal feed manufacturing in Kenya showed that Standardized root mean square residual (SRMR) value was 0.056 which is less than 0.08 thus indicating reasonable fit to the data and accepted (Henseler et al., 2014). Normed Fit Index (NFI) had a value of 0.948 and it was acceptable because any value of 0.90 or greater indicate well-fitting model (Bentler & Bonett, 1980). The squared Euclidean distance (d_{ULS}) fit indices had the value of 1.452 which was less than the bootstrapped HI 95% of d_{ULS} and similarly, the geodesic distance (d_G) had the value of 0.954 which was less than bootstrapped HI 95% indicating the data fits the model exactly. The GOF of the model was 0.443, which shows that empirical data fits the model satisfactory and has substantial predictive power in comparison with baseline value (Henseler et al., 2016). The structural model therein shows path coefficients relationship between technology orientation and performance of small and medium animal feed enterprises in Kenya

Table 4.11: Confirmatory factor analysis model fits of Technology orientation

Model	NFI	SRMR	d_{ULS}	d_G	GOF
Saturated Model	1	1	1	1	1
Independent Model	0.948	0.056	1.452	0.954	0.443

The hypothesis to test for this specific objective was:

H_{01} Technology orientation does not influence performance of small and medium enterprises in animal feed manufacturing in Kenya.

The study found that there was a positive path coefficient (beta= 0.802) between technology orientation and performance of small and medium enterprises in animal feed manufacturing in Kenya, as shown in Figure 4.5. Similarly, figure 4.1 shows that technology orientation had coefficient of determination (R^2) 0.644. The value of R^2 indicates that 64.4 % of the variation in firm performance can be accounted for by customer orientation.

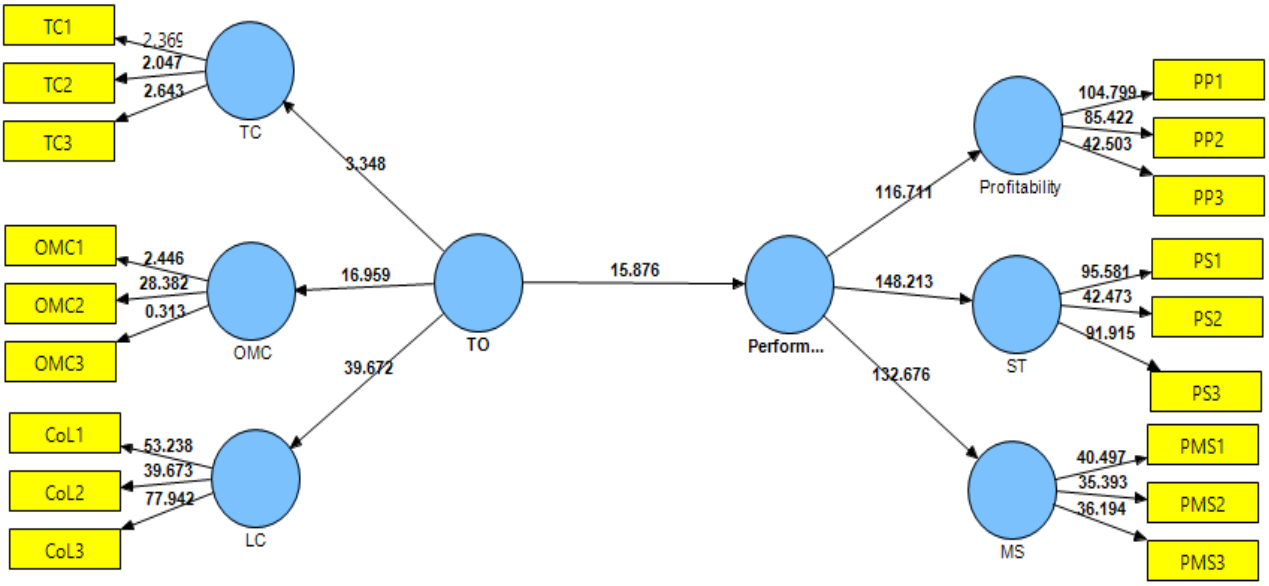

Figure 4.1: structural model path coefficients between technology orientation and performance of small and medium enterprises

Based on the T value of technology orientation 15.876 which was more 1.96 ($p<0.05$), thus the relationship between technology orientation and performance of small and medium enterprises was significant and positive, as shown on figure 4.2. The study rejects the null hypothesis and accept alternative and concludes that technology orientation (technological capabilities, owner/manager capability and learning capabilities) Influence performance of small and medium enterprises in animal feed manufacturing in Kenya.

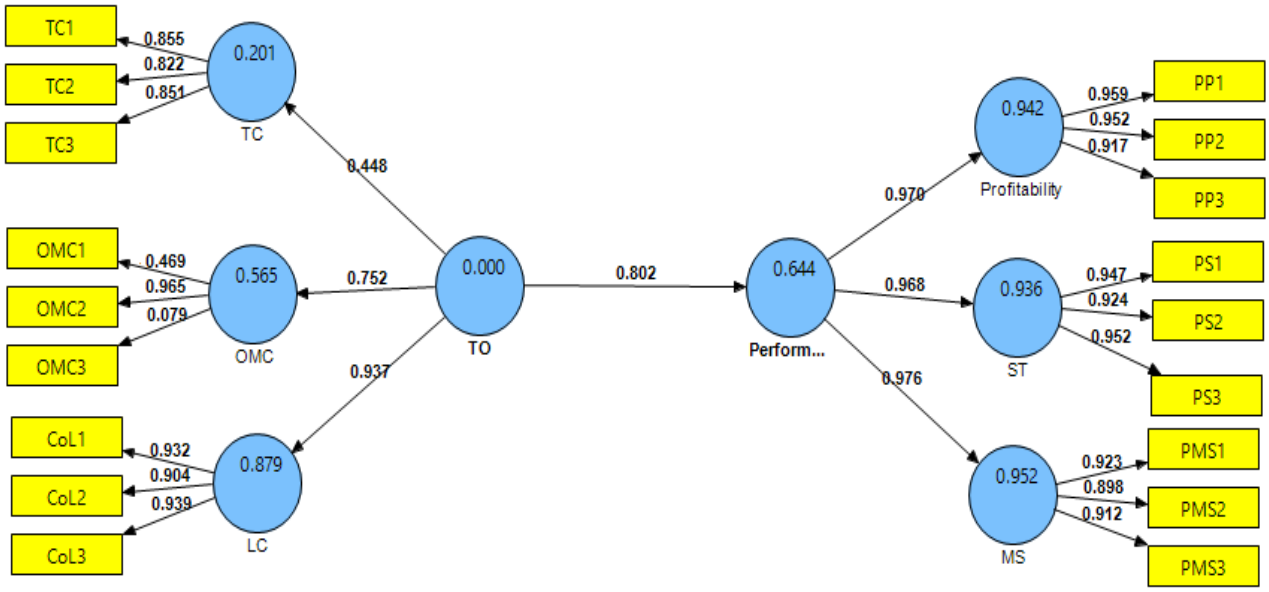

Figure 4.2: Structural Model T-Statistics for relationship between Technology orientation and performance of small and medium enterprises

Table 4.12, shows that technology orientation had a beta value of 0.802 and T statistics of 15.876 which is above critical value of 1.96, thus it H01 is rejected. The beta value of 0.802, signify that for every one unit increase in technology orientation, performance of small and medium enterprises in animal feed manufacturing in Kenya is predicted to increase by 0.802 units and therefore H01. Therefore, technology orientation enhances the performance of small and medium enterprises in animal feed manufacturing in Kenya and thus managers/owner of these enterprises should embrace and nurture technology in all spheres to release better profits, sale turnover and new markets.

Table 4.12: Path coefficients for relationship between technology orientation and performance of small and medium enterprises

Path	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P value
TO -> Performance	0.802	0.802	0.051	15.876	0.000

Qualitative Data Analysis

The study further sought to find out from the respondents how else technology orientation influenced their business performance. According to majority of the respondents, technology orientation

enabled them to increase the number of customers, improve their methods of production, increase their customer satisfaction and finally assisted the SMEs to identify new distribution and methods of marketing. According to the respondents, technology orientation opens new channels of doing business that never existed before and hence the companies that adopt new technologies likely to boost their performance. Some of the technologies that respondents mentioned they had adopted include use of mobile money payment for their customers, use of internet banking and digital marketing. They further mentioned that their production technologies have been changing over time and they have aggressive in adopting them to improve the quality of the animal feeds produced

5. Conclusion

From the findings, technology orientation had a positive and significant relationship with small and medium animal feed manufacturing enterprises in Kenya. Secondly, from the findings the study concludes that SMEs in animal feed manufacturing in Kenya, leads in upgrading technology standards, has strong technological skills in various fields and are skillful in applying technologies to problem solving. Also the study concludes that SMEs in animal feed manufacturing in Kenya are managed by owners/managers who are knowledgeable about firm's field of operation and relate well with customers, suppliers and employees. Similarly, the study concludes that TO has enabled the firm increase the number of customers, improve their methods of production, and increase their customer satisfaction and opens channels of doing business. Further, the study concludes that the SMES under survey adopted the following technologies use of mobile money payment for their customers, use of internet banking , digital marketing and production technologies have been changing over time and they have aggressive in adopting them to improve the quality of the animal feeds produced

6. Recommendations

The study findings indicate technology orientation promote positively small and medium animal feed manufacturing enterprises; therefore, the study recommends that SMEs owners and management should at no costs ignore the importance and role of technologies in enhancing the performance of their businesses. The study results reveal few SMES survey encourage commitment to learning to new practices, technologies and technologies thus the study recommends management always scan their operating environment for new technologies and invest in these technologies to stand a chance of outperforming their competitors and dominating their industries.

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Influence of Business Continuity Planning on Performance of Selected Restaurants in Thika Town, Kiambu County, Kenya

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Abstract

Strategic business planning on operations reduces disruption to employees, productivity, profitability and enables an organization to play a stabilizing role in the industry. Business Continuity Planning is associated with identifying, acquiring, developing and documenting along with conducting and testing for resources and procedures to ensure the key or critical operations of an organization are secured in case of a disaster or any unplanned event. However, restaurants in Thika town in Kenya continually faced survival challenges when faced with various disasters with some of them already having significant reductions in operations and productivity. This was evident during the Covid-19 pandemic era when many businesses continually faced productivity and operational challenges. No study had attempted to investigate how business continuity planning tool could be used to help address such challenges. Based on the contingency and resource-based theories, this study seeks to determine the influence of business continuity planning on the performance of selected restaurants in Thika town. The specific objectives were to investigate effect of business risk analysis on business performance, to evaluate effect of strategic management on business performance and also to assess effect of training & awareness on business performance. Data was collected using a structured questionnaire. The study adopted a correlation research design suitable to determine relationship between variables of interest. The study targeted managers of 22 selected restaurants in Thika town. Convenience sampling was employed to get data from 14 restaurant managers. Data was analyzed using linear regression methods and presented using descriptive statistics. The results would be useful to business managers and investors in formulating business continuity strategies, scholars and future researchers in the area of business continuity planning practices. Mean and standard deviation were used to analyze objectives, whereas regression analysis was used to analyze the effect of business continuity planning practices on performance of restaurants in Thika town. Using multiple regression, the study established that training and awareness has an insignificant effect on restaurants performance (β=-0.267, $p<0.05$). This implies that an increase in training & awareness will insignificantly affect the performance of the restaurants in Thika. Business risk analysis had a significant effect on performance of the restaurants in Thika (β=0.383) and leads to an increase in the performance. Strategic management also had a significant effect on performance of restaurants in Thika (β=0.555$p<0.05$). The study recommends that the restaurants should have a continual focus on training and awareness to improve their performance. The study concludes that business continuity planning influences the performance. Therefore, the study recommends that restaurants should be advised to embrace the concept (BCP) so that they can be able to reap the benefits of adopting these practices.

1. Background of the Study

The increasing interconnectedness of commercial enterprise with all facets of the community in what is called supply chains makes business continuity planning a cornerstone for the stakeholders to bank on. Business preparedness reduces the interruption of employees, disruption to productivity, and profitability; and it enabled an organization to play a stabilizing role in the community. Business Continuity Planning is associated with identifying, acquiring, developing and documenting along with conducting a testing for resources and procedures so that it ensured the key or critical operations of an organization were secured in case of a disaster or any such event. Successful business continuity planning – creating plans that allowed an organization to perform its critical business processes during and after a disaster – rely more upon human nature and less upon technical knowledge and rigor than many people realized. Utilities tend to be highly technical environments given both the nature of the business and the nature of people who come up through the ranks of those organizations (Butler, Meshkati and Pelling, 2001). Business Continuity Planning (BCP) is a tool which primarily assesses existing operations, finds out the risks to these operations and the organizational preparedness incase these operations were disrupted. It developed a build in approach to ensure that critical operations and processes continued to work after interruption, as an example, as a result of an episode or disaster.

The BCP served as an essential component of an organization‟s response planning (Lindstrom, 2010). According to Savage (2002), an effective BCP details out the manner in which a business entity should operate in the event of an incident; including the different ways it expected to return to "normal business operations" in the most optimum and quickest period possible. Further, a BCP does not require to have specific modalities like for terrorist incidences but rather ought to have made application of any potential major disruptions like incidences of fire, power fault or flooding (Botha, 2004). A BCP forges an agreed framework for ensuring disruptive events were kept under control; ensures critical and appropriate resources were reinstated to maintain and sustain critical business functions; and also facilitates the staffing process to ensure the right personnel required to coordinating activities were on board (Pitt, 2004). A BCP must be clear and well-presented so as to avoid vagueness and be in a way that all persons could understand its content and act in what was expected of them (Karakasidis, 2007). The necessary resources needed to boost business continuity even encompass personnel, equipment, financial allocations, infrastructure, accommodations and protection (Karakasidis, 2007).

BCP is critical to any business and may have varied widely depending on the kind of operations undertaken by an organization; the same may also have varied given the location. However, the following must be included, according to Lindstrom, Samuelsson, and Hagerfors, (2010): plans, arrangements and measures geared towards ensuring the continuous delivery of major services or products; thus, enable Safaricom, for instance, to recover its facility, assets and even data. According to Lingeswara (2012), the key challenges in the implementation of BCP include lack of senior management commitment and involvement. In most organizations, BCP is left to middle and junior staffs that were not empowered to make decisions and did not even control budgets making the process fail. The implications of these challenges pointed directly to weak BCP plans which were not able to safeguard organizations against failures. Organizations ended up losing opportunities as well as customers or having very dissatisfied customers. The AT&T study (2016) established that 81% of companies indicated that their business continuity plans accommodated the chance of a network

security event, such as for instance malware, phishing, bugs and malicious hackers. Additionally, it discovered that 63% of business leaders classified security breaches as their number one business concern in terms of overall security strategies. Although many companies (89%) indicated that they had a proactive approach to overall security, less than half those polled (49%) claimed they had a powerful execution strategy in place. The AT&T survey discovered that although business leaders had the right tools in place, the quantity of threats infiltrating the company now required stronger requirements on leading and back end to fend off ongoing attacks. 86% of companies surveyed were worried about the usage of mobile networks and devices. Over one-third (34%) had experienced a distributed denial-of-service (DDoS) attack before 24 months. However, only half organizations (50%) were currently taking proactive measures against protecting their company against DDoS 14 attacks. Similarly, one-fourth (26%) of companies had experienced an enhanced persistent threat (APT) attack before 24 months. However, only 44% of respondents were having a proactive approach to protecting their companies against advanced persistent threats.

The above-mentioned studies failed to demonstrate specifically the effect of business continuity thinking in relation to the performance of businesses. Business preparedness to disasters and risks discovered that as devices infiltrate the workforce and organizations expand globally, companies were looking beyond the impact of natural disasters when evaluating their business continuity strategies; this was a study by AT&T (2016). They certainly were now evaluating the ongoing impact of security breaches and the tools needed not just to mitigate risks but also proactively anticipate potential internal and external threats with their organizations.

2. Problem Statement

BCP serves as an essential component of an organization's response planning (Lindstrom, 2010). In light of the current spread of the coronavirus on a world-wide scale, it is possible that in many cases business continuity plans will have to be activated. As we know from media reports, many businesses were ordered to close for a significant period of time. We can only hope that those affected had some business continuity plans implemented. Restaurants in Thika are in competition with other retailers all the time. The stiff competition for scarce resources depend on the number of restaurant points in any given market arena, their size in terms of the variety of goods and services offered, population size and promotional activities by the various restaurants such as aggressive advertising, quality services among other factors. Among the scarce resources were scarce goods and services, customers, suppliers, supplies and prime sites to locate the restaurants. They were seen as taking over market share in Kenya's hospitality system. With the expanding middle class, improved infrastructure and high urban populations among many factors, restaurants were on an upward growth path. Liberalization of the economy, ease of entry into markets, improved infrastructure and supportive policies, information technology and the media, change in consumer's lifestyle and improved income, growth in industrial and manufacturing sectors and urban migration were some of the other factors that had made the environment conducive to the retail sector growth in Kenya. Competition was therefore very high in a situation and context where the retail sector faced such high rates of growth. Different firms and their competitors attempted to outperform each other to get the best and more and secure and indefinite lease in the sector through whatever means. In Kenya today, restaurants among other firms were investing significantly to stay relevant in the market arena.

Past studies had only concentrated on the performance of restaurants in comparison to local competition. Furthermore, none of the studies had looked into how preparedness of the restaurants to various business risks may have been affecting the overall performance. This study would seek to determine the effects of business continuity planning practices on the performance of restaurants in Kenya.

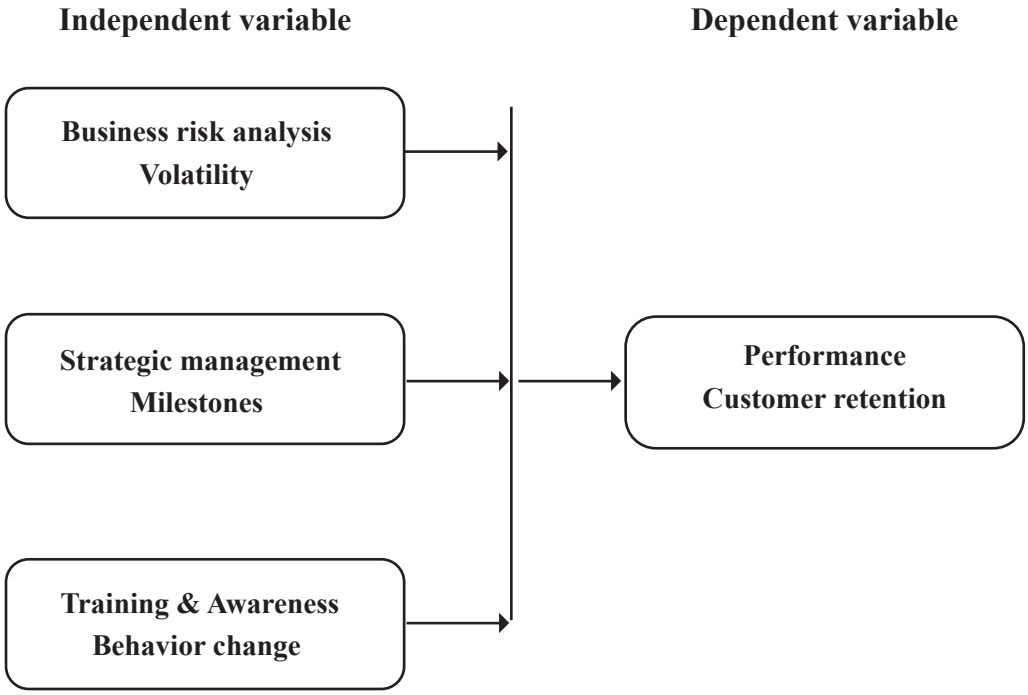
3. Objectives

The general objective was to investigate the influence of business continuity planning on performance of selected restaurants in Thika town.

Specific objectives were:

i) Investigate effect of business risk analysis on business performance.
ii) Evaluate effect of strategic management on business performance.
iii) Assess effect of training & awareness on business performance.

4. Conceptual Framework



Source: Author, 2021

5. Literature Review

5.1 Contingency Theory

This theory was concerned with organizational structure including both the formal and the informal organization of hierarchical and information as well as decision making structures within an organization. (Otieno, 2009). This approach to management had its roots in general systems theory and the open systems perspective. The open systems perspective viewed the complex organization as a set of interdependent parts that, together, constituted a whole which, in turn, was interdependent with the larger environment. The interactive nature of the elements within the organization and between

the organization and the environment resulted in at least two open system characteristics that were central to the contingency approach. The principle of adaptation asserted that the elements within the system adapted to one another to preserve the basic character of the system.

5.2 Resource Based Theory

The approach referred to as Resource-Based Theory (RBT) that was thought to originate from Penrose's idea (1959) of the firm as a coordinated „bundle" of resources, tackled the question of a firm's goals and strategic behavior (Barney, Della Corte, Sciarelli, 2008; Della Corte, Sciarelli, 1999). If the strategy was „a firm's theory about how exactly to compete successfully'(Barney, 2002), the origin of the sustainable competitive advantage was the ability to exploit a bunch of resources that the business had at its disposal or had use of, which were valuable, rare and inimitable (Wernerfelt, 1984; Barney, 1991). The organization, in the widest sense of the term, must favour the coordination and complete exploitation of the potential of those resources. 21 Mechanisms that prevented or limited imitative processes played a decisive role. Unique, unrepeatable historical conditions or the accessibility to systems to safeguard innovation (patents), coupled with conditions of „causal ambiguity" and „social complexity '. Sometimes, tacit understanding, complexity and specificity of resources could make the causal connection between resources and competitive advantages indecipherable. A company culture, a reputation, and interpersonal relations between managers will be the consequence of socially complex phenomena and therefore difficult to replicate.

According to Akram (2011), business preparedness, through implementing Business Continuity Planning (BCP), decreased or eliminated the disruption to employees and profitability and allowed businesses to execute balanced tasks in community. This study presented a conceptual design for measuring the factors of BCP on business disaster preparedness through the usage of statistical indicators. Such research was necessary to develop systematic knowledge how important it absolutely was for businesses to persist with BCP to recover from disasters. The paper figured there was a substantial effect of Strategic Management, Business Risk Analysis, Training and Awareness, and Information Life Cycle Managements when creating BCP a cornerstone for the successful preparedness to any disaster. Morwood (1998) of KPMG Consulting argued that business survival depends on the assured continuity of core business activities and supporting services, that is, business continuity (BC). Plans were therefore developed to provide this assurance. He added that by including client personnel in the BCP project they championed the BC process and the BC plan. They took the initiative for its continued tuning and testing, and if a problem that escalated to a crisis or if a disaster were to suddenly occur, they would provide the leadership necessary for business survival. 31 Katunge (2015) studied business continuity planning, implementation and performance in Safaricom Limited using a descriptive case study of the biggest telecommunications company in Kenya. The study used both qualitative and quantitative data collection methods which targeted a total of 37 employees in the company. Primary data was collected using self-administered questionnaires and one-on-one in-depth interviews. The study found that BCP had been successfully implemented at Safaricom for all key services which included M-PESA and MShwari. The company had benefited much from the implementation of BCP. The study concluded that the steps for BCP process were followed at Safaricom. BCP process was found to be a critical function that involves many different personnel and departments over multiple phases. The study recommended that for entire BCP process to succeed the organization should include participation from all levels of an organization, including an organization"s board of directors, senior management, business and technology managers, and

staff. Further research was also recommended in the implementation of BCP for the other products especially on Voice and data services. There was also need for further research extended to the other mobile service providers. This study, however, did not specifically address the pertinent issues of BCP awareness, preparedness and barriers in relation to the performance of the organization. According to Cytonn Group (2017) Nairobi, Mombasa, and Kisumu counties had the largest mall space supply with market shares of 59.4%, 10.0% and 7.4%, respectively. Nairobi‟s supply was expected to grow with a 3-year CAGR of 7.3% CAGR to 6.90mn Sq. ft. in 2020 from 5.6mn Sq. ft. in 2017.

5.3 Gaps in Literature

The above section demonstrated a number of studies which had been carried out in the area of business continuity management and performance of restaurants in Kenya. While business continuity management had been demonstrated to be of benefit to organizations, no specific mention had been made regarding the preparedness of the organization, awareness and implementation barriers and how each of these impacted on the ultimate performance of the organization. This therefore provided justification for this current study on the effect of business continuity management on the performance of restaurants in Thika Town, Kiambu County, Kenya.

6. Research Methodology

6.1 Research Design

This study has adopted a correlation research design. This design was suitable because it would be possible to help determine relationship between variables of interest.

6.2 Target Population

The study targeted managers of 22 selected restaurants in Thika town.

6.3 Sampling

Convenience sampling was employed to get data from 14 restaurant managers.

6.4 Data Collection

Researcher used questionnaires targeting managers of restaurants in Thika town.

6.5 Data Analysis

Collected data was entered using SPSS (v 22) to get required output. Regression analysis was conducted to test the influence among the variables.

7. Results and Discussion

Descriptive Statistics

	N	Mean	Std. Deviation	Skewness
Business risk analysis	163	3.664	.59246	-1.321
Strategic management	163	3.715	.58186	-1.140
Training and awareness	163	3.743	.60219	-.452

Regression Analysis

Multiple regression analysis was conducted to test the influence among predictor variables. The research used statistical package for social sciences (SPSS V 22) to code, enter and compute the measurements of the multiple regressions

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	Sig. F Change
1	.789	.623a	.616	.320	.623	87.679	.000b

Adjusted R squared is coefficient of determination which tells us the variation in the dependent variable due to changes in the independent variable, from the findings in table above the value of adjusted R squared was 0.616 an indication that there was variation of 61.6% on the performance of restaurants due to changes in awareness, preparedness, and barriers to implementation at 95% confidence interval. This shows that 61.6% changes in performance of restaurants could be accounted for by awareness, preparedness, and barriers to implementation. R is the correlation coefficient which shows the relationship between the study variables, from the findings shown in table above there was a strong positive relationship between the study variables as shown by 0.789.

ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	27.082	3	9.027	87.679	.000

From the ANOVA statistics, the processed data, which is the population parameters, had a significance level of 0.000 which shows that the data is ideal for making a conclusions on the population‟s parameter as the value of significance (p-value>0) is less than 5%. The significance value was less than 0.05, an indication that the model was statistically significant.

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Constant	1.612	.166		9.686	.000
Business risk analysis	-.267	.097	-.306	-2.769	.006
Strategic management	.383	.115	-.430	3.339	.001
Training and awareness	.555	.106	-.645	5.339	.000

From the data shown in the table above, the established regression equation was:

$Y= \beta 0+ \beta 1X1+\beta 2X2+ \beta 2X3+e$

$Y = 1.612- 0.267 X1 + 0.383 X2 + 0.555 X3 + 0.166$

Model: X1= Business risk analysis

X2= Strategic management

X3= Training and awareness

Y= Performance of restaurants

This illustrated that a unit increase in business risk analysis, other factors held constant, would lead to a 0.267decrease in performance of the restaurants in Thika town. The regression equation revealed that holding independent variables at constant zero, performance of restaurantss would be at 1.612, a unit increase in risk analysis would lead to a decrease in performance by a factor of 0.267, unit increase in strategic management would lead to an increase in performance by a factor of 0.383, a unit increase in awareness would lead to an increase in performance restaurants by a factor of 0.555.

Interpretation of Findings

From this regression equation it was revealed that awareness had a negative relationship with performance of restaurantss. The study also found that there was a positive relationship between preparedness, barriers to implementation and performance of restaurantss. The finding of this study concurs with the finding of Herbane et al., (2004) who explained that when an organization is well prepared, practices are incorporated into existing processes, staffs as well as senior management are highly committed, continuity practices are said to be embedded in the organization.

8. Conclusion and Recommendations

The study concludes that business continuity planning practices positively influenced the performance of restaurants in Thika town, as it was found that there was a strong positive relationship between business continuity planning practices and performance.

The study also found that there was a negative relationship between business risk management and performance. Thus, the study concludes that risk management negatively affects the performance of restaurantss. The study also revealed that there was a positive relationship between strategic management, awareness and performance, hence, positively influences the performance of restaurants. The study recommends that there is need for the restaurants to effectively implement business continuity planning practices as it was found that it positively influences their performance. There is need for the management of restaurants to constantly check their risk analysis, as it was revealed that it negatively affects the performance. There is need for restaurants to enhance their strategic management and training and awareness as it was revealed that they positively influence the performance.

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Levering on Universities and TVETs Students for Innovations in Green Investments and Financing for Sustainability of the Economy

By Irene Kinyua – Gretsa University

Abstract

According to the Kenya National Climate Change Action Plan 2015-2020, extreme climatic events could cost the economy as much as $500 million a year, equivalent to about 2.6 percent of the country's GDP. Sustainability requires continuous application of science and technology to ensure environmental concerns are addressed. There has been a consensus between various actors including International Finance Corporation (IFC), World bank and United Nation Environmental Program (UNEP) that green investments have the capability of reducing environmental degradation leading to extreme climatic conditions. IFC report (2019) indicates green investments in Kenya are dismal compared to standards. Undoubtingly, universities and TVET graduands are expected to innovate various green investments opportunities through science and technology to bridge such gaps. Research on contribution of higher learning especially in technical colleges, universities and TVET is similarly dismal. Therefore the research was carried out to : to determine the awareness level of green investments amongst the technical universities and TVET students, to carryout comparative analysis of the awareness level of green investments between Technical University students and TVET students compared to students of other institutions, to carryout comparative analysis of the awareness level of the various green investments between female and male Technical and TVET students, to assess whether the higher institutes have embraced science and technology in coming up with innovations that enable green investments and finally to make recommendations on various opportunities in green investments and technologies currently applied. A mixture of documentary analysis and ANOVA was carried to achieve the objectives. The research findings indicate that first, the awareness level of green investments is low among all students. Two, that there is significant difference in awareness level of students of institutions other than TVET and technical universities. Three, there is significant difference between female and male gender on awareness of green finance investments. Four, though higher education institutes have improved in the adoption of science and technology, the adoption is still low. Recommendation based on documentary analysis indicates that NSE should come up with new products that support green investing. The paper also discusses other recommendation based on each of the objective.

1. Introduction

Accoording to the Ministry of Health, Kenya report dated 1st May 2020, as of 30th April 2020, World Health Organisation reported over 3 million cases of Corona virus infection and over 217,000 deaths which was a fatality rate of 7%. In Africa the total number of cases as of the same date were over

27,000 with 923 deaths which was a fatality rate of 3.8%. According to a report released by the Kenyan National Bureau of Statistics on Sept. 1, 2020 the unemployment rate has doubled to 10.4% as compared to 5.2% in March. As many as 1.7 million Kenyans have lost jobs. As much as the COvid 19 pandemic contributed largely to the loss of jobs and over all decline in the economy of the country other factors such as climate change have also contributed to the decline in production of various goods and a negative effect on the economy.

Climate change is one of the most pressing global challenges today, with the most vulnerable people feeling the brunt of changing weather patterns, primarily in developing countries. The Kenyan economy, particularly agriculture and tourism, which underpin the bulk of people's livelihoods, has been hit hard by climate change. Water towers and wildlife variety have both suffered as a result of declining forest cover. (Bjerborn & Kirima, 2015). Undoubtingly, technology universities and TVET graduands are expected to innovate various green investments opportunities through science and technology to bridge such gaps.

Green financing and investments plays a pivotal role in propelling the environment towards sustainability. The tradeoff between the economic development and environmental concern is the present day concern in order to safeguard the interests of the future generations (Tran, Do, Vu & Do,2020). However, climate change is becoming rampant; causing ecological imbalances and therefore unsustainable development. Global warming has become an important policy area for governments globally with increased demand for solutions to accelerating economic development while ensuring ecological sustainability (Gilchrist, Yu & Zhong, 2021). With this, the role the green finance market cannot be overemphasized, where the emphasis is on allocation of funds towards socially responsible investments (Wang $ Zhing, 2017).

The 70th session of the United Nations General Assembly, UN member states convened a special summit for the adoption of the post-2015 development agenda. This culminated in development and adoption of UN Millennium Development Goals (MDGs). To achieve these goals, the Sustainable Development Goals (SDGs) were subsequently developed with an aim of uniform applicability across the globe (Woodbridge,2015). Johnston, Everard, Santillo and Robèrt (2007) opines that the definition of sustainability is dependent on the context in which it is applied, that is whether on Environment, Social or Governance consent. In the context of Environmental sustainability, sustainability is maintenance of natural capital for future generations (Moore, Mascarenhas, Bain &Straus, 2017).

Environmental Sustainability from the business perspective stems from the paradigm shift from shareholder's view to stakeholder's view of the business. These are the two arguments on existence of a firm which are hotly debated topics in economics and finance research. The shareholders view indicates that the sole reason for existence of a firm is to make profit (Friedman Savage & Becker,2007). The stakeholders view on the hand emphasizes, the need for all stakeholders to be engaged in the overall decision making of the firm. Thus, the stakeholders view advocates that, the organisations goes beyond shareholder's profit making motive and consider all the other stakeholder's interests in the decision making (Jensen & Meckling, 1976). The seminar paper by Jensen and Meckling indicates that the firm should be seen as a nexus of contracts which emphasizes the shareholder's primacy as key to attainment of the corporate goal. In line with this, amongst the various interests, is the environmental concerns which form the wider part of the Environmental, Social and Governance

(ESG) issues which enable the sustainability. Therefore, firms should strive to address environmental concerns in addition to profitability and interests of other stakeholders. Narrowing down to the environmental concerns, there lies the concept of green financing and green investments. Green finance is the financing of investment in all financial sectors and asset classes that integrate environmental, social and governance (ESG) criteria into the investment decisions and include sustainability into risk mitigation in order to encourage the development of a more sustainable economy. The essence of green financing and investment is in investments in those sectors and those products that are environmental friendly to ensure sustainability. The Global Sustainable Investment Alliance (2018) indicated that the amounts spent in incorporating ESG globally stood at US$30.7 trillion in 2018, this amount is equivalent to 42.32% of total assets under management and therefore substantial. Though green investment is on the rise in Africa, the investments standing at $428.3 billion in assets, the continent is lagging behind the international peers with Europe leading in such investments. This calls for institutes of higher education to come up with innovations especially in the investments that are likely to reduce environmental degradation.

The importance of Education cannot be emphasized with United Nations designating the period between 2005 and 2014 the United Nations decade of Education for Sustainable Development. Similarly, the AU's second decade of education for Africa 2006-2015 Plan of Action, highlighted the importance of knowledge and innovation to the global well-being. According to UNESCO (2004), education plays a role in empowering people and changing the way they think and work towards sustainable future. UNESCO (2004) puts emphases on education system that is streamlined to deal with issues that affect climate change, poverty eradication and other issues indicated under the UN (2014) Millennium development goals. This calls for participatory education system that dedicates its resources towards development of green technology that can ensures economic development while taking care of the well-being of the environment. Accordingly, Hill and Birch-Thomsen (2005) indicates that for Higher education to achieve the sustainability goals, they must be forward looking and serve the society beyond the heights of the science and technology.

There is need for streamlining the higher education with the sustainability goals commonly referred to as Economic, Social and governance (ESG). Emphases in this case should be on technology Universities and TVET institutions coming up with innovations and technological advancements that addresses the economic, social and environmental concerns (Grimpe and Fier, 2010). Narrowing down to environmental concerns, there has been a consensus amongst the academia and policy makers that Universities and other academic institutions have a key role in coming up with innovation and technological advancements that addresses the environmental concerns (Camison and Fores, 2010). For this to be possible, there is need for continuous interrogation of the various stakeholders, especially students as to the awareness level of different products and technologies that may be used to address the various sustainable goals. Since education is the primary producer of knowledge, higher education can serve as a key tool to help in creation of sustainable future. This has led to development of the concept of "education for Sustainable Development" as one of the core educational initiatives to help in addressing the problems facing the humanity as indicated in the MDGs (Blessinger, Sengupta & Makhanya, 2018). Despite this, Nyerere et al.,2015 conclude that, in African context, though extant strides have been made in integrating sustainable development goals with higher education programs, African Universities and TVET colleges still lag behind compared to their counterparts globally in their contribution towards cutting edge research and technology. Closer home, Kenya is at its initial stage of integrating her higher education with global scientific community.

1.1 Statement of the problem

The economy of Kenya has traditionally been strongly reliant on environmental goods and services. Kenya's economic growth is on the rise, and environmentally sustainable techniques must be incorporated into the process. According to the Kenya National Climate Change Action Plan 2015-2020, Extreme climatic occurrences might cost the Kenyan economy up to $500 million each year, which equates to around 2.6 percent of the country's GDP in 2013. This economic costs shall rise in the future, with some sources estimating that they would reach the equivalent of 7% of GDP by 2030. As a result, the importance of higher education in mitigating such negative consequences cannot be overstated. The MDGs place a greater emphasis on high-quality, innovation-driven education that considers environmental, social, and governance issues. To focus on the environmental agenda, science and technology must be integrated into current curricula with the goal of producing graduates who are capable of identifying the best investments and funding options that are environmentally benign. For this to happen, students in higher education, including TVET and technical universities, must be constantly informed about green financing and investment options in order to stimulate innovative thinking through the use of science and technology instruments (Mochizuki, 2015).

Nyerere, Mfune, Fuh, Sulemana, Mutisya, Yiran &Odingo (2015) alludes that, in African context, emphases should be on the importance of higher education, research and innovations to come up with programs that not only lead to accelerated economic development but also considers social aspects of the population, while ensuring the well-being of the ecosystems within the environment. However, the connection between Kenya's environmental challenges and opportunities for green growth, and the role financial institutions plays in apportionment of funds is not widely recognized. For instance, it is not addressed in Vision 2030, and the central bank financial stability report (Bjerborn & Kirima, 2015). Similarly, the role of academia in promotion of green investments and financing has not been adequately addressed and especially in the institutions of higher learning. Higher Education Development for a Green Economy & Sustainability (HEDGES) baseline survey (February 2021) indicated that the concept of green economy is not well defined in the existing curriculum, Similarly, the concept of Green Economy in Higher Learning Institutions has not been well understood and practiced. This raises the question as to how science and technology can be applied in coming up with innovations that culminate to attainment of environmental sustainability.

From the discussion above, the study was carried out with the following objectives

i) To determine the awareness level of green investments amongst the technical universities and TVET students.
ii) To carryout comparative analysis of the awareness level of green investments between Technical University students and TVET students compared to students of other institutions.
iii) To carryout comparative analysis of the awareness level of the various green investments between female and male Technical and TVET students.
iv) To assess whether the higher institutes have embraced science and technology in coming up with innovations that enable green investments
v) To make recommendations on various opportunities in green investments and technologies currently applied.

2. Literature Review

The concept of sustainability is fast gaining traction in the economic and financial literature. The concept was first introduced in the 1970s and 1980s during United Nations conferences on environmental interpretation. This study approaches environmental sustainability as a multi-attribute method in which economic and environmental components are interconnected and linked. The core principle of sustainability is that there should be a clear link between current and future generations (Soppe, 2004). The concept of sustainability has even gained more prominence in the present-day century with recognition that, global economy is highly affected by three big issues: environmental degradation, vitality constraints, and economic-related emergencies. Green finance has come up as a means of achieving a balance between the economy and the environment. according to the International Finance Corporation (2014) green finance is described as investment solutions that protect the environment, assure social justice, and create economic success. Lindenberg (2014) defined the notion as financial institution policies that support the green economy.

In regard to environmental sustainability, there is interlink between Millennium Development Goal "7" and "4", that's is, sustainable environment and education agendas. This paper adopts the definition of Environmental sustainability as 'maintenance of natural capital' as indicated by Goodland (1995). Higher education makes the most significant contribution to environmental sustainability by equipping enormous numbers of graduates with the knowledge, skills, and attitudes that enable industry, government, and society as a whole to develop toward more sustainable living and working practices (Chalkley, 2006). Whereas the role of higher education in the attainment of sustainable goals and in particular environmental sustainability is no doubt widely accepted, it remains unclear as to whether the technical Universities and TVET students are fully aware of the current day developments in green economy as a way of ensuring environmental sustainability. Similarly, the acceptance of the concept of green investments and financing has not been properly interrogated with an aim of encouraging such graduands to take advantage of such investments.

The study is anchored on social responsibility theory, demand pool theory and science theory. While the demand pull theory stresses market forces as the primary determinant of technological advancements that lead to economic growth, the science push theory acknowledges science as the primary determinant of industrial innovations. Those who believe science is the principal driver of innovation and economic prosperity emphasize the primary and critical function of higher education institutions as centers of learning.

In a study conducted by Nyerere et al. (2015) to determine the role of higher education in the development of a sustainable African society, they discovered that institutes of higher learning have not only embraced sustainable development (SD) in their teaching and learning, but have also gone beyond the walls of their universities to engage with communities in their search for solutions to the numerous problems that face the continent. However, their efforts were hampered by a lack of finance to support research and development. Furthermore, while government support for higher education, science, and technology prevailed, such support often ignored teaching practices aimed at instilling creative thinking, which is critical for societies to be sustainable and resilient. Despite the fact that this study is the largest attempt to link higher education with innovations for sustainability, the paper took a broad approach and looked at science and technology applications at the university level. This paper

expands on their study by examining the awareness level of different green economy opportunities and innovations, the scope is also broadened to include institutions other than universities.

In an attempt to review studies on green finance of banks, Akomea-Frimpong, Adeabah, Ofosu, & Tenakwah (2021) found that green securities, green investments, climate finance, carbon finance, green insurance, green credit and green infrastructural bonds as part of key green finance products of banks. Further, the study documents Environmental and climate change policies, interest rates, religion, risks, social inclusion and social justice, and banking regulation as imperative determinants influencing bank green finance policies. In addition to green investments and financing, the current paper examines the level of awareness among higher education students and incorporates scientific and technology advancements as significant drivers of environmental sustainability.

Odhiambo (2018) in interrogating the role of Kenyan Universities in enhancing economic development contend that University education's contribution to society's long-term growth has become one of the most essential activities of higher education institutions. The paper further contends that, it's time the role of institutes of higher learning is evaluated and redefined in order to determine their contribution to sustainability. The paper also points out that maintaining quality and efficiency standards with limited resources has been one of the major challenges in university education, as recently highlighted by a commission on higher education report, and that this has had an impact on the sector's contribution to the country's development. Whereas the paper identified the challenges facing higher education in endeavors to achieve intended targets, the current paper shall shift focus to students and interrogate the awareness level of green financing and innovations necessary in attainment of sustainable environment.

3. Methodology

3.1 Sample and data collection

The study adopted a mixture of documentary analysis and questionnaire. A questionnaire was issued to students in **three** technical Universities, **three** TVET institutions and **three** from other institutions of higher learning. The student was purposively selected and questionnaire issued. ANOVA analysis and descriptive analyses was carried out.

3.2 Analysis

The data was analyzed using both descriptive and inferential statistics

3.4 Research findings, discussions and conclusions

This section provides the research finding, conclusions and recommendations to practice based on the objectives earlier indicated:

In determining the awareness level of the green investment opportunities amongst Technical University students and TVET student, it was found that on average the students are not aware of the green investments opportunities, in fact most students **averaging 99%** could not list green investment opportunities that are available in Kenya. It was therefore concluded that that the awareness level of various green investment opportunities is low amongst the Kenyan University students the study recommended that the curriculum be reviewed to include the environmental component and in

particular green financing and investment component. The Commission for University Education in regulating the university programmes to be offered should make it compulsory for all programmes to have environmental component. Similarly, The Technical and Vocational Education and training authority in its role of accrediting and inspecting programmes and courses, should emphasize on programmes with environmental component.

To further understand whether there is significance difference between the Technical Universities and TVET students compared to students in other universities in the awareness level, evidence indicated that there is significance difference between the awareness level (**P Value =0.038).** It was therefore concluded that, students in other institutions are more aware of the green financial investments than the technical universities and TVET students**.** In view of this, it is recommended that Technical Universities and TVET having been formed with ultimate intentions of coming up with various innovations by application of science and Technology, more emphasis should be put towards creating awareness of this green investments. Indeed, the ministry of education and its various commissions should put more emphasis on programmes with emphases on green investments. To solve environmental, economic, and social concerns, improve education on green technologies, circular economy, industrial symbiosis, and sustainable production consumption.

In attempt to determine whether there was significance difference in awareness level between male and females. The research findings indicated that there was significance difference between male and female. (p=0.04). in conclusion therefore, Female were found to be more aware than the male of the green financial investments. Its therefore recommended. It is therefore recommended that, as much as the awareness level when female and male of this institutes was below average, the institutions should put more efforts in promoting awareness on male.

In an attempt to determine whether the higher institutes have embraced science and technology in coming up with innovations that enable green investments, it was found that on average, most Technical universities and TVET institutions do have the requisite tools to embrace green investments (Mean= 0.32). it was therefore concluded that, most institutes have not embraced Science and technology as a key tool to innovations. Its therefore recommended that the government provides funding to this this institutes in order to help them in coming up with these investments.

In line with objective five and from the documentary review, one of the most important natural resources we have is water. There is considerable fear the world will run out of fresh water due to climate change. The European Environment Agency notes that some 20 European countries depend on other countries for more than 10% of their water resources. Five (the Netherlands, Hungary, Moldova, Romania, and Luxembourg) rely on rivers that flow in from other countries to provide more than 75% of their water. In the United States, cities from Los Angeles to Miami are concerned about water scarcity as climate change takes a toll on water resources. In Kenya, out of approximately 50 Million of the population, 16 Million do not have access to clean water while 24 million people lack access to improved sanitation (Water.org, 2021). In view of this documentary finding, green financing and investment have a key role to play, to be noted Kenya unlike the developed counterparts, has not developed securities whose aim is to encourage investments in clean and sustainable areas. It is therefore recommended that the Capital markets to work in collaboration with NSE to come up with such securities and the syllabus be updated with such opportunities technical and TVET students.

Specific source could include Exchange-traded fund offering which basically support water projects. Other areas to consider include areas in wind, solar, green transportation, waste reduction, organics, aquaculture and geothermal. Once the government incorporates specifically tailored learning in the area of green finance, then Kenya will be in a position to overcome challenges brought by the ever changing climate conditions and effects of pandemics like the covid 19 pandemic

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Influence of Lean Production Practices on Performance of Large Manufacturing Firms in Kenya

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Abstract

The study sought to establish the influence of lean production practices on performance of large manufacturing firms in Kenya. The unit of analysis consisted of 138 large manufacturing firms registered with the Kenya association of manufacturing under the category of large scale manufacturing firms; the unit of observation consisted of the Heads of Supply chain, Production and Logistics. Data was collected using questionnaires. The approaches to ensure validity were content validity and construct validity. Data reliability was measured using Cronbach's alpha. The data collected was analyzed by use of descriptive and inferential statistics aided by Statistical Package of Social Sciences (SPSS) version 22. Bivariate regression model was used to show the relationship between the variables. The study findings indicated a positive significant influence of lean production on performance of large manufacturing firms. The study recommends the need by manufacturing firms in Kenya to enhance adoption of the lean production practices such as having a continuous improvement programs in terms of production, automation and use of just in time concept to a great extent so as to improve performance significantly.

Key Words: Lean production, Performance of large manufacturing firms, Kenya

1. Background of the Study

Manufacturing establishes for a better welfare for the citizens. Tybout (2000) suggests that the manufacturing sector is well taken care of by policy makers because it is the tool for modernization, employs skilled workforce, and results. The business environment has changed dramatically in the last few years, especially in developing countries. Regionally the manufacturing sector in Kenya is growing far slower at rate of 7% than those in Ethiopia at 24%, Rwanda 35%, Tanzania 25% and Uganda 22%. If this trend continues, other East African countries will begin to dominate manufacturing in the region. Further, governments in East Africa seem to be putting more pronounced effort into building manufacturing through the creation of industrial parks (Ethiopia) and making land available for manufacturing, particularly labor-intensive manufacturing. Uganda and Tanzania are also determinedly positioning themselves as investment destinations for manufacturing in the region. Kenya does not seem to be echoing this impetus (ODI, 2016).

In terms of growth of the value of manufacturing exports, Nigeria is a leader in Africa a study by ODI published earlier this year looked at data from Ethiopia, Kenya, Nigeria and Rwanda and the distribution of gross value addition by manufacturing subsector Food and beverages (usually a domestically-oriented industry) is the dominant manufacturing sector (40–70%), followed by textiles and clothing, which is more likely to be export-oriented (ODI, 2016). The 'other' category is a mixed bag; for example, 6% for cement in Nigeria, 12% for machinery and transport equipment in Kenya and 5% for non-metallic mineral products in Rwanda (ODI, 2016).

The good news from a regional perspective is related to the fact that the East African Community (EAC) is aligning itself as the next global manufacturing destination. Such regional initiatives can be leveraged by the manufacturing sector in Kenya and catalyze its growth. There is clearly room for growth, evidenced in the fact that the combined manufacturing sector in the seven countries in Eastern Africa as a whole is only about one-third the size of the manufacturing sector in Vietnam, which has a population one-third the size of the seven countries (AFDB, 2014). Locally manufacturing is very important sector in Kenya as it makes a substantial contribution to the country's economic development. The manufacturing sector in Kenya grew at 3.5% in 2015 and 3.2% in 2014, contributing 10.3% to gross domestic product (GDP) (KNBS, 2016). On average, however, manufacturing has been growing at a slower rate than the economy, which expanded by 5.6% in 2015. This implies that the share of manufacturing in GDP has been reducing over time. As a result, it can be argued that Kenya is going through premature deindustrialization in a context where manufacturing and industry are still relatively under-developed. Kenya seems to have 'peaked' at a point much lower than in much of Asia.

The sector is one of the key economic pillar in the vision 2030 geared to make the nation a middle level income country by the year 2030.The manufacturing sector is the third biggest industrial sector after agriculture and transport and communication (KPMG, 2014.Although Kenya is the most industrially developed country in East Africa, the manufacturing sector constitutes merely 10 per cent of the industrial sector contribution to GDP (RoK, 2014).

1.1 Statement of the Problem

Statistics from World Bank show that the manufacturing sector in Kenya is the third largest by sectoral contribution to GDP (10.3 per cent) (KNBS, 2016). Vision 2030 stipulates that the manufacturing sector should account for 20 per cent of GDP by 2030 (RoK, 2015; Mutindi, Namusonge & Obwogi, 2013; Achuora, Guyo, Arasa, Odhiambo, 2015). However, this fit is threatened by the poor performance of the manufacturing firms. The average annual growth rate of real GDP for the manufacturing sector declined from 10 per cent in the period 1974–79 to 4.8 per cent, 2.5 per cent and 3.8 per cent in the periods 1980–89, 1990–99 and 2000–07, respectively. Large scale manufacturing firms operating in Kenya registered stagnation and declining profits for the last five years due to a turbulent operating environment (WB, 2014). It is estimated that large manufacturing firms have lost 70 per cent of their market share in East Africa (RoK, 2014). Compared to the other sectors the manufacturing sector, which is dominated by large manufacturing firm slugged behind in output growth.

However the sector's contribution to the GDP has stagnated at an average of 10 per cent for more than ten years with a growth of 3.1 percent, significantly lower than the overall economic growth of 5.0

percent (WB, 2014). Although there has been a slight upswing in more recent years, the contribution of manufacturing to GDP has remained low; contributing 11.5 per cent and 12.8 per cent in the second quarters of 2009 and 2010, respectively. The manufacturing sector in Kenya has a huge untapped potential contribution to employment and GDP if the challenges facing this sector are properly addressed (Wagana & Kabare, 2015). If this problem is not addressed it will cause low economic development leading to lack of achievement of the vision 2030 with regard to the manufacturing sector, lack of competitiveness in the global market, loss of jobs consequently creating social injustice in the society. The aim of this study was to eventually help in determining what is needed to stop manufacturing firms from failing, stagnating in performance or relocating from Kenya resulting to job losses and therefore continue in operation to the foreseeable future.

1.2 Objective of the Study

To identify the influence of Lean production practices on performance of large manufacturing firms in Kenya.

2. Literature Review

2.1 Theoretical Framework

Theory of Constraints

The theory of constraints was appropriate theory for this study because it helped in understanding constraints which affect the efficiency and effective performance of organization i.e. in terms of production. The theory of constraint is a method of improvement in business which was developed from management of logistic perspective that is lean manufacturing and total quality. The theory aims at reducing the throughput time. The theory of constraints is a system management philosophy developed by Goldratt in the year 1984. This theory suggests that managers should focus on effectively managing the capacity and capability of the few core constraints contained in the organization if they are to improve the operational performance of the organization. The fundamental notion of the theory of constraints is that constraints establish the limits of performance for any system in the organization.

According to Dettmer (1996), theory of constraints challenges the managers on the need to reconsider some of their essential assumptions that help in achieving their goals and improve the operational performance. This theory focuses on understanding and managing the constraints that stand between an organizations and the attainment of its goals. Lean supply chain management as a strategy plays a major role in the performance of the organization that implements it and therefore the theory of constraints explains how the constraints that will be identified in the implementation of lean can be handled since theory of constraints acts as a thinking process and helps the managers in coming up with simple solutions to handle some of the most complex hitches (Goldratt, 2011). It provides a reliable process that insists on follow through and focuses on the enhancement of strategies in the areas where they will be of great impact on the bottom line and it's all about focus and follows through (William, 1996).

Conceptual Framework

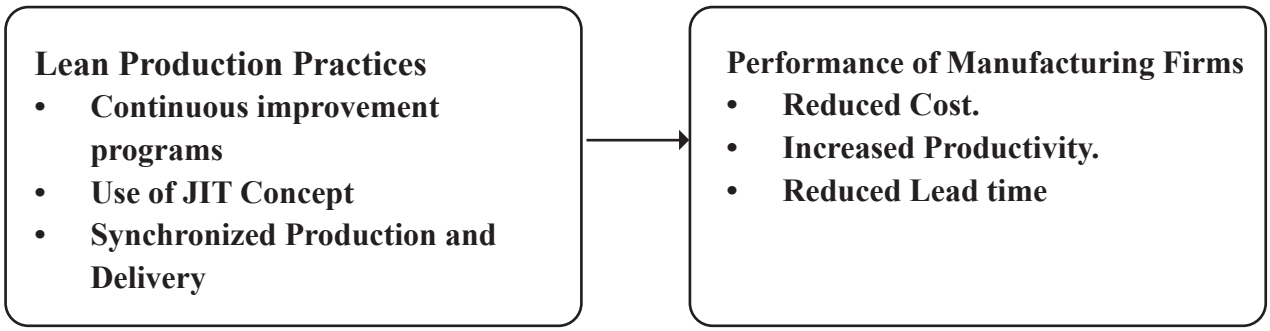


Figure 1 Conceptual Framework

2.2 Empirical Review

Argus and Iteng (2013) examined the importance of incorporating lean in production in the Malaysian manufacturing firms and its impacts on business operational performance. They tested the implementation of Just in time and technology and innovation use by interviewing senior managers in two hundred and five firms. Using regression analysis they concluded that long term implementation of lean supply results in improvement on business performance. However, many organizations have struggled to implement LSCM practices due to lack of awareness and improper implementation approach. Further, several studies have focused only on individual aspects of LSCM and very few researches have approached both upstream and downstream activities of the organization (Anand and Kodali, 2008; Jasti and Kodali, 2015; Riet et al., 2015).

Ferdoursi (2009) investigated the benefits of implementation of lean manufacturing practices in Bangladeshi garment manufacturing firms on operational performance. He selected nine garment manufacturing companies where he conducted survey with a semi-structured questionnaire and interviews with the respondent. He used purposive sampling to ensure the best possible scenario of lean practices in Bangladesh. The focus of the study was to investigate the improvement of manufacturing performance through lean practice in the Bangladeshi garment industry. His findings indicated that the selected companies had adopted a wide variety of lean tools and techniques and gained many performance improvements.

According to Alukal and Manons (2002), a planned implementation of lean production system leads to improved quality, better cash flow, increased sales, better productivity, improved morale and higher profits. It has also been argued that a lean organization optimizes the flow of products and services to its customers and that it delivers customer value by reducing lead times, improving quality, eliminating waste, reducing the total costs, engaging and energizing people (Industry Week, 2010). The Resource Based View and Lean Production both focus upon customer value, efficiency and waste (Peteraf and Barney 2003; Womack, 2002).

Keitany and Riwo-Abudho (2014) researched on the effects of lean production on organizational performance in Kenyan Milling firms. Their study was designed to determine the elements of lean production, effect of lean production systems on product quality, strategies for waste reduction and the challenges of adopting lean production. From the results, they established that flexible manufacturing is a major approach that firms can use to enhance lean production and JIT and Kaizen are other

approaches that firms can use to enhance lean production. From the results, they established that firms can improve lean production by adopting latest technology, involving staff, customer involvement, staff motivation to reduce resistance and proper integration of systems in the value chain, thus reducing wastes and increasing organizational performance. Numerous studies have been conducted in order to explore the relationships between LSC and different factors. One of the most important relationships investigated by researchers was the relationship between LSC and productivity. The results indicated that LSC has a positive impact on a product's quality, productivity and customer responsiveness (Rahman et al., 2010), productivity maximization (Agus and Hajinoor, 2012), cost performance (Hallgren and Olhager, 2009), waste elimination and productivity (Taj and Berro, 2006), and productivity of manufacturing firms (Jasti and Kodali, 2016; Taj and Morosan, 2011). One can conclude that LSC positively predicts the productivity of manufacturing firms.

3. Research Methodology

This study adopted the descriptive research design to answer the research questions using quantitative and qualitative approach. Descriptive research design was adopted in order to ascertain and describe the characteristics of the variable under study (Sekaran & Bougie, 2011). The study was anchored on the positivist research paradigm; it views the research as independent of the study they are conducting (Cooper & Schindler, 2011). The population targeted was 494 firms for this study which is classified as Large Manufacturing Firms as per Kenya Association of Manufacturers (2016). From the Firms the unit of respondents of this study was head of Production, Procurement and Logistics departments. Stratified random sampling method was applied to come up with the sample size, since the population in different large manufacturing firms does not represent a homogeneous group, therefore the method was generally applied in order to obtain a representative sample. The sample size was calculated according to the following formula (Kate, 2006).

$$n = \frac{t^2 \times p(1-p)}{m^2}$$

Where: n = required sample size, t = confidence level at 95% (standard value of 1.96) , p = estimated percentage prevalence of the population of interest – 10% , m = margin of error at 5% (standard value of 0.05). Therefore, the sample size (n) for this study was computed as follows:

$$n = \frac{1.96^2 \times 0.1 (1 - 0.1)}{0.05^2}$$

$$N = 138.30 \sim 138$$

This gives a sample size of 138 respondents. This implies that the study involved 138 large scale manufacturing firms that were selected through stratified sampling.

The research used structured questionnaire developed to capture the various variables understudy. Likert scale of 1-5 was used in formulation of the structured questions. The Likert-scale was used in this study since it is more reliable and objective and can easily indicate the presence or absence of the attitude (Mugenda & Mugenda, 2003). A pilot test was conducted on 10% of the entire sample size, which translated to 13 firms. The study used Cronbach alpha formula to test reliability which helped to find out internal consistency of the questionnaire. An alpha coefficient of 0.7 or higher indicates

that the data gathered is reliable as it has a relatively high internal consistency and can be generalized to reflect opinions of all respondents in the target population. Content validity was analyzed by professionals in the field such as university supervisors while construct validity was computed using factor analysis. Data was analyzed quantitatively using descriptive statistics including frequencies, percentages, mean and standard deviation using the Statistical Package for Social Sciences (SPSS) version 24 and inferential statistics using correlation and regression analysis. A linear regression analysis was used to establish the relationship between the study variables. The research used the following bivariate regression model:

$$Y=\beta o + \beta_1 X_1 + \varepsilon$$

Where; Y represents the dependent variable (Firm Performance), X_1 is lean production practices; ε is the error term of prediction.

4. Research Findings and Discussion

The study targeted 138 manufacturing firms in Kenya. Out of the number, 96 questionnaires were filled and returned which represented a response rate of 69.6%. For a descriptive study, a response rate of 50% and above is adequate for analysis (Kothari, 2004). Therefore 69.6% response rate is good for the study.

Instrument Reliability

The study conducted a pilot test to test for the instrument reliability. The thirteen participants in the pilot test were not included in the final study. Reliability of this instrument was evaluated through Cronbach Alpha which measures the internal consistency. Cronbach Alpha value is widely used to verify the reliability of the construct. The results are presented in Table 1.

1. Table 1: Reliability Coefficient

Variables	Cronbach's Alpha	Number of Questionnaire Items	Comment
Lean Production Practices	0.805	6	Reliable

The findings in Table 1 indicate that the variable in the study were reliable since the value of Cronbach Alpha was above the minimum accepted value of 0.7 as argued by Al-Tit and Hunitie (2015) that a value of 0.70 or more is enough for a scale to be reliable. This represented high level of reliability and on this basis it was supposed that scales used in this study was reliable to capture the variables. Ngechu (2009) explains that the higher the coefficient, the more reliable the data is. Performance was measured by secondary information and hence it was not included.

Sample Adequacy Test

The study sought to establish the construct validity of the data collected before using it for further analysis. However, the reliability of factor analysis is dependent on sample size; therefore it was necessary to determine the adequacy of the sample size before proceeding to conduct factor analysis.

To do that, the study adopted the Kaiser-Meyer-Olkin (KMO) test of sampling adequacy. According to Magd (2008) KMO is an index used to examine and justify the appropriateness of application of Factor Analysis. The KMO statistic is a measure of the proportion of variance among variables that might be common variance. The lower the proportion, the more suited the data is to Factor Analysis. A value greater than 0.5 is recommended for factor analysis (Field, 2009) and this is the threshold adopted in this study. The findings are presented in Table 2.

2. Table: 2 Kaiser-Meyer-Olkin (KMO) Test of Sample Adequacy

Lean Production	Approx. Chi-Square	97.147
	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.572
	Approx. Chi-Square	59.644
	Approx. Chi-Square	32.639

The findings presented in Table 2 indicate that the KMO test on all the factors in the study generated values greater than 0.5, implying that the sample size was adequate for further confirmatory factor analysis.

Confirmatory Factor Analysis

Communalities were used to indicate the substantive importance of variable factors where a loading value of 0.7 as a rule of thumb is believed to be satisfactory but due to the seemingly difficulties of meeting the 0.7 criterion a loading of up to 0.4 level is acceptable (Cooper & Schindler, 2011). Table 3 shows how much of the variance in the variables accounted for by the extracted factor; in other words, it shows the variations from the expected initial value which is one. The findings indicated that all the factors used to measure the study variables exceeded the criterion of 0.4 and thus no question was removed in line with Mugenda and Mugenda (2003).

Table 3: Confirmatory Factor Analysis

Confirmatory Factor Analysis of Lean Production		
	Initial	**Extraction**
Your company has continuous improvement programs in terms of production	1.000	0.747
There is automation and use of just in time concept in production hence elimination of all non-value added activities in your company	1.000	0.531
Your company has synchronized production and delivery throughout the supplier network	1.000	0.573
The company has implemented pull production based on demand	1.000	0.735
The company has implemented value stream in its system	1.000	0.619
The company has implemented quality control system on its production system	1.000	0.498

Descriptive Findings

Lean Production

The study sought to establish the respondents' agreement extent with the statements on the influence of Lean production practices on performance of large manufacturing firms in Kenya. The results in the table 4 show that 20.8% of respondents agreed to a very great extent that the company had continuous improvement programs in terms of production, 18.8% agreeing to a great extent, 21.9% agreeing to a moderate extent, 9.4% agreeing to small extent and 29.2% agreeing that the statement does not affect lean production at all.

On whether there is automation and use of just in time concept in production with elimination of all non-value added activities in the company, majority of the respondents 44.8% agreed to a very great extent with 27.1% agreeing to a great extent while 26% agreed to a moderate extent and only 1% agreeing to small extent and 1% agreeing that the statement does not at all affect lean production. Moreover, 24% of respondents agreed to a very great extent that their companies had synchronized production and delivery throughout the supply network with the majority, 33.3% agreeing to great extent with 13.5% both agreeing to a moderate extent and to a small extent while 15.6% agreed that the statement does not at all affect lean production.

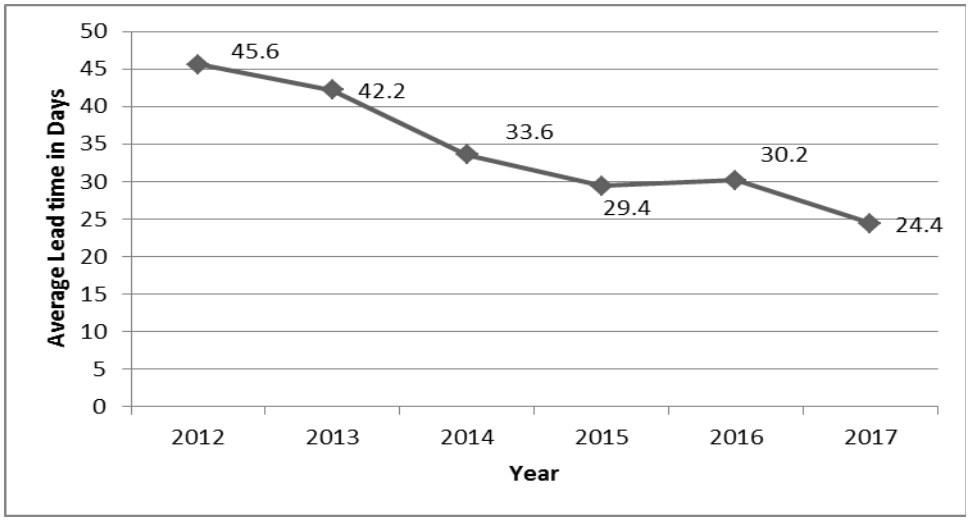
On whether the company had implemented pull production based on demand, 28.1% agreed to very great extent, 29.2% agreed to a great extent, 12.5% agreed to a moderate extent, 10.4% agreed to a small extent and 19.8% agreed that the statement does not at all affect lean production. Furthermore, 25% of respondents agreed to a very great extent that the company had implemented value stream in its system with the majority 33.3% agreeing to a great extent and 32.3% agreeing to a moderate extent. Similarly, only 4.2% agreed to a small extent that the company had implemented value streams in its systems with 5.2% agreeing that the statement does not affect lean production at all. Lastly, majority of respondents, 39.6% agreed to a great extent that the company had implemented quality control system on its production systems with 33.3% agreeing to a very great extent and only 27.1% agreed to a moderate extent. The findings are consistent with Alukal and Manons (2002) study which found that a planned implementation of lean production system leads to improved quality, better cash flow, increased sales, better productivity, improved morale and higher profits.

3. Table 4: Descriptive Analysis of Lean Production

Statement	5	4	3	2	1
Your company has continuous improvement programs in terms of production	20.8%	18.8%	21.9%	9.4%	29.2%
There is automation and use of just in time concept in production hence elimination of all non-value added activities in your company	44.8%	27.1%	26.0%	1.0%	1.0%
Your company has synchronized production and delivery throughout the supplier network	24.0%	33.3%	13.5%	13.5%	15.6%
The company has implemented pull production based on demand	28.1%	29.2%	12.5%	10.4%	19.8%
The company has implemented value stream in its system	25.0%	33.3%	32.3%	4.2%	5.2%
The company has implemented quality control system on its production system	33.3%	39.6%	27.1%	0.0%	0.0%

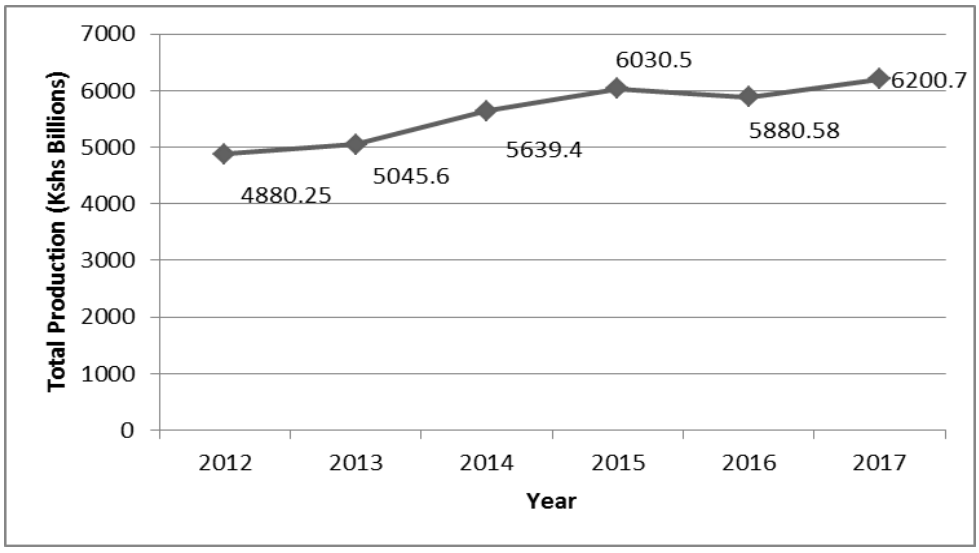
Performance of Manufacturing Firms

The performance of manufacturing firms was measured as costs, lead time and production levels. The quality of products was also measured as the defects units returned to the firm. Since the firms are not listed, the data was filled by the firms. The subsection discusses the findings. The findings in figure 2 indicates that on average, the number of days taken to completely accomplish a supply chain process has been decreasing in the five years investigated from an average of 45.6 days to 24.4 days in the year 2017. The findings are consistent with Phogat (2013) who argued that application of lean practices leads to substantial improvement, better lead-times and enhanced customer value.



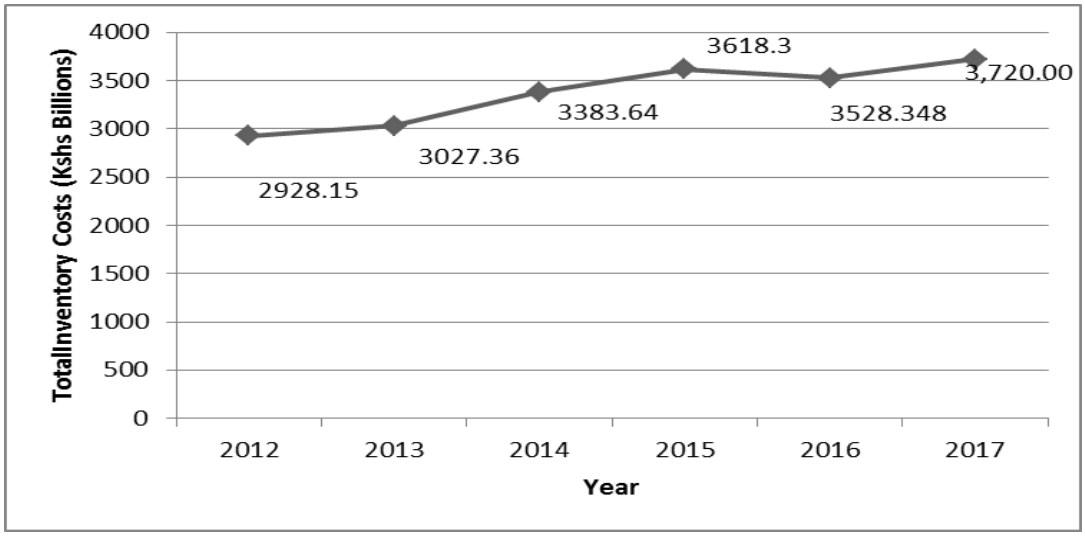
4. Figure 2 Average Lead time in Days

The study also sought to establish the total production of the manufacturing firms for the last five years as shown in Figure 3. It was established that on average, the total production has indicated unsteady trends although it stands between 4.8 and 6.2 Trillion. The findings however agree with the KAM report that the sector has had unsteady trends. The findings are consistent with the argument by Argus and Iteng (2013) who indicated that lean practices led to an improvement in business performance in terms of increased production and sales.



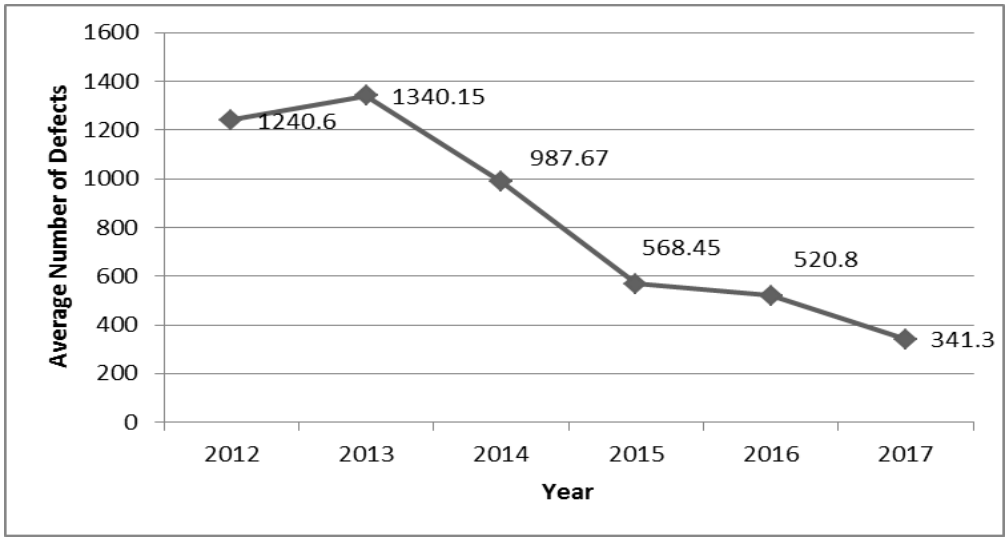
5. Figure 3 Total Production

The study also established the total inventory costs and presented the trends as shown in Figure 4. It was revealed that the inventory costs have been increasing before a decrease in the year 2016. On average, the inventory costs have increased from 2.9 Trillion in the year 2012 to 3.7 Trillion in the year 2017. The findings indicate the performance of the large manufacturing firms in terms of production costs is high and need to be managed by methods among them lean practices. The findings are consistent with Achuora, Guyo, Arasa and Odhiambo (2015) who agreed that the manufacturing firms in Kenya have had turbulent performance with high costs.



6. Figure 4 Total Inventory Costs

The performance of the manufacturing firms was also captured in terms of the quality of products measured as the number of defects recorded by the companies. The findings presented in Figure 5 indicate that the number of defects have decreased from an average number of 1240.6 return inwards due to defects to an average of 341.3 units. The findings indicate that adoption of lean practices has led to management of defects. The findings are consistent with Alukal and Manons (2002) who indicated that a planned implementation of lean practices leads to improved quality, better cash flow, increased sales, better productivity, improved morale and higher profits.



7. Figure 5 Number of Defects

Correlation Analysis

The study used correlation analysis to establish the association among the variables used in the study. The results finally indicated that there is a positive and significant association between lean production practices and performance of large manufacturing firms in Kenya as shown by Pearson correlation value of 0.346 and level of significance of 0.001 which is less than 0.05. The results imply that an improvement in lean production practices such as having a continuous improvement programs in terms of production, automation and use of just in time concept in production hence elimination of all non-value added activities in your company, having a synchronized production and delivery system throughout the supplier network, implementing pull production based on demand, value stream in its system and quality control system on its production system results to a positive and significant improvement in the performance of large manufacturing firms in Kenya.

The findings relating to lean production are consistent with the findings of Argus and Iteng (2013) who examined the importance of incorporating lean in production in the Malaysian manufacturing firms and its impacts on business operational performance and established that long term implementation of lean supply results in improvement on business performance. The findings are also consistent with Ferdoursi (2009) who investigated the benefits of implementation of lean manufacturing practices in Bangladeshi garment manufacturing firms on operational performance and the findings indicated that the selected companies had adopted a wide variety of lean tools and techniques and gained many performance improvements.

10. Table 5 Correlation Matrix

Correlations		**Lean production practices**	**Performance**
Lean production practices	Pearson Correlation	1	
	Sig. (2-tailed)		
Performance	Pearson Correlation	.346**	1
	Sig. (2-tailed)	0.001	
	N	96	96

Diagnostic tests

Before running the regression model, the assumptions of Ordinary Least Square regression were observed. Normality of the dependent variable was established using Smirnov Kolmogorov and Shapiro Wilk test. The study also tested for homogeneity of variance (Heteroscedasticity) and Linearity using Levene's test as well as scatter plot. The findings are presented and discussed in the subsections that follow.

Normality Test

In order to make inferences from an analysis, assumption of normally distributed dependent variable is very important. The study used both kolmogorov-Sminorv and Shapiro- Wilk normality tests. However, the Shapirao Wilk results were interpreted since the data set is less than 2000. In both tests, if the test of normality yields a figure of less than 0.05 it means that the data is not normally distributed. The findings are presented in Table 6 below. The findings indicate that all the variables had insignificant Shapiro Wilk values and Kolmogorov Smirnova values (greater than 0.05) implying that the variables were normally distributed.

11. Table 6 Test of Normality

Tests of Normality	**Kolmogorov-Smirnova**			**Shapiro-Wilk**		
Variable	Statistic	df	Sig.	Statistic	df	Sig.
Lean Production	0.116	288	0.058	0.973	96	0.065
Performance	0.142	288	0.052	0.96	96	0.058
Lilliefors Significance Correction						

Heteroscedasticity

Heteroscedasticity means a situation in which the variance of the dependent variable varies across the data, as opposed to a situation where Ordinary Least Squares (OLS) make the assumption that variance of the error term is constant (Nordgaard *et al*., 2010; Field, 2013). To test heteroscedasticity, the study adopted Breusch Pagan test (Tabachnick & Fidell, 2013). The findings indicated in Table 7 indicate that the Prob > Chi2 value which represents significance is greater than 0.05 which indicates that the null hypothesis of constant variance is not rejected. This shows presence of homogeneity hence a regression model was suitable in this study.

13. Table 7 Breusch-Pagan / Cook-Weisberg test for Homoscedasticity

Breusch-Pagan / Cook-Weisberg test for Homoscedasticity
Ho: Constant variance
chi2(3) = 8.57
Prob > chi2 = 0.134

Homogeneity and Linearity

The study also tested for homogeneity and linearity using Levene's test. The findings are presented in Table 8 below. The test for linearity has a significance value of 0.000 which is smaller than 0.05, indicating that there is a linear relationship between lean supply chain management and performance of manufacturing firms. The test for deviation from linearity has a significance value of 0.45 which is greater than the significance value of 0.05, which means that there doesn't exist a nonlinear relationship in addition to the linear component.

15. Table 8: Levene's Test of Homogeneity and Linearity

ANOVA Table			**Sum of Squares**	**Mean Square**	**F**	**Sig.**
Performance * Independent	Between Groups	(Combined)	8.295	0.094	1.736	0.226
		Linearity	2.735	2.735	50.376	0.000
		Deviation from Linearity	5.56	0.064	1.177	0.45
	Within Groups		0.38	0.054		
	Total		**8.675**			

Regression Analysis

To establish the influence of Lean production Practices on Performance of Large Manufacturing Firms in Kenya, other factors held constant, a bivariate regression model of the form below $Y= \beta_0+ \beta_1X_1 + e$ was used where Y = Performance of large manufacturing firms in Kenya and X_1 = Lean Production Practices. The results showed that, other factors held constant, Lean production Practices explains up to 12% of the variations in performance of large manufacturing firms in Kenya as indicated by an R-square value of 0.12. The findings also showed that the correlation between Lean production practices and performance of large manufacturing firms in Kenya was positive at a value of 0.346. The model significance results indicated that the model linking Lean Production Practices and Performance of large manufacturing firms in Kenya was significant as shown by a significant F statistic vale of 0.001 (Sig <0.05) at 5% level of significance. This implies that Lean production Practices can be used to predict performance of large manufacturing firms in Kenya.

The regression results of the study also showed Lean Production Practices positively and significantly influence the Performance of Large Manufacturing Firms in Kenya as indicated in Table 9. This is shown by a positive beta coefficient of 0.196 and significance value of 0.001 (Sig < 0.05) at 5% level of significance. The results imply that other factors held constant, a one unit increase in Lean Production Practices leads to a 0.196 units increase in performance of large manufacturing firms in Kenya. These findings are consistent with Alukal and Manons (2002) who argued that a planned implementation of lean production system leads to improved quality, better cash flow, increased sales, better productivity, improved morale and higher profits. The findings also support the assertion by Industry Week (2010) that a lean organization optimizes the flow of products and services to its customers and that it delivers customer value by reducing lead times, improving quality, eliminating waste, reducing the total costs, engaging and energizing people.

17. Table 9 : Regression analysis of Lean Production Practices and Performance

Model Summary			
R	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
.346[a]	0.12	0.11	0.285

ANOVA					
	Sum of Squares	**df**	**Mean Square**	**F**	**Sig.**
Regression	1.04	1	1.04	12.801	.001
Residual	7.635	94	0.081		
Total	8.675	95			

Model Coefficient					
	Unstandardized Coefficients		**Standardized Coefficients**	**t**	**Sig.**
	B	**Std. Error**	**Beta**		
(Constant)	2.07	0.135		15.298	0.000
Lean Production Practices	0.196	0.055	0.346	3.578	0.001
Dependent Variable : Firm Performance					
Predictor Variables : (Constant), Lean Production Practices					

The optimal regression model therefore becomes:

$Y= \beta_0 + \beta_1 X_1 + e$
Performance of Large Manufacturing Firms = 2.07 + 0.196 (Lean Production Practices)

Conclusions

The study findings led to the conclusion that an improvement in lean production practices such as having a continuous improvement programs in terms of production, automation and use of just in time concept in production hence elimination of all non-value added activities in your company, having a synchronized production and delivery system throughout the supplier network, implementing pull production based on demand, value stream in its system and quality control system on its production system results to a positive and significant improvement in the performance of large manufacturing firms in Kenya.

Recommendations

The study also recommends that since lean production practices lead to an improvement in performance of large manufacturing firms, there is a need for the firms to enhance adoption of the lean production practices such as having a continuous improvement programs in terms of production, automation and use of just in time concept in production hence elimination of all non-value added activities the company, having a synchronized production and delivery system throughout the supplier network, implementing pull production based on demand, value stream in its system and quality control system on its production system to a great extent so as to improve performance significantly.

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The effect of Procurement Related Losses on Financial Sustainability of County Governments in Kenya

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Abstract

Kenyan government loses about one third of the national budget to corruption, through unexplained purchases in the County Governments as is annually raised by the Auditor General's. For example, in Vihiga County Government in 2018/2019 financial year, Kshs. 3,454,884 and another Kshs. 15,805,000 was raised as an audit query of unexplained legal fees expenditure and purchases of motor vehicles and land. In Busia County Government, Kshs 6,699,428 and Kshs. 7,800,000 in contracts of the construction of faulty laundry machines. In Marsabit County Government, Kshs. 1,475,000 of supply of solar power systems was raised as unsupported purchase of fuel. The investigations examined the effect of procurement related losses on financial sustainability of County Governments in Kenya. We tested the hypothesis HO1: that procurement related losses do not significantly affect financial sustainability of County Governments in Kenya. The study used a casual correlation research design taking a census of the 47 County Governments in Kenya. The study analyzed panel data regression between 2014 and 2018, a period of 5 years. The study established statistically significant effect of procurement related losses in audit queries raised by the Auditor General's on financial sustainability of County Governments (β =-1.20875, p=0.008) indicating that an increase in procurement related losses in audit queries by 1 unit leads to a decrease in financial sustainability of County Governments in Kenya by 1.20875 multiple units. The study therefore concluded that procurement related losses in audit queries raised by the Auditor General's negatively affected financial sustainability of County Governments in Kenya. The study recommends that the County Governments in Kenya should evaluate their respective Procurement Policy aligning them with PPADA, 2015 with a deliberate intention of reducing procurement related losses.

Key words: Procurement Practices, Audit Queries, Public Finance, Financial Sustainability

1. Introduction

Government spending is a major component of economic activity, and public procurement, in particular, accounts for around 12% of GDP in OECD countries (OECD, 2017a, OECD, 2020). The magnitude of public procurement has captured scholarly interest and generated a vast number of articles, special issues, books, and reports (e.g. Aschhoff & Sofka, 2009; Chicot & Matt, 2018;

Edler & Yeow, 2016; Edquist, 2011; Edquist, Vonortas, & Zabala-Iturriagagoitia, 2015; European Commission, (EC), 2018; OECD, 2017a; Rolfstam, Phillips, & Bakker, 2011).

Procurement largely contributes to the local market in developing nations. The economy of majority of these nations is highly dependent on the way procurement activities are managed. Most government institutions utilize procurement avenues to promote local industries, enhance regional balance and bring about equality in the society at large (Kihara, 2009). Despite the vital role played by procurement practices, it has been an avenue of wastage of public resources in the process benefiting few individuals, especially cartels in the government (Mokaya, 2013).

Public procurement is defined as 'the purchase by governments and state owned enterprises of goods, services and works' from other organizations, such as from firms (OECD, 2020). Procurement is not only an operational act (the purchase) but also an administrative process, which (despite national differences in procurement practices) in general's consists of several stages: the initial recognition of a public need (conceptual stage); the craft of the procurement contract (design stage); the call for tenders (tendering, or offering stage); the decision-making on proposals and the award of the contract (contract stage); the actual purchase (supply or execution stage); and the post-procurement evaluation of the provision (auditing stage) (see Osei-Tutu, Offei– Nyako, Ameyaw, & Ampofo, 2014).

It has been researched, that wrong deliveries of construction materials is a major setback in the construction sector. The problem of wrong deliveries in the construction sector is a global phenomenon. Wrong deliveries of materials and services give rise to dissatisfaction to all the parties involved and the main role of procurement directors and procurement managers is to make sure that supplies are delivered at the most economically advantageous tender or tender that gives the overall best value for money to specifications.

According to Lysons and Farrington (2017), wrong deliveries include deliveries that do not meet quality of materials specified, deliveries of materials that are not fit for purpose and deliveries of materials that are not required by the procurers and their user departments. Procurement is a crucial element in the working functions of any state. It refers to the purchasing of goods and services in the right quality, from the right source and the right price all to meet a specific need. Every government has the obligation to provide essential services to its citizens.

According to PPOA (2010), there is very little that has been achieved even with the regulations set out in the (PPADA, 2015), the Kenyan procurement system still faces a myriad of challenges with a highlight on losses of funds associated to procurement malpractices. The process still chokes with political interference at the highest level of government. The government and the economy have lost billions to scandals and scams linked to sourcing/procurement processes; Ken Gen, Goldenberg, Anglo leasing on mention of a few cases. Interference from political entities and persons who have intervened either at contract award or implementation of investigative reports continue to limit and thwart efforts to clean and streamline the procurement processes (World Bank, 2008). Audit Reports from responsible authorities point to a mismatch on the usual cost- benefit metrics on procurement processes (Mukinda, 2014).

In 2016, former head of the Ethics and Anti-Corruption Commission (EACC) Philip Kinisu reported that Kenya loses about KSh600 million to corruption each year. At the time, this translated to about a third of the entire national budget. Earlier this year, the president said that over KSh2 billion is stolen every day from government coffers. Granted, this sparked quite the reaction on social media, but nobody really knows how much Kenya actually loses to graft. One of the main reasons for this is the opaqueness of public procurement. For the government to provide services to the citizens of Kenya, it is at times necessary to contract with private entities to deliver goods or services. Indeed, the Public Procurement and Asset Disposal Act of 2015 provides a framework for efficient procurement by public entities. Under this framework, it is crucial that such procurement is conducted or implemented in a transparent manner.

This is especially crucial when dealing with foreign-registered companies. Some may remember the story of CMC Ravenna, the Italian company that filed for bankruptcy in its own country shortly after it had received a KSh15 billion down payment by the Kenyan government for the construction of Arror, Kimwarer and Itare dams. The total value of the three contracts was KSh150 billion. In 2013, Washington, DC-based think tank Global Financial Integrity (GFI) estimated that the Kenyan government lost potential revenues of KSh97 billion for the year to trade misinvoicing of which KSh21 billion was attributed to uncollected corporate income tax. Meanwhile, Kenya's budget has been steadily increasing from KSh2.2 trillion for the 2015/16 financial year to KSh3 trillion for the 2019/20 financial year. And of course, most of the tax burden falls on ordinary Kenyans and is supplemented by heavy borrowing, which citizens eventually have to pay for.

Financial Performance

Financial performance according to Richard, Devinney, Yip and Johnson (2009) relate to the results of an organization as compared to the expected results for the period. This financial performance is often observed in two main aspects profitability and sales level. Traditionally, business organizations have relied on profitability such as profit after tax and operating profit to measure performance. However, modern firms have attempts to indicate performances of enterprises by utilizing modern models such as the balanced scorecard in which case performance is measured through different varying dimensions which are financial in nature (including profitability and return on investment), and non-financial such as service to customers, responsibilities to the society (outreach to the community and corporate responsibilities) and stewardship by employees. Hence, Modern firms use a combination of financial performance (profits, return on assets, return on investment, etc.); product market performance (sales, market share, etc.) and shareholder return (total shareholder return, economic value added) (Kuloba, 2016).

Profit oriented organizations measure performance in terms of productivity and profit. However, this is not the case in public sector organizations. Private firms endeavor to maximize their profitability while public institutions aim to offer services more efficiently, satisfy the user and the continuously improve their services. Consequently, performance in the public sector is viewed in terms of effectiveness and efficiency of utilization of scarce resources and how they use the tax payers' money to provide services (Kingei, 2015). Public sector organizations according to Boland and Fowler (2010) may therefore adopt various measure of performance such as productivity, customer service, and employee retention, levels of absenteeism, motivation, innovations and surpluses.

County Governments in Kenya

The County Governments in Kenya are geographical units envisioned by the 2010 Constitution of Kenya as the units of devolved government. The First Schedule of the Constitution of Kenya outlines the establishment of forty seven county governments in the Republic of Kenya. Article 202 of the Constitution stipulates that revenue raised nationally shall be distributed equitably among the national and county governments. In Kenya, public procurement is governed by the Public Procurement and Asset Disposal Act (PPADA, 2015) pursuant to article 227 of the Constitution of Kenya. On 5th April 2013 under Legal Notice No. 60, the Minister for Finance gazetted the Public Procurement and Disposal (County Governments) Regulations, 2013. This focused the Public Procurement and Disposal Act, 2015 on county governments, designed to promote local industries and support socio-economic development.

1.2 Objectives and Hypotheses of the Study

The general's objective of the study was to investigate effect of procurement related losses on financial sustainability of the County Governments in Kenya. The specific objective of the study were; to analyze the effect of goods procurement losses on financial sustainability of the County Governments in Kenya and the second objective is to assess the effect of services procurement losses on financial sustainability of the County Governments in Kenya. The study first hypothesis $\mathbf{HO_1}$: was that there is no significant effect of goods procurement losses on financial sustainability of the County Governments in Kenya. The second hypothesis $\mathbf{HO_2}$: was that there is no significant effect of services procurement losses on financial sustainability of the County Governments in Kenya.

1.3 Statement of the Problem

Public procurement has, for long been overshadowed with inefficiency, corruption and disregard of fundamental value for money considerations (Manyenze, 2013). New ways of malpractice are coming in and Onyango (2013) argues that the government is losing millions of shillings through fresh scandals that involve inflation of costs by its suppliers. In Kenya, the government spends about Kshs. 500 billion per year on public procurement with loses attributable to malpractices amounting to Kshs. 300 billion per year (World Bank, 2010). On annual basis, the government losses close to Ksh. 121 billion about 17 per cent of the national budget due to inflated procurement quotations (KISM, 2010). The country is considered among the most corrupt in the world and was ranked number 136 out of 175 in the Transparency International Corruption Perceptions Index (TI, 2014).

Procurement is among the departments most prone to corruption at Kenya's county government level (TI, 2015). Resulting from devolution, some county governments have been alleged to have wasted public resources and loss of funds running into millions of shillings mainly through procurement irregularities. The Auditor General's's reports of the years 2013 to 2016 on procurement point out some outrageous procurement expenditures in county governments. According to the Auditor General's it is evident counties are not adhering to the procurement law and regulations. The Ethics and Anti-Corruption Commission has active investigations over procurement in various counties (Kenya National Integrity Alliance, 2016). Some county officials have been summoned for interrogation by the Ethics commission. From the reports there is a big challenge in how procurement practices in county governments are being conducted. Some of which revolve around the key principles underpinning public procurement which are: value for money, ethical standards, competition, transparency and

accountability. It is evident the procurement practices in county governments in Kenya are not as per the laid down laws and regulations. This investigation analyzed the effect of procurement related losses on financial sustainability of County Governments in Kenya

2. Literature Review

2.1 Theoretical Review

2.2.1 Agency Theory

The agency theory advocated by Donahue (1989), explains how procurement managers must play the agency role. The procurement department takes the role of agents on behalf of their institutions. The Principle-Agent model main concept is the premise the Principle is so busy that they can't execute a certain task, making it important to hire an agent, but the principal cannot supervise the agent ideally because he or she is busy. Agency Theory explains how to best organize relationships in which one party determines the work while another party does the work. In this relationship, the principal hires an agent to do the 20 work, or to perform a task the principal is unable or unwilling to do." According to the agency concept the principals (owners) must supervise and be in command of agents (managers) to guard the owners' outstanding claims from the extremes of self-centred agents, Bansal, (2013).

Procurement practices must be embraced by both the principal and the agent to avoid agency conflicts (Flynn & Davis, 2014). Agency theory is helpful to companies in a variety of industries and contexts. The managers, especially those in the procurement department need to understand and resolve abnormal behaviours across supply chains, Procurement can be seen as having a minimum of two components with two different objectives; a buyer and seller in competition for contracts. Nonetheless, on top of the agency connection that the buyer and competing vendors have, several internal stakeholders with potentially conflicting interests may also exist, increasing the sophistication of the procurement process. This assumption of self-interests dooms agency theory to inevitable inherent conflicts. Thus, if both parties are motivated by self-interests, agents are likely to pursue self-interested objectives that deviate and even conflicts with the goals of the principals. Yet, agents are supposed to act in the sole interests of their principals. This theory was anchored on the effect of goods and services procurement losses on financial sustainability of the County Governments in Kenya.

2.2.2 Theory of Legitimacy

This theory affirms that institutions have the command to explain their operations to their respective key actors, especially if it is a public entity should state its benefits to the society (Wilmshurst & Frost, 2000). Suchman (1995) stated that Theory of Legitimacy (LT) is a general'sized assumption or perception that the activities of any organization which are workable, appropriate and viable in system which are based on social beliefs, values, definitions and norms. The notion of LT sturdily proposes that the social agreement which is between the government and the public universities is in position of being eliminated. Based on the context of procurement among the County Governments, there is likelihood of existence of issues like cronyism, corruption, as well as nepotism which can affect the practice of legitimacy theory. The study therefore employed legitimacy theory to be able to examine whether the procurement officers make disclosure of practice of procurement in order to build a better status with the respective government, key players together with the entire society.

The County Governments may choose to legitimize and implement procurement practices on the understanding of their states or involved sections. Nevertheless, different public managers seem to differ ideally on the public expectation and their respective local authorities or agencies and even departments as the society views them to comply with their expectations. It is therefore the work of the Auditor General's to audit and make public how the County Governments carry out purchases which convertible inventories meant to be used in the processes of the final product which is sold for a profit by the corporations. This theory therefore was used to analyze the auditing processes of the County Governments in Kenya and how it affects goods and services procurement losses on their financial sustainability.

2.2 Empirical Review

Hassan (2019) observes that auditor general's report has revealed various corruption cases in counties and mismanagement of taxpayers' money allocated to counties. This has led to several impromptu search and arrest of governors and procurement officers by Ethic and Anti-Corruption Commission. Transparency and accountability in procurement have been issues thus the study examine the factors hindering effective procurement of goods in Wajir County. The objectives of this study were to examine how corruption hinder effective procurement of goods, assess how political changes hinder effective procurement of goods and find out how technological advances hinder effective procurement of goods in Wajir County. The study adopted institutional theory. The study used descriptive survey design. Research instrument was questionnaire. The study used simple sampling technique. The total target population was two hundred participants and a sample size of fifty respondents was used. Questionnaire was piloted before the actual study by a test and retest method. Questionnaire was given to the respondents with agreeable duration of reply which was later collected.

Data collected was analyzed quantitatively. The analyzed data was presented in frequency tables. The study found out that there was corruption in the procurement process with overpricing of goods and services, delivery of substandard goods and some suppliers being favoured during tender awarding leading to ineffective procurement. Respondents argued that with e- procurement, there had inadequate staffs with knowledge of eprocurement, it had quickened procurement process but e-procurement data had been manipulated to fix corrupt procurement process. Data analyzed showed that there had been politics in procurement process with politicians having interest in procurement process, bribery and misuse of office. The study recommends for accountability and openness in procurement, training of more staffs to increase the literacy level on e-procurement and sensitize on upholding ethical values in all procurement process. The study findings provide information to the policy makers such as auditor general's, national and county government on the factors that have hindered effective procurement of in Wajir County. This study did not use published Auditor General's's data to investigate the effect of Procurement Related Losses on Financial Sustainability of County Governments in Kenya which was analyzed by the current study.

Nyambariga (2016) observes that public procurement process in Kenya plays significant role in ensuring effective control and supply of inputs, which are important for all levels of any establishment. It plays a key role in promoting good management that prevents the potential of corruption in the use of public resources. However the problem of poor governance and corruption remains one of the main obstacles to economic development in the country. There has been a series of reforms aimed at streamlining public procurement process in the country, however the bulk of corrupt practices still

occur in procurement whose explanation could be found in the changing aspects of social, Economic and political state of affairs.

This study sought to answer the questions; to what extent collusion, pressure from senior officers, pressure from society, social status and poor remuneration contribute to corruption in the public procurement process in Kenya. In answering these questions, the study adopted descriptive research targeting sample size of 41 respondents out of a total population of 400 officers. With a response rate of 92 percent, 96.4 percent of variations in corruption perception are explained by the six variables. The results further shows that majority of the staff either agreed or strongly agreed that collusion, poor remuneration, pressure from top management, pressure from society, social status and protection of corrupt officials drive corruption perception in the Ministry. Nyambariga (2016) study analyzed the effect of pressure from senior officials on procurement outcome but did not use published Auditor General's's data to investigate the effect of Procurement Related Losses on Financial Sustainability of County Governments in Kenya which was analyzed by the current study.

Odero and Ayub (2017) established the effect of procurement practices on procurement performance of public sugar manufacturing firms in Western Kenya. The specific objectives of the study were to establish the effect of procurement planning and staff competence on procurement performance of public sugar manufacturing firms in western Kenya. The study employed a descriptive survey research design. Primary data was collected using questionnaires targeting employees in the procurement department. A census was done. The study achieved 72% response rate since forty five (45) out of the 62 questionnaires administered were filled and returned. The study population comprised of two public sugar manufacturing firms in Kenya operating in Western Kenya. The study findings revealed that procurement planning had a positive and insignificant impact on the procurement performance whereas staff competence had a strong positive and significant impact on the procurement performance of sugar manufacturing firms in Western Kenya studied. The study recommends that all sugar manufacturing firms in Kenya must implement efficient procurement practices in order to become more efficient in their operations. Particularly the study recommends that the organizations should enhance their planning and also ensure that procurement plans are adhered to, staff employed in the procurement department should be competent and that there should be training opportunities for the staff.

This study used primary data whereas the current study used secondary published Auditor General's's data to investigate the effect of Procurement Related Losses on Financial Sustainability of County Governments in Kenya which was analyzed by the current study. Mokogi, Mairura and Ombui(2015) State that procurement practices are a set of activities undertaken by an organization to promote effective management of its supply chain (Sollish & Semanik, 2012).The main purpose of the study was to establish the effect of procurement related loses on Financial Sustainability of County Governments in Kenya. Mehmet & Roberto (2021) Observes that procurement has received scholarly attention as a valuable policy tool to reach desired outcomes in society, such as innovation. While interest has grown in analyzing the impact of the 'substantive' function of procurement (purchasing of goods and services), procurement is much more than purchases, and most public buyers' activities are 'procedural', as they are aimed at improving the many internal stages of the procurement process. This study explains how procurement can be both a substantive and procedural tool, particularly in terms of innovation.

Using the 2010 Inn barometer dataset that consist of 4,063 public organizations from 29 European countries, this study answers how public procurement, as a procedural policy tool, affects the implementation of public sector innovations. We find that procurement activities are positively related to innovation within public organizations. In particular, procurement as R&D for new technologies and services has an important and meaningful effect. We discuss implications for policy tools and public sector innovation literature, and we suggest that policy makers make use of more procedural tools such as procurement to increase innovation within public organizations. This study was carried out in Europe whereas the current study used published Auditor General's's data to investigate the effect of Procurement Related Losses on Financial Sustainability of County Governments in Kenya which was analyzed by the current study.

2.3 Conceptual Framework

Conceptual framework is a hypothesized model identifying the concepts or variables used in a study and their relationships. It is a scheme of concepts (variables), which the researcher will use to operationalize in order to achieve the study objectives. The purpose of the conceptual framework is to help the reader to see the proposed relationships. The independent variable was the loses related to goods and services procured by the 47 County Governments reported by the Auditor General's of the Republic of Kenya in the Annual Audit Reports between 2014-2018. The dependent variable was the financial performance of the 47 County Governments in Kenya measured in terms Surplus/ Deficits (Total Receipts-Total Payments). It is hypothesized that when the Auditor General's reports the procurement related losses in the 47 County Governments in Kenya and an action is taken to reduce them over years, then 47 County Governments in Kenya will acquire assets which in the long run make them have declared surplus which is an indication of budget absorptions and also prudent use of public funds where the receipts are greater than payments..

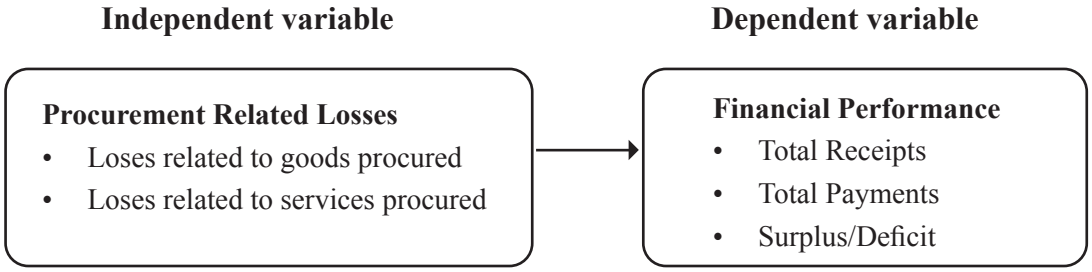

Figure 1: Conceptual Framework

3. Methods and Materials

3.1 Study Area and Target Population

The study targeted the audited financial reports of the 47 County Governments in Kenya. The audited records of the 47 County Governments was obtained from the Website of the Office of Auditor General's (http://oagkenya.oagkenya.go.ke/index.php/reports/cat_view/2-reports/11-county-governments). The study used panel data of procurement related losses of goods and services and surplus/deficits extracted from the Auditor General's Reports of the 47 County Governments (2014-2019). The justification for the period of investigation (2014-2019) is that it covers 6 years period of devolution and the period which the Auditor General's reported data were available over the 47 County Governments.

3.2 Research Design and Sample Size

In order to establish the effect of Procurement Related Losses on Financial Sustainability of County Governments in Kenya, the researcher employed a casual correlation research design. From panel data on procurement related losses on goods and services and the financial reports on surplus/deficits by the 47 County Government, regression models were designed first to statistically ascertain whether there was a significant relationship between procurement related losses on goods and services and the financial reports on surplus/deficits by the 47 County Government in Kenya. The information obtained was used to develop and demonstrate the model's reliability, thereby showing the link between procurement related losses by 47 County Governments and the financial reports on surplus/deficits by the 47 County Government.

3.3 Ethical and Consenting Consideration

The study extracted the data published by the Office of the Auditor General's of Kenya on procurement related losses on goods and services and the financial reports on surplus/deficits by the 47 County Government between 2014-2019 to meet the quality of ethical consideration. The audited financial statements used in the study have already been validated by the National Assembly of Kenya through Public Audit Act 2015 and are therefore accurate for the intended investigation.

3.4 Data Analysis and Model Specifications

The study used time series based panel data for 6 years, beginning from 2014 to 2019 to analyze the collected secondary data which increases precision, giving the researcher a large number of data points, thereby increasing freedom on the one hand and reducing collinearity on the other hand leading to econometric calculation which are effectiveness. Finally, the importance of the effect of the independent variables on the dependent variable was checked using the panel data model. As shown below, the dependent variable in the model of panel data analysis is;

$$Y_{it} = \beta 0 + \beta 1 X1_{it} + \beta 2 X2_{it} + u_{it} \ldots\ldots\ldots (1)$$

Where:

$\beta 0$ (i=1….n) is the intercept.

Y_{it} = dependent variable (DV), that is County Governments Surplus/Deficits on the Financial Statements.

X_1 = Loses incurred in the procurement of goods

X_2 = Loses incurred in the procurement of services

$\beta_{(1\ldots2)}$ = coefficient for that independent variables,

uit = between entity error term

i = entity and

t = time

4. Results and Discussions

4.1 Haussmann Test

In panel data analysis there are two estimation techniques namely Random effect and Fixed effect model estimation. In order to determine the appropriate estimation technique for this study, Haussmann tests was conducted. The HA_1: The fixed effect model is preferred to the alternate hypothesis Ho_1: random-effect model is preferred. Estimating models from panel data requires a determination of whether a correlation exists between the unobservable heterogeneity of each firm and the independent variables within a model (fixed effects). The choice of the model to use was based on Hausman (1978). The study established p=0.0028<0.05 hence the alternate hypothesis was accepted, taking a fixed-effect model as the preferred model which according to Raheman and Nasr (2007) counters the challenges of heteroskedasticity.

4.4.1 Effect of Goods Procurement Losses on Financial Performance

The section presents the results of bivariate regression of effect of goods procurement losses on financial performance of the 47 County Governments in Kenya. The results were meant to test the null hypothesis that **$H0_1$:** there is no significant effect of goods procurement losses on financial sustainability of the County Governments in Kenya.

Table 1: Effect of Goods Procurement Losses on Financial Performance

Fixed-effects (within) regression			Number of obs =	188	
Group variable: code			Number of groups =	47	
R-sq: within = 0.4962			Obs per group: min =	8	
between = 0.4378 .			avg =	8.0	
overall = 0.4876			max =	8	
			F(1,328) =	49.00	
corr(u_i, Xb) = -0.9449			Prob > F =	0.0017	
F_sus |	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
procgoods |	- .1608	.0587	1.73	0.0017	-.0000359 .0005638
_cons |	41.18763	57874.35	71.17	0.000	4004911 4232615
sigma_u |	145632.71				
sigma_e |	559061.66				
rho |	.06354554	(fraction of variance due to u_i)			
F test that all u_i=0:		F(46, 186) =	63.146		Prob > F = 1.0000

Key: F_sus – Financial Sustainability, procgoods = goods procurement losses

The study established a statistically significant effect of Auditor General's Report of goods procurement losses on financial sustainability in Kenya (procgoods β -0.1608, p=0.0017). The R-square for financial sustainability was found to be 0.4876 indicating that 49% of the variance in financial sustainability can be explained by Auditor General's Report of goods procurement losses. Therefore 51% of the variance in financial sustainability of the 47 County Governments was explained by other factors outside this study (see Table 1).

The F value for income was significant (F (46, 186) =63.146, p=0.0017) implying that there is a significant effect of Auditor General's's Report of goods procurement losses on financial sustainability of the 47 County Governments in Kenya. Auditor General's's Report of goods procurement losses therefore could be used to predict the financial sustainability of the 47 County Governments in Kenya. This finding indicated that an increase in Auditor General's Report of goods procurement losses by 1 unit will lead to a decrease in financial sustainability of the 47 County Governments in Kenya by 0.1608 multiple units.

The regression models, therefore, can be used to predict financial sustainability of the 47 County Governments in Kenya is given by
Y = 41.18763 - 0.1608 procgoods + ε where
Y = Financial sustainability of the 47 County Governments
procgoods = Auditor General's Report of goods procurement losses

The null hypothesis **HO_1**: was that there is no significant effect of goods procurement losses on financial sustainability of the County Governments in Kenya was therefore rejected at 0.05 level of significance and alternate hypothesis accepted. This finding implies that Auditor General's Report of goods procurement losses was a predictor of Financial sustainability of the 47 County Governments in Kenya.

4.4.2 Effect of Service Procurement Losses on Financial Performance

The section presents the results of bivariate regression of effect of service procurement losses on financial performance of the 47 County Governments in Kenya. The results were meant to test the null hypothesis that **$H0_2$:** there is no significant effect of service procurement losses on financial sustainability of the County Governments in Kenya.

Table 2: Effect of Service Procurement Losses on Financial Performance

Fixed-effects (within) regression				Number of obs	=	188
Group variable: code				Number of groups	=	47
R-sq: within	= 0.330			Obs per group: min	=	8
between	= 0.319				avg	= 8.0
overall	= 0.338				max	= 8
			F(1,328)		=	7.71
corr(u_i, Xb)	= -0.9245		Prob > F		=	0.0058
F_sus	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
procservices	-.1655	.0000596	2.78	0.006	.0000483	.0002828
_cons	4083344	52523.43	77.74	0.000	3980019	4186670
sigma_u	194960.14					
sigma_e	555120.97					
rho	.10980037	(fraction of variance due to u_i)				
F test that all u_i=0:		F(46, 187) =	41.083		Prob > F =	1.0000

Key: F_sus – Financial Sustainability, procservices = services procurement losses

The study established a statistically significant effect of Auditor General's's Report of service procurement losses on financial sustainability in Kenya (procgoods β -0.1655, p=0.0058). The R-square for financial sustainability was found to be 0.338 indicating that 34% of the variance in financial sustainability can be explained by Auditor General's Report of services procurement losses. Therefore 66% of the variance in financial sustainability of the 47 County Governments was explained by other factors outside this study (see Table 1).

The F value for income was significant (F (46, 187) = 41.083, p=0.0017)) implying that there is a significant effect of Auditor General's Report of services procurement losses on financial sustainability of the 47 County Governments in Kenya. Auditor General's Report of services procurement losses therefore could be used to predict the financial sustainability of the 47 County Governments in Kenya.

This finding indicated that an increase in Auditor General's Report of services procurement losses by 1 unit will lead to a decrease in financial sustainability of the 47 County Governments in Kenya by 0.1655 multiple units.

The regression models, therefore, can be used to predict financial sustainability of the 47 County Governments in Kenya is given by
Y = 41.18763 - 0.1655 procservices + ε where
Y = Financial sustainability of the 47 County Governments
procgoods = Auditor General's Report of services procurement losses

The null hypothesis $\mathbf{HO_2}$: was that there is no significant effect of services procurement losses on financial sustainability of the County Governments in Kenya was therefore rejected at 0.05 level of significance and alternate hypothesis accepted. This finding implies that Auditor General's Report of services procurement losses was a predictor of financial sustainability of the 47 County Governments in Kenya.

5. Conclusions, Recommendations and Limitations

The general's objective of the study was to investigate effect of procurement related losses on financial sustainability of the County Governments in Kenya. The first specific objective of the study was to analyze the effect of goods procurement losses on financial sustainability of the County Governments in Kenya. The study established a significant effect of Auditor General's Report of goods procurement losses on financial sustainability of the 47 County Governments in Kenya. The study first hypothesis $\mathbf{HO_1}$: that there is no significant effect of goods procurement losses on financial sustainability of the County Governments in Kenya was rejected and alternative hypothesis accepted. This finding statistically confirmed that the Auditor General's Reports of goods procurement losses had significant effect on financial sustainability of the 47 County Governments in Kenya.

The second specific objective of the study was to analyze the effect of services procurement losses on financial sustainability of the County Governments in Kenya. The study established a significant effect of Auditor General's Report of services procurement losses on financial sustainability of the 47 County Governments in Kenya. The study first hypothesis $\mathbf{HO_2}$: that there is no significant effect of services procurement losses on financial sustainability of the County Governments in Kenya was

rejected and alternative hypothesis accepted. This finding statistically confirmed that the Auditor General's Reports of services procurement losses had significant effect financial sustainability of the 47 County Governments in Kenya. The main objective of the study which was to investigate effect of procurement related losses on financial sustainability of the County Governments in Kenya therefore was statistically confirmed that procurement related losses had significant effect on financial sustainability of the County Governments in Kenya.

5.2 Recommendations

The researcher recommends that the County Governments in Kenya should first evaluate the existing policy on its accounting procedures for procurement losses as a clear means of enforcing Public Procurement and Disposal Act (PPADA) 2015 at their level as regulators to supplement the efforts of Public Procurement Oversight Authority (PPOA). This may reduce the rampant procurement related losses incurred by County Governments in Kenya as is expressed in the annually Auditor General's's Reports. Secondly, for practice, it should be the responsibility of the individual County Governments in Kenya to make sure that the audit queries on procurement losses are traced and corrected in the succeeding accounting years. The National Treasury on the other hand should peg further devolved fund disbursement on the extent the concerned County Governments have corrected issues related to procurement related losses.

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CLUSTER 3

Sub-Theme 5: Education

Sub-Theme 6: Community Development

Sub-Theme 7: Mass Communication and Journalism

&

Sub-Theme 8: Health Sciences

Moderators:

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A Systematic Review of Online Teaching and Learning of the English Language during the Covid-19 Pandemic

By Judith Mwikali – Gretsa University

Abstract

The Covid-19 pandemic forced many learning institutions to result to emergency online teaching and learning, a measure that not only controlled the spread of the pandemic but also ensured sustainability in the sector. Many researchers have investigated the effects of the emergency online teaching and learning of various disciplines, language inclusive. This paper presents a systematic review of online teaching and learning of the English language during the Covid-19 pandemic. It is designed to specifically: (1) establish the ways through which online teaching and learning of the English language took place during the Covid-19 pandemic; (2) investigate the merits of online teaching of the English language during the Covid-19 pandemic; (3) find out the challenges faced in the online teaching and learning of the English language during the Covid-19 pandemic; and (4) study the remedies for the challenges faced in the teaching of the English language during the Covid-19 pandemic. This search generated 73 papers on online teaching and learning. However, only 27 papers were used for the study as some of the excluded ones were duplicates and the rest failed to meet the selection criteria. The review established that many institutions integrated social media platforms such as Facebook, Instagram and WhatsApp with e-learning platforms such as Google Meet, Google Classroom and Zoom. The most striking merits of the process were in the use of digital content which enhances understanding of content by learners and creativity on the side of teachers. The main challenges faced was unstable internet connections, power outages and inadequate online conferencing skills. To control these challenges, proper planning by governments and stakeholders in education as well as continued training in digital literacy were suggested.

Keywords: Online teaching and learning, Covid-19, digital literacy, systematic review, sustainability.

1. Introduction

Following the announcement of Covid-19 as a global epidemic by the World Health Organisation (WHO) in March 2020, various measures were introduced by various countries to control its spread. There were lockdowns which limited movement of people in many parts of the globe. The pandemic and the measures taken to combat it caused uncertainty which severely affected education in all parts of the world. Standard face-to-face classroom interactions ended unexpectedly. This posed a challenge to educators, administrators, parents and all stakeholders in the field as observed by Krishnan (2020). They had to device ways of continuing with the teaching and learning processes remotely. Many learning institutions across the world had to shift to emergency online teaching and learning as an action plan to ensure sustainability in the sector (Fatima 2020). Although it was unplanned for, this kind of teaching provided a great opportunity for educators and learners.

This review is an assessment of online teaching and learning of the English language during the Covid-19 pandemic era. The motivation behind this review stems from the lessons learned by the reviewer when teaching English linguistics remotely. The pandemic did give the reviewer, a teacher of English linguistics a challenge which has informed the enhancement of teaching strategies and experiences to ensure continuity of learning.

1.1 Statement of the Problem

Online teaching and learning has been a subject of research globally. Many empirical studies and systematic reviews have covered the effects of Covid-19 pandemic on education. A fraction of these studies have assessed the process of online teaching and learning of the English language. However, there has been limited reviews, to the best of my knowledge, on the studies on online teaching and learning of the English language during the Covid-19 pandemic. This review investigated ways through which online teaching and learning of the English language was conducted during the Covid-19 pandemic. It examined the merits and the challenges faced in the online teaching and learning of the English language during the Covid-19 pandemic. Finally, outlines suggested remedies for the challenges faced in the teaching of the English language during the Covid-19 pandemic.

2. Methodology

The paper takes on systematic literature review for purposes of objectivity and irrefutability as suggested in Kitchenham & Charters (2007). Peer reviewed and non-peer reviewed investigations were included. Google Scholar and Directory of Open Access Journals were the main sources of peer-reviewed literature. To further maintain objectivity, the review also included non-peer reviewed articles published by government institutes such as the English UK, Department of Education, United States of America and organizations such the Migration Policy Institute of the United States and OECD of the European Union. This review is based on secondary data from researches done by various educators in the field of linguistics across different countries using various methods from March 2020 to October 2021 to ensure current validity and relevance.

The criteria used in arriving at the required papers for this review included: (1) any study on the effects of Covid-19 on English language teaching and learning; (2) any published paper on the perceptions of learners on online English language learning; (3) any journal article on the perceptions of English language educators on online language teaching; (4) any investigation on the benefits and challenges of online teaching and learning of the English language during the Covid-19 pandemic; and (5) any study on the teaching of English through online platforms during the Covid-19 pandemic.

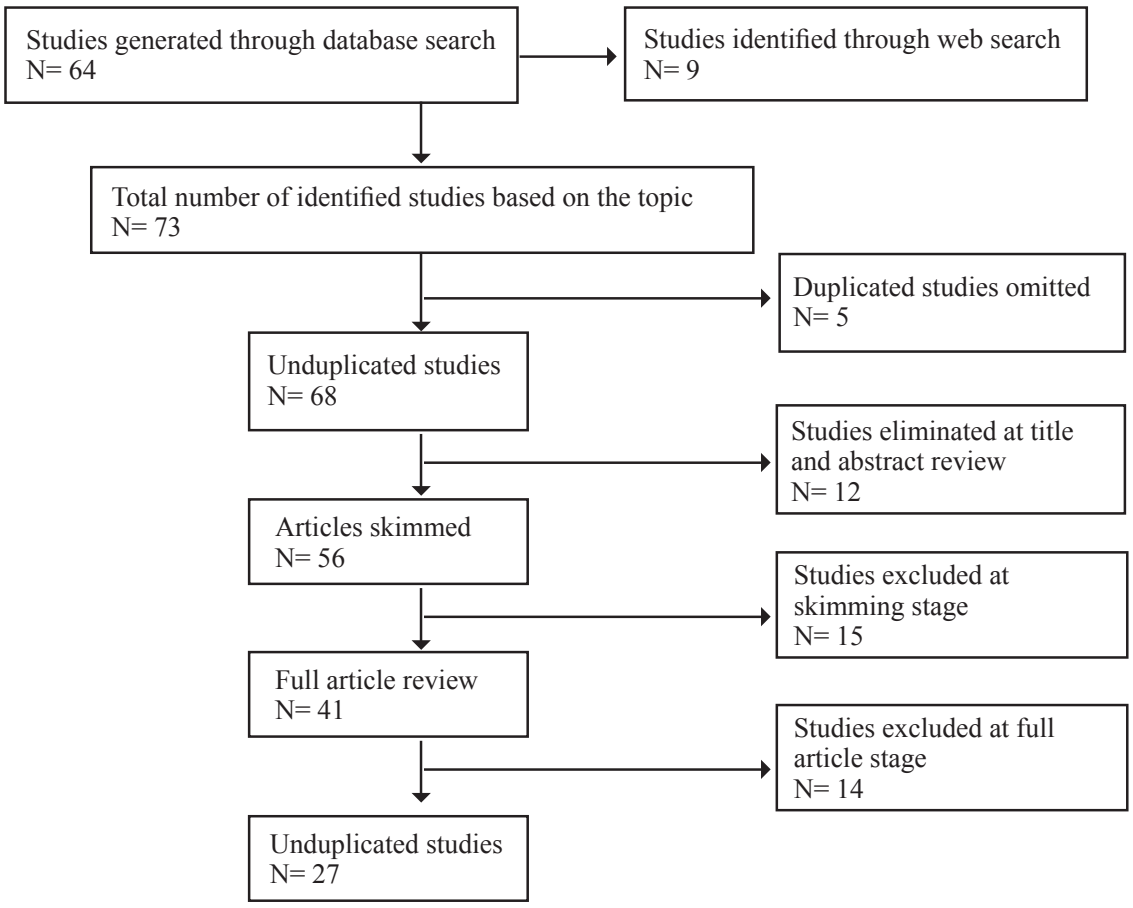
The criteria used to exclude certain studies were: (1) investigations that focused on the online teaching and learning of foreign languages during the Covid-19 pandemic in general; (2) papers about English as a medium of instruction and for academic purposes during the Covid-19 pandemic; (3) studies on the effects of the Covid-19 pandemic on English language use in various discourses; (4) studies on the lexical changes that emanate with the Covid-19 pandemic; (5) studies on online teaching and learning of English within other contexts other than the Covid-19 pandemic context; and (6) studies on the impact of Covid-19 to education in general.

The first search method applied on all studies on online teaching and learning of the English language. The key phrases that guided this search included: English language teaching and learning process, remote learning, challenges and benefits of online teaching and learning of English, English learners'

perspectives of online learning, English educators' experiences during the Covid-19 pandemic and technology applied in teaching English.

This search generated 73 papers on online teaching and learning. Five of these studies were duplicates and were eliminated. Some of the remaining 68 were examined for content through reading their titles and abstracts, others were assessed for content through skimming through their introductions and findings while others were fully reviewed. 27 of these were excluded because they did not meet the selection criteria: 8 of these focused on online teaching of foreign languages in general, yet the review aimed at studies on online teaching of one language, English; 4 dealt with technology in the teaching of English in contexts outside the Covid-19 pandemic; 3 assessed the effects of the Covid-19 pandemic on English language use in engineering, mass media and public health discourses respectively; 2 examined the lexical changes that resulted from people's experiences during the pandemic; 1 focused on English as a medium of instruction during the pandemic; 4 analysed the impact of Covid-19 on education in general; 1 discussed teacher's intentions in adopting online teaching; 1 focused on maintaining learners' motivation in online classes; 2 dealt with the use of English language for communication during the pandemic; while 1 evaluated the English content words used in instilling fear among people through fake news during the Covid-19 pandemic.

Twelve papers were eliminated through reviewing titles and abstracts. Fifteen more papers were ruled out as a result of skimming, while another fourteen were repudiated after a full article review was done on forty-one studies. As a result of this comprehensive elimination, the review settled on 27. The figure below illustrates this selection and elimination processes.



Source-Author

3. Findings and Discussion

The review included twenty-seven studies which were considered relevant in terms of their content in relation to the title and objectives of the study. Twelve of these twenty-seven discuss benefits and challenges of online teaching and learning of English language, with three of these offering remedies for the challenges. Five articles exclusively were on assessment of the challenges faced and opportunities that came with online teaching and learning of the language, and two articles of the five adding suggestions to counter the challenges. The remaining ten examined the various online platforms that were used in the process of teaching and learning English during the Covid-19 pandemic.

The first objective was to establish the platforms through which online teaching and learning of the English language took place during the Covid-19 pandemic. It was established that many institutions integrated social media platforms such as Facebook, Instagram and WhatsApp with e-learning platforms such as Google classroom, Zoom and Be-Smart, (Hafidz (2020), Mustadi, Anisa, & Mursidi (2020), Fansury, Januarty, Rahman, & Syawal (2020), Nartiningrum & Nugroho (2020), Wong (2020), and Fitria (2020)). Others were restricted to WhatsApp messaging (Chiatoh & Chia (2020)), while others adopted a Moodle system (Fatima (2020) and Turchi, Bondar, & Aguilar (2020)). Furthermore, others used self-platform, Email, BlogSpot, Skype, English Discoveries, SPADA System, Elena Platform, Edmodo and Schoology (Fitria (2020)). Moreover, others used Google Meet (Rifiyanti (2020)).

The second objective was to investigate the merits of online teaching of the English language during the Covid-19 pandemic. The use of digital content in teaching English helps learners understand the material being taught better as they as it invites active student engagement. It also eases the learning process because it can be directly integrated into various applications such as WhatsApp groups, Zoom and Google Meet. Further, it increases student motivation in learning because the material provided has been designed to evoke students' interest. Student's research skills, confidence (especially introverted ones, as they interact with educators and fellow students at the privacy of their gadgets' screens), self-reliance, technological skills are enhanced through use of online platforms and this in turn promotes independent learning as established by Kawinkoonlasate (2020). Teachers are also made more creative and innovative in terms of resources. Interaction is also enhanced through chats as the normal interruptions through turn-taking encountered in face-to-face interactions are limited.

Other researchers such as Situmorang (2020), found online teaching and learning of English cost-efficient no commuting fee is incurred. Additionally, it saves on time as one does not have to shift buildings or commute to the institution. There is also flexibility in terms of the time fixed for the meeting. Moreover, it saves learners' time in knowing their writing, structure and vocabulary errors and correcting those electronically using online programs.

It is useful for the reason of giving materials, assignments, or tests. Many found this kind of evaluation exciting and flexible. Furthermore, educators are able to adapt effective teaching methods, pair and group activities and self-study. Online classes therefore deepen learning experiences.

This review also aimed at finding out the challenges faced in the online teaching and learning of the English language during the Covid-19 pandemic. Educators had to deal with unstable internet connection resulting in switching between platforms, immaturity of online teaching of English, slow internet connection, inadequate online conferencing skills hence consuming more time through training sessions, inability to follow through learners' records, time consuming online grading systems, overloaded platforms and difficulties in monitoring learners' behaviours as observed by Hakim (2020), Huang, Shi, & Yang (2021) and Fritia (2021).

Poor learning due to limited interaction with educators, limited access to online platforms, poor internet connectivity, power outages, high chances of distractions hence poor concentration and wastage of time in discussions and assignments done during online classes are some of the challenges faced by learners. Additionally, others found it difficult to understand digital content that involves own guided learning as feedback from the educators was delayed of even limited. Moreover, weakened commitment to study due to insufficient of no monitoring by educators and limited access to computers made the learning process even harder as asserted by Luporini (2020), Nartiningrum & Nugroho (2020). A number had to deal with digital fatigue due to straining of the eyes.
The final objective was to suggest the remedies for the challenges faced in the teaching of the English language during the Covid-19 pandemic. Online group activities should be employed to counter feelings of isolation among students. This is because in most cases, they are limited to interaction through chats. In order to reduce fatigue and enhance understanding and memorability, educators need to make the learning process a relaxing one. This is by incorporating fun learning activities such as singing songs and watching videos related to the content being covered. Educators should also give clear deadlines for all online tasks given to ensure that learners spent their time efficiently. Availing digital content and assignments that is retrievable any time will control time wasted through lengthy discussions and assessments done in online classes. This will also help learners who may have encountered blackouts and poor internet connectivity to access what they could not access in the scheduled online sessions.

4. Conclusion

Online teaching and learning of the English language during the Covid-19 pandemic had its merits and challenges. Twenty-seven studies were reviewed to establish them and also to find out the suggested remedies to the challenges encountered. The merits include enhanced understanding through videos and digital content that can be retrieved and reviewed later after the lesson, flexibility of time and access to digital content, saving of time that would have otherwise been used for travelling and shifts of buildings as well as enhancement of skills to both teachers and learners.

This review will help governments to understand some of the weaknesses that online teaching and learning process has. This information is instrumental in helping them to improve on technological infrastructure and increase its availability even in remote areas. This will control poor connectivity and limited access to computers. They may also provide power backups to the infrastructure availed to control power outages.

It was noted that many educators and learners across the globe were not prepared for emergency online learning. There were various challenges such as connectivity issues, limited monitoring of students'

activities, and limited interaction with learners as well as inadequate digital literacy. They therefore had to adapt as well as go through rigorous training on online teaching and learning. They have however advanced themselves in online teaching. Therefore, the review is also significant to learners, educators and administrators as well. English language learners and educators will see the importance of continuous advancement of their skills on online teaching and learning. Administrators will be encouraged to introduce continued training of teaching staff and learners on emergent educational technologies to enhance their digital literacy. Online teaching and learning is the future of education. In his discussion on education, Harari (2018) noted that change is the only constant. We need to critically think about the skills that we need to understand and adapt to our world which is full of radical uncertainties and transformations. Thus skills in digital literacy are very important.

4.1 Suggestions for further research

Researchers are invited to investigate the ways in which English language curriculums of various education systems have been adapted to suit the challenges of the Covid-19 pandemic. Such a comparative study will explicate sustainable policies in the wake of uncertainties. Moreover, they may also explore the lessons learned during the emergency online teaching and learning of the English language during the Covid-19 pandemic. This will shed light on the planning that needs to be done by English language curriculum developers and other key stakeholders in planning for future pandemics. Additionally, researchers can also study the opportunities that came with online teaching and learning of the English language during the Covid-19 pandemic to show how chances were availed while navigating through the challenges experienced.

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A Critical Review of the Role of Non-Governmental Organizations during the Covid-19 Pandemic in Kenya

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Abstract

The devastating impacts of the COVID-19 pandemic have been present in all parts of the world since the outbreak of the virus in Wuhan, China in 2019. The adverse effects on the economy, tourism, education, and healthcare sectors have been evident. Typically, the Coronavirus pandemic paralyzed the entire world, forcing the economic and livelihood systems to their knees. Due to the high prevalence rate of COVID-19 and its associated problems, Government and health-care systems are usually unable to manage the same resulting to devastating effects. NGOs are instrumental in supporting government efforts in addressing the pandemic in most countries. To establish the role of NGOs during the Covid-19 pandemic outbreak in Kenya with a view of informing policy and practice in Kenya, this study was guided by the following research questions: 1. what is the role of NGOs in Provision of health information during the Covid-19 pandemic? 2. What roles do NGOs play in educating the public during the Covid-19 pandemic? 3. Do NGOs provide food and basic necessities during the Covid-19 pandemic? Guided by the study objectives, the research involved the review of literature related to Covid-19 pandemic and the role of NGOs during the Covid-19 Pandemic in Kenya. The researcher first sourced for 102 research documents from google scholar but filtered the documents and finally settled on 21 research documents that are relevant to the study. All the literature reviewed are from 2019 to 2021. The literature review has revealed that indeed Non-governmental organizations played a massive role in fighting against Covid-19 in Kenya. During the pandemic, these entities provided health information by developing awareness programs to share accurate and trustworthy health information regarding Coronavirus, funding training and information sharing programs, and curbing misinformation. They also played a significant role in educating the public about the Covid-19 pandemic through training volunteers that helped spread the educational messages to communities, writing advocacy proposals, and soliciting funds from donors and well-wishers, and actively creating educative health messages. Lastly, the NGOs provided food and basic needs through cash transfers to vulnerable households and emergency relief foods, shelters, soap, and protective equipment during the Covid-19 pandemic in Kenya. Given NGOs' vital roles in curbing the Covid-19 pandemic, the Kenyan government should provide the necessary support to ensure better outcomes. This can be achieved by providing grants and creating a favorable working environment for NGOs.

1. Background

Since the Covid-19 outbreak in 2019 in Wuhan, China, the devastating impacts of this health crisis have been present in all parts of the world. According to recent statistics by the World Health Organization (WHO), approximately 249 million cases have been reported so far, and about 5.03 million of this

has died (WHO, 2021). The adverse effects on other areas like the economy, tourism, education, and healthcare sectors have not been left out. Typically, the Coronavirus pandemic paralyzed the entire world, forcing the economic and livelihood systems to their knees.

Tregoning et al. (2021) states that although nations are recovering from this deadly and traumatizing experience, projections have indicated that the adverse implications will last for the unforeseeable future. This is because many people globally are still experiencing the effects of the pandemic as new cases and related deaths continue to rise. Fortunately, during this time, Non-governmental Organizations (NGOs) played a vital role and continue to do so in helping to fight the Covid-19 pandemic. In regions like Sub-Saharan Africa, particularly Kenya, NGOs have played a significant role in responding to Coronavirus and the associated implications. Specifically, NGOs have taken part in providing health information during the Covid-19 pandemic, educating the public about the pandemic, and providing food and basic necessities during the pandemic.

A survey by Bond (2021) established that International Non-governmental Organizations (INGOs) are working tirelessly to help curb the pandemic and support the most vulnerable communities across the globe. The findings revealed that about 95% of United Kingdom-based NGOs are fighting the pandemic in developing nations. Of these organizations, about 40% are addressing the crisis without additional funding. The investigation further revealed that if additional funding, resources, and equipment, the vulnerable communities in developing countries will continue to be struck by the pandemic. This survey is a small glimpse of the role NGOs play in fighting the Covid-19 problem. They are dedicated to assisting even without funds and other necessary resources.

In Kenya, NGOs like World Vision, CARE International, Oxfam, Amnesty International, Amref, and Red Cross played a central role in helping to reduce the spread of Covid-19 and addressing the related adverse implications. The NGOs have worked in close collaborating with the national government of Kenya and other local interest groups to upskill the efforts aimed at averting the pandemic. Therefore the study on the critical role played by NGOs is timely.

2. Problem statement

Due to the high prevalence rate of COVID-19 and its associated problems, Government and health-care systems are usually unable to manage the same resulting to devastating effects. NGOs play are instrumental in supporting government efforts addressing the pandemic in most countries. Despite the critical role NGOs play in public health education and provision of basic necessities during the Covid-19 pandemic in sub-Saharan Africa, the pandemic has still persisted and hence the critical question is, what is the role of NGOs in averting the Covid 19 pandemic in Kenya.

3. Objectives of the study

General Objective

To establish the role of NGOs during the Covid-19 pandemic outbreak in Kenya with a view of informing policy and practice in Kenya.

Specific objectives

1. To establish the role of NGOs in Provision of health information during the Covid-19 pandemic
2. To determine the role of NGOS in educating the public during the Covid-19 pandemic
3. To establish the role of NGOs in provision of food and basic necessities during the Covid-19 pandemic

4. Methodology

The study did a critical review of literature based on the following themes

1. The role of NGOs in Provision of health information during the Covid- 19 pandemic
2. The role of NGOs in educating the public during the Covid- 19 pandemic
3. The role of NGOs in provision of food and basic necessities during the Covid-19 pandemic

The study involved the review of literature related to Covid-19 pandemic and the role of NGOs during the Covid-19 Pandemic in Kenya.

The researcher first sourced for 102 research documents from google scholar but filtered the documents and finally settled on 21 research documents that are relevant to the study. All the literature reviewed are from 2019 to 2021.

5. Findings and Discussions

The following is a critical review of the role of NGOs during the pandemic in Kenya.

5.1 Provision of Health Information during the Pandemic

Accessing reliable and accurate health information regarding Covid-19 has been central in fighting the pandemic. A study by Parikh et al. (2019) indicated that accessing relevant and trustworthy health information is vital in fighting any illness. It enables individuals or patients to make informed health decisions that can facilitate prevention or speedy recovery. The authors added that accessing reliable health information improves the health literacy of individuals, allowing them to maneuver through the healthcare system to get the appropriate care. During the Covid-19 pandemic, various kinds of health-related information went around, including misleading ones. It was difficult for the public to understand which information to trust or disregard.

NGOs stepped up and actively developed awareness programs to provide accurate and trustworthy health information regarding Coronavirus. Wilke et al. (2020) established that since the Covid-19 outbreak in 2019, NGOs have come up with appropriate measures to ensure the public receives the correct information about the causes, effects, and interventions for Covid-19. For instance, these organizations provided communities with information about how Covid-19 affected individuals, pathophysiology, and prevention approaches. Research by Brand et al. (2020) pointed out that many communities in Kenya were unaware of Coronavirus when the first case was announced in March 2020, creating tensions and anxiety across the country. Immediately following the announcement, major towns like Nairobi, Mombasa, Nakuru, and Kisumu witnessed an exodus of people to rural areas.

Nevertheless, particular NGOs like Amref Health Africa, World Vision, and Health Communications Resources (HCR) started health information awareness programs to help people understand this disease and approaches to preventing it. Austrian et al. (2020) noted that due to their established presence within communities, Non-Governmental Organizations are well-positioned to disseminate health information to vulnerable and difficult-to-reach communities quickly. The NGOs in Kenya utilized a combination of phone calls, social media, text messages, pamphlets, posters, and radio announcements to reach the target populations.

Health Communications Resource (HCR) portrayed an excellent example of NGOs' role during the Covid-19 pandemic in providing health information. According to Bond (2021), HCR mobilized and equipped partners and local individuals to transform the community's health and well-being through media. In Kenya's Nairobi crowded slams, HCR helped Mtaani FM create a "nudge" campaign, engaging the disaffected youths who had been ignoring public health messages. The program enabled many young people to access the correct health information, changing their attitude towards Covid-19.

Providing reliable and accurate health information about the Covid-19 pandemic helped fight the crisis significantly. Pelham (2021) indicated that many Kenyan communities, particularly those in slams and rural areas, became aware of Coronavirus following the information-sharing campaigns of NGOs. The enhanced awareness helped them make health information such as embracing social distancing, handwashing, sanitizing, and avoiding crowded areas. The health information also helped individuals take Covid-19 tests and other routine tests like temperature testing. Additionally, spreading health information to rural and vulnerable populations also helped bridge the health information access gap experienced in Kenya. Most individuals in rural areas in Kenya face numerous health disparities, such as the inability to access accurate health information due to the inadequacy of media outlets such as television, community healthcare workers, and internet connectivity (Pelham, 2021). Nonetheless, some studies have noted that NGOs encountered numerous challenges such as financial constraints and primitive cultural practices that opposed the scientific explanations of Covid-19.

Studies have also shown that apart from actively providing health information during the Covid-19 pandemic in Kenya, NGOs helped fund specific training and information-sharing programs to reach more people. NGOs like World Vision, IMPACT, and the Kenya Red Cross Society trained their staff and volunteers to provide health-related information to areas like Mathare, Korogocho, and Kangemi in Nairobi through a door-to-door approach. Also, Amref Health Africa partnered with Kenya's Ministry of Health to train volunteers who worked with frontline healthcare workers and community leaders to raise awareness of Coronavirus and share health, sanitation, and hygiene messages. Through the "Operation Safisha Mji" program, the youth volunteers engaged in sharing up-to-date information regarding the virus by directly demonstrating disinfection and cleaning procedures like proper handwashing (Amref Health Africa, 2021). They also handed out posters and fliers, which stipulated the Ministry of Health Covid-19 guidelines and the appropriate managing and wearing personal protective equipment (PPE) such as face masks.

Sudhipongpracha and Poocharoen (2021) pointed out that the door-to-door and using local leaders' approach to providing health information to communities used by the NGOs was effective because it enhanced trust. In other words, it was easy for individuals to believe the NGOs employees and volunteers than other sources. Sudhipongpracha and Poocharoen added that the volunteers helped

the Kenyan government reach its Covid-19 communication objective of convincing people to take the disease seriously. In addition, the NGOs assisted in funding local groups that, in turn, helped share the health information about Covid-19. A survey by Voothaluru et al. (2021) conducted in early 2021 showed that funding the staff and volunteer training programs and local groups helped spread the health information message regarding Covid-19 in several communities in Kenya by over 50%. Using the local groups was necessary because they had already established good relations with community members.

Lastly, NGOs played a considerable role in providing health information by curbing misinformation during the pandemic in Kenya (Abuya et al., 2020). Since the outbreak of the Coronavirus, there has been uncontrollable emergence of fake news concerning its spread and treatment. Across various social media channels and internet websites, numerous myths were being propagated such as 5G mobile networks are responsible for spreading Covid-19, houseflies spread the infection, and using pepper in a soup can cure Coronavirus." These are some of the myths identified by the World Health Organization. In Kenya, specific myths about Covid-19 included, "Covid-19 only affects white people, Ginger and lemon can cure Coronavirus, and imported face masks spread the infection."

Because of the rampant rise in fake news or misleading health information, many NGOs intervened by not only informing the communities about the prevention measures but also eliminating the myths surrounding Covid-19. Abuya et al. (2020) pointed out that NGOs in Kenya ensured that individuals were well-informed through continuous communication and awareness, preventing them from adopting harmful practices. A survey carried out by Amref Health Africa showed that many people used harmful practices like drinking unapproved traditional herbs and medicines believed to have the potential to prevent or treat Covid-19. This was mainly influenced by the misleading information they accessed from word of mouth, websites, and social media platforms.

According to Brechenmacher et al. (2020), curbing misinformation and fake news enabled people to stick with reliable and accurate information about Covid-19, thus immensely helping fight the crisis. As many studies have agreed that fighting Covid-19 requires every individual's holistic approach and efforts to win this war, dealing with misinformation enabled NGOs and Kenya's Ministry of Health (MOH) Covid-19 Task Force to bring the people on board and contribute their part. Besides, there has been a shift and disregard of many myths linked to Covid-19 since the NGOs started demystifying them and providing alternate accurate health information. Many Kenyans now can differentiate between fake and precise Covid-19 related information, and the credit goes to the NGOs effort in curbing misleading health information regarding this disease.

5.2 Educating the Public about Covid-19 Pandemic

According to Adebisi et al. (2021), NGOs plays a considerable role in educating the public about Covid-19 in Kenya through training volunteers that helped spread the educational messages to communities. NGOs like Amref trained more than 14000 youths across seven counties, including Migori, Busia, Siaya, Hom Bay, and Bungoma, to help educate the communities' bout the virus and prevention procedures (Amref Health Africa, 2021). The seven counties were primarily targeted because of their congested population and low-income statuses. The youth volunteers worked closely with local leaders who helped them identify disadvantaged areas and places to target the educational

messages. This was accomplished under the "Operation Safisha Mji" initiative. Although the program mainly focused on cleaning marketplaces, informal settlements, bus terminus, and other public places, the volunteers also educated the people about Covid-19. These places were targeted because they were marked high-risk areas and had low adherence rates to the Covid-19 containment measures. The volunteers also distributed educational materials such as posters and flyers containing the Ministry of Health Covid-19 guidelines to public members.

In addition, the youth volunteers also educated individuals by demonstrating safety procedures such as proper handwashing and wearing masks. A survey by John et al. (2021) indicated that educational and awareness programs carried out by volunteers trained by NGOs had a positive impact in fighting Covid-19. As of September 2020, over 60% of the Kenyan adult population understood how to wash hands and disinfect properly. Many of them also became aware of the virus and the related preventive measures. Such awareness improved adherence to Ministry of Health Covid-19 guidelines and other containment measures (John et al., 2021). This situation also helped reduce the transmission rate of the virus. In October 2021, the government of Kenya lifted a dusk-dawn curfew that had been in place for nearly one year and seven months due to reduced transmission and positivity rate. The lifting of the curfew and reduced positivity can be attributed to the efforts of the NGOs and other stakeholders in educating the public and promoting their compliance to Covid-19 prevention protocols.

Numerous studies have also shown that NGOs' other role in educating the public about Covid-19 related to writing advocacy proposals. Kimani (2021) stated that through their advocacy, NGOs influenced the government of Kenya to develop educational programs and policies about the virus for the public. It was due to NGOs like World Vision, Amref Health Africa, Red Cross, and Impact advocacy efforts that encouraged the national government and private sector to come up with educational programs on Covid-19 for all. Alizadeh et al. (2020) stated that advocacy comprises one of the significant ways NGOs use to accomplish their objectives. These activities influence policymakers to develop policies that align with the NGO's goals, for example, of helping vulnerable communities. In Kenya, the advocacy efforts of the NGOs influenced the national and county governments to hire additional healthcare workers and pay volunteers to expand the health education and awareness of the public regarding the Covid-19 pandemic (Kimani, 2021). Such action went a long way to reducing the spread and transmission of the virus.

Voothaluru et al. (2021) pointed out that NGOs educated the public during the Coronavirus pandemic by soliciting funds from donors and well-wishers. Through writing funding and grant proposals to donors, well-wishers, other governments, NGOs in Kenya generated money that was channeled towards educating the public about Covid-19. For instance, in April 2020, Amref Health Africa received a $1 million grant from the Rockefeller Foundation to help boost its Covid-19 response in Kenya (Rockefeller Foundation, 2021). The NGO used the funds to purchase medical equipment for Kenya's Ministry of Health and strengthened the government's efforts to curb the spread of Coronavirus. One of such efforts comprised broadening the educational programs. The Kenyan government used the money to educate or share health messages via TV, radio, newspapers, and magazines. The funds also strengthened the efforts of the local community health workers, leaders, and volunteers to educate the communities about the Covid-19 pandemic.

NGOs in Kenya also engaged in educating the people about Covid-19 through actively creating educational health messages on their websites and social media platforms (Johnston et al., 2020). These organizations created and posted educative content regarding the Covid-19 pandemic. People could access health information related to the virus, such as causes, transmission, effects, at-risk populations, prevention, and treatment options. They also posted and shared information about the economic and social impacts of the pandemic and ways of mitigating them effectively. For instance, immediately following the outbreak of the Covid-19 pandemic, NGOs like Red Cross, Amref Health Africa, United Nations, Amnesty International, and Impact posted in the sites the relevant statistics, prevention measures, and various economic approaches individuals can take to caution themselves against the financial effects of the health crisis (Johnston et al., 2020). They also highlighted measures to embrace to maintain the social connection.

According to Statista (2021), Kenya had an internet penetration rate of 85.5% as of 2020, enabling people to access the educative content about Covid-19 shared by the NGOs via their websites and social media pages. The lockdowns and stay-at-home containment measures also increased internet use in this country, providing NGOs with an effective platform to educate the public about Coronavirus. This approach continues as individuals access and trust health information related to Covid-19 via the NGOs sites and social networking platforms like Facebook, Twitter, and Instagram.

5.3 Provision of Food and Basic Necessities

In the wake of the Covid-19 pandemic, many individuals and families were economically walloped as they experienced job losses and business closures. In Kenya, vulnerable communities in the informal sector lost their livelihoods and employment. Data from the Kenya Bureau of Statistics showed that about 85% of employment populations in Kenya are from the informal sector as of 2019. Out of this, approximately 56% reside in the informal settlement in Nairobi. When the Covid-19 hit and was proceeded by containment measures such as the closure of markets, curfew, and movement restrictions, the families in these settlements lost jobs or closed down their businesses, increasing food insecurity, health problems, gender inequalities, and other social concerns like gender-based violence.

In Kenya, most retail happens in the informal sector, often in the open-air market across the cities and towns. However, many of these markets were temporarily closed for months as part of the containment measures, disrupting food systems and livelihood strategies for residents in informal settlements who relied on these markets for food and employment. At the same time, in 2020, the country experienced national food shortages caused by low agricultural productivity, locust crisis, drought, and aflatoxin contamination. This situation increased food prices, presenting a challenging scenario for communities that worked in the informal sector, whose businesses were shut down and everyday work disappeared.

According to Gikandi (2020), several NGOs responded to the challenging economic situation the Covid-19 pandemic created by providing food and basic necessities to vulnerable communities. In collaboration with the Kenyan government, the NGOs provided food to vulnerable Kenyans, including food insecure households, the elderly, and people living with disabilities. Although particular NGOs like Concern Worldwide and Kenya Red Cross Society provided foods such as maize, rice, and beans directly to the needy communities, the national government achieved this objective through

the cash transfers programs. According to the Kenyan government, about one million vulnerable Kenyans received between Ksh 2000-2700 monthly under the national Inua Jamii program during the pandemic (Gikandi, 2020). In addition, the Kenyan Ministry of Interior added Ksh 4000 per month to vulnerable households to cope with the pandemic.

Although the government's cash transfer programs tried to address the financial challenges the pandemic caused to vulnerable households, a survey by CREAW indicated that only a tiny portion of the affected population benefited (Marindany, 2020). This signified a need for a top-up to the government efforts to reach more vulnerable communities and broaden the safety nets to minimize physical contacts and Covid-19 spread. To attain this, seven NGOs, including the Kenya Red Cross Society, Oxfam, IMPACT, ACTED, Wangu Kunja Foundation, CREAW, and Concern Worldwide, launched a safety-net program that targeted the Kenyan informal settlements. The program was funded by the European Union and the German and Danish governments. Between June and December 2020, Ksh 590 million were transferred to 29,400 households in Mombasa and Nairobi informal settlements (Gikandi, 2020). The money helped these families afford food and other basic necessities.

Marindany (2020) also indicated that NGOs provided emergency relief shelters, soap, and protective equipment during the Covid-19 pandemic in Kenya. NGOs like Care International and Kenya Red Cross Society provided emergency shelters, particularly to displaced families who ran away from social conflicts such as gender-based violence during the pandemic. Amref Health Africa also distributed face masks, sanitizers, and soaps to vulnerable families in Kenya. The organization also carried out Covid-19 tests, helped establish isolation centers, and provided the necessary treatment with the assistance of the flying doctors. Gerard et al. (2020) stated that by providing food and basic necessities, the NGOs helped minimize physical contacts, thus limiting the spread of Covid-19 in Kenya. However, research by Wilke et al. (2020) noted that NGOs did not do much in providing food and necessities during the pandemic in Kenya since most of them lacked adequate funds to accomplish these goals.

6. Conclusion

The literature review has revealed that indeed Non-governmental organizations played a massive role in fighting against Covid-19 in Kenya. During the pandemic, these entities provided health information by developing awareness programs to share accurate and trustworthy health information regarding Coronavirus, funding training and information sharing programs, and curbing misinformation. They also played a significant role in educating the public about the Covid-19 pandemic through training volunteers that helped spread the educational messages to communities, writing advocacy proposals, and soliciting funds from donors and well-wishers, and actively creating educative health messages. Lastly, the NGOs provided food and basic needs through cash transfers to vulnerable households and emergency relief foods, shelters, soap, and protective equipment during the Covid-19 pandemic in Kenya.

6.1 Recommendations

Given NGOs' vital roles in curbing the Covid-19 pandemic, the Kenyan government should provide the necessary support to ensure better outcomes. This can be achieved by providing grants and creating a favorable working environment for NGOs (Abuya et al., 2020). These organizations should also

conduct comprehensive surveys to identify all the vulnerable populations to ensure they benefit from the assistance provided. Finally, NGOs should ensure they put in measures such as hiring individuals of integrity and conducting periodical reviews to enhance accountability and ensure the right people receive the assistance.

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A Systematic Review of Social Media as a Disrupter to Mainstream Media during Covid-19 Pandemic

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Abstract

The global crisis caused by COVID-19 pandemic placed individuals and organizations into a new reality in many ways. The role of Mainstream media is to present in-depth analysis, inquiry and fact-checking of information to maintain its place in the industry. However, the media industry was among the hardest hit by the COVID-19 since it emerged in december of 2019 resulting to hundreds of thousands of deaths worldwide (Roser et al., 2020). Since the outbreak, people in many countries have relied on social media to obtain information about the virus which have affected many individual's lives daily. (Med 2020). Social media has been seen as a disrupter of the mainstream media industry today as individuals, families, friends, influencers, brands and bloggers converge on multiple Social media sites and apps daily to share updates & communicate. Worldwide (Roser et al., 2020).This paper aimed at carrying out a systematic literature review guided by the following objectives: (1) to determine the Social media Platforms used by Kenyans during Covid 19. (2) To assess the topics mostly heard/seen/read on social media during Covid 19 Pandemic (3) to assess the nature of information/content shared on Social media and its motivation during Covid 19 Pandemic. (4) To find out whether social media was a disrupter to mainstream media during Covid 19 Pandemic.

The review used a total of one hundred and eighty seven papers which were acquired. After critically screening and studying the papers, the duplicate were removed based on title and content and only 12 papers which met the inclusion criteria were finally selected for this review. The review found out that many people have embraced the use of digital technologies like Social media which have changed the way they engage with media content in the right way, at the right medium and at the right time. Secondly, users have greatly changed the tools for getting the information they need from use of traditional media to social based on the content shared. Third, the nature of information shared or themes vary with purpose and finally, the media industry in this era of disruption must confront with opportunities and threats contained in the emerging technologies by administering social media analysis, audience measurement, and cross-platform app implementations.

Key words: Disrupter, social media, mainstream media, Covid-19

1. Introduction

Loten 2020 notes that in the first few months of 2020, information and news reports about the Coronavirus disease (COVID-19) were rapidly published and shared on social media and social networking sites. During lockdown, people used social media platforms to gain information about COVID-19 which varied based on individuals, gender, age and education level (Med 2020). In Africa,

organizations leveraged telecommuting applications like Zoom, Skype, and Microsoft Teams to enable its staff to work from home by being supported with software technology or online platforms that are connecting individuals, businesses, and governments. (*Jeune Afrique* 2020). Governments' attitudes toward the pandemic and individuals' ability and willingness to embrace change determined the ultimate pace of technology adoption to support global platforms (Loten 2020).

Humanity relies on the media industry for crucial up-to-the-minute information .Consumers also wants to stay informed and entertained. Media has the mandate to maintain value of accurate and reliable information at all times (Med 2020).Mainstream media presents in-depth analysis, inquiry and fact-checking to maintain its place in the industry. People watching or reading a news story must feel that the journalist went of their way to gather content beyond what is on social media. However, the virtual reality is the biggest disruptor to be seen in the media and entertainment industry today. Social media sites and apps is the new home where families, friends, influencers, brands and bloggers converge multiple daily to share updates & communicate.

Due to the limitations imposed during the Covid-19 pandemic, People turned to the use of technology as a valuable resource to cope with uncertainly which have both positive and negative outcomes that disrupt the mainstream media use. Social media and online networks make it easier for individuals to create a mass circulation of their message transmitted via different online means, such as instant messaging, blogs, group lists and forums, and chat rooms (Leavitt et al., 2009).

According to Kenya Bureau of Statistics (2021), there were 1100 million social media users in Kenya in January 2021. The number of social media users in Kenya increased by 2.2 million (+25%) between 2020 and 2021. This shows that social media is an integral part of people's lives and its disruption can have huge economic, social and even political consequences and hence the viability of this study.

1.1 Problem Statement

Social media use is considered to be popular across different age groups presenting both positive and negative outcomes that disrupts the use of mainstream media especially during the crisis of COVID-19. Social media platforms are used for exchanging experiences, opinions, and information between users via different formats such as image, text, and video to share and browse a huge amount of information daily. However, Fake and negative news, false, incorrect, and inaccurate information and information that is either biased or meant to mislead deliberately has become common on social media and many users share the same intentionally or unintentionally (USIU-A 2020). For instance, misinformation about COVID-19 through use of social media and conspiracies distorted people's risk perception of the COVID-19 virus .Therefore, this review aimed to assess how social media disrupted mainstream media in dissemination and use of Covid-19 information by identifying types of social media platforms used, nature of information shared and motivation behind using any type of media.

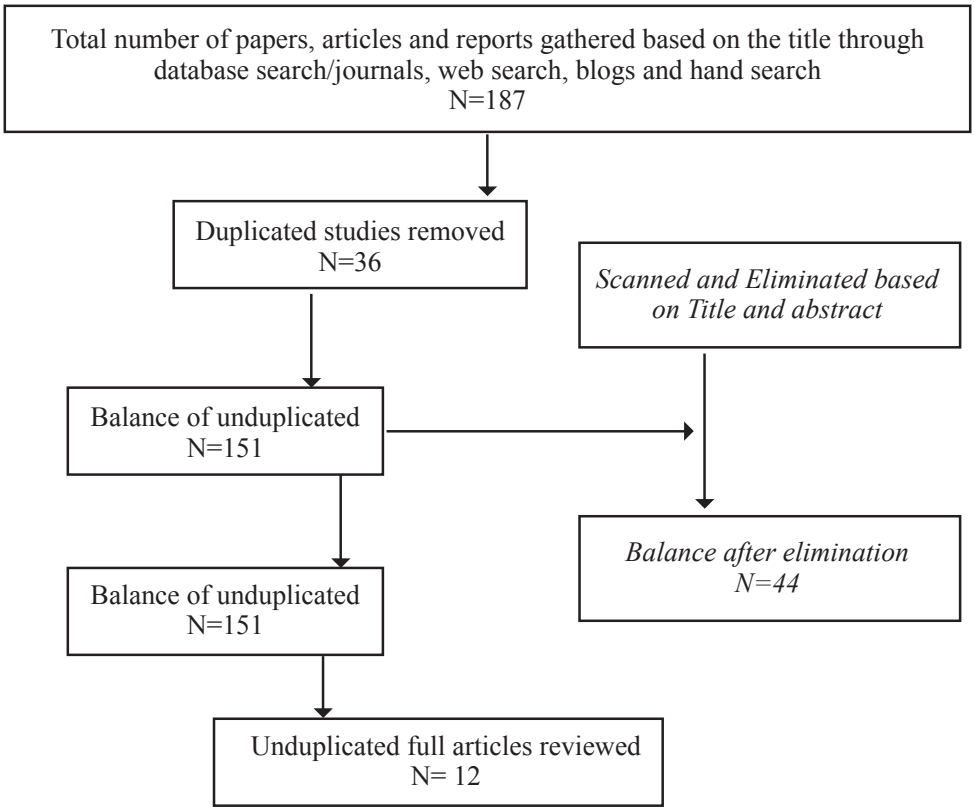
1.2 Objectives of the study

(1) To determine the Social media Platforms used by Kenyans during Covid 19 period.
(2) To assess the topics mostly heard/seen/read on social media during Covid 19 Pandemic
(3) To assess the nature of information/content shared on Social media and its motivation during Covid 19 Pandemic.
(4) To find out whether social media was a disrupter to mainstream media during Covid 19 Pandemic.

2. Methodology

A systematic literature review was used in order to reduce biases and uncertainty (B.A. Kitchenham and S. Charters. 2007). An assessment of peer reviewed and none peer reviewed sources of relevant information was done. The search also included media reports and organizations reports like Kenya Bureau of Statistics.

From the various databases assessed, a total of **187** papers with basic information on media were identified. This included articles and reports gathered based on the title through database search/ journals, web search, blogs and hand search. Out of these, **36** papers were found to be duplicated studies therefore were removed. The balance of unduplicated papers was **151** where further Scanning and elimination based on title and abstract was done and **107** papers were eliminated again because the titles and content of abstracts were not relating to the topic under review. The balance after elimination was **44** papers**.** The full articles were then scrutinized and skimmed that led to **32** papers being excluded .Therefore, the unduplicated full articles that were finally reviewed were **12** papers which met the inclusion criteria. The selection process is diagrammatically presented in the figure below.



Source: *Author*

Discussion

The systematic review included 12 papers whose title and content had information that was relevant to the topic under review. Four (4) of the studies reviewed had information on the major social media platforms used by Kenyans. Also, Four (4) of the studies reviewed focused on the nature of information or content shared on Social media and its motivation while three (3) of the articles reviewed focused on how the social media was viewed as a disrupter to mainstream media.

3.1 Social media Platforms used by Kenyans during Covid 19.

The first objective of the study was to determine the Social media Platforms used by Kenyans during Covid 19. Based on the review done, four papers described and listed the most used social media platforms. One of the review indicated that WhatsApp (89%), Facebook (81.7%) and Instagram – 61%, and YouTube (51.6%) were still the top most used social media in Kenya. Twitter -14.3% and Snapchat- 17.7% users had increased while LinkedIn- 43% of users only access it for less than thirty minutes daily (USIU-A 2020). The majority of participants used Facebook to acquire information about COVID-19 because it is the most popular social media platform. Other platforms like TikTok, Skype, WeChat, and Myspace were among the lowest used for news and information on Covid-19 (Med 2020).

Mano (2020) notes that specific features of online platform creates variations in use and outcomes where Twitter and Tumblr are based on written interaction, Instagram focuses on photo-sharing while Facebook users have higher values of life satisfaction, happiness and social support

3.2 The topics mostly heard/seen/read on social media during Covid 19 Pandemic

The second objective was to assess the topics mostly heard/seen/read on social media during Covid 19 Pandemic as users shared videos, pictures, songs, text messages among others. Three papers described the topics users mostly heard/seen/read on social media. Based on the review, it indicated that the COVID-19 health crisis affected the type of news topics most commonly followed on social media by users. The highest proportion of users had heard, seen, or read health news (COVID-19), followed by social news, political news, economic, cultural among other news. (Med 2020).

3.3 The nature of information/content shared on Social media and its motivation during Covid 19 Pandemic.

The third objective was to assess the nature of information/content shared on Social media and its motivation during Covid 19 Pandemic. Different categories of information was shared but Information on Health (Covid-19) was greatly shared among users of social media particularly in relation to fake news and misinformation had an immediate and massive impact on individuals during this crisis, but also factual information such as the number of cases - infections and deaths (Med 2020). Other motivations of sharing information was to maintain existing friends/contacts ,to find new friends ,for business networking ,to find activity partners , Dating among others. The review showed that people used social media for reconnecting with friends and families, maintaining existing networks/ relationships and sharing knowledge, ideas and opinions. Also, Personal chats acted as conversational forum to exchange and share about each other in a dialogue during the crisis. (Neelamalar M. & Chitra P. 2018).

3.4 Whether social media was a disrupter to mainstream media during Covid 19 Pandemic.

The fourth objective was to find out whether social media was a disrupter to mainstream media during Covid 19 Pandemic. The review showed that disruption has gone a long way with the rapid use of technology as it has transformed the way the news in mainstream media is produced, delivered and consumed across the world (Med 2020). Consumers have now become participants and users of information rather than being only the readers and viewers. The news media have adapted itself with the pace of this evolution. Disruption in news media has also changed the way people think and react to information because they give feedback through twitter, short messages, Instagram, Facebook and other platforms (Neelamalar M. & Chitra P. 2018).

Social media engages people to adapt to new ways of communication. It also leads to the formation of new ideas and expectations and requires a journalist to be innovative and creative. This has created an impact on the stages of planning, executing and managing a communication strategy like analysis of the consumer interests, consumer behavior and content marketing automation. It is a key role in enticing the audience to actively participate through group discussions, forums, doing tweets or posts, leaving comments or feedback beneath the news section page (USIU-A 2020).
The review indicated that digital disruptions that have occurred in News Media due to advanced technologies are like Facebook and YouTube which permits millions of consumers to interact and experience with content from distant away through very natural and immersive human experiences. Facebook and Twitter have become heavily social media channels for making the news participatory among users (USIU-A 2020). The consumer expectations are propelling media companies to offer maximum digital content across all channels with access devices that continue to emerge. This leads to disruption in the audience.

In addition , digital technologies have led to the reduction in the circulation of mainstream newspapers and the art of consuming news, accumulating and writing more democratized, the need for journalists to be active on the digital platform becomes essential (USIU-A 2020).

4. Conclusion

The review showed that social media has played a significant role in affecting the public during the COVID-19 crisis. People gathered information from governmental sources were more likely to get their information from social media than from other sources. Some users were unable to discern which information on social media was true and which was false thus causing panic and rumors about the true nature of the Covid-19.

The review helped to find out that many people have embraced the use of digital technologies like Social media which have changed the way they engage with media content in the right way, at the right medium and at the right time. Secondly, users have greatly changed the tools for getting the information they need from use of traditional media to social based on the content shared. Third, the nature of information shared or themes vary with purpose and finally, the media industry in this era of disruption must confront with opportunities and threats contained in the emerging technologies by administering social media analysis, audience measurement, and cross-platform app implementations. Therefore media experts and educators have an important role to play both now and in the future to educate media consumers on what constitutes good and reliable information and how to critically think through this information.

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Implications of Fake News and Mis-Information on Social Media among the Youth during the Covid-19 Pandemic

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Abstract

The proliferation of fake news on social media is now a matter of considerable public and governmental concern. With the evolution of technological advancements especially in the entertainment and media industry, the world has witnessed not just polarizing but also diverse array of options to choose from in terms of media consumption, a blessing and a vice in one way or another. This paper focuses on misinformation and fake news in social media, Facebook to be precise, during the Covid-19 era among the youth being the largest consumers of social media. Following the most recent contrivances regarding Facebook's alarming spread of misinformation regarding the developing and released Covid-19 vaccines that has led to panic among its consumers over the safety of the vaccines has elicit uproar from members of the public demanding a solution to the vice of misinformation by the now rebranding social media giant Facebook. Based on the review of past literature and findings from relevant researches conducted on the same, it is evident that indeed Facebook, now known as "Meta", indeed has some serious misinformation issues. The fact that Facebook has failed to curb this by identifying individuals spreading wrong information regarding Covid-19, and to seize the sub-groups and channels championing the misinformed news and ideas regarding Covid-19 pandemic is a clear indication of the serious depth of this matter. It was found that such misinformation caused reluctance among the public to get the vaccine most common reasons being that the vaccine could mutilate their DNA, that the vaccine could contain tracking microchips, or that there were claims that the vaccine led to fertility issues, a main concern of the general public, the youth to be precise.

Keywords: Fake News, Misinformation, Social Media, Youths and Covid 19

1. Background

According to the Institute for Strategic Dialogue 2021, despite detailed policies on misinformation and disinformation and promises to enforce them, social media platforms are failing to tackle prominent groups and individuals who spread false claims about COVID-19 and vaccines online (ISD, 2021). The youth being the largest age group of the consumers of social media, they are the most influenced and affected by the misinformation displayed in the social media platforms.

Placing the focus on Facebook, now rebranding as Meta, being the largest social media platform globally owning other social media platforms like Instagram, there's an alarming chunk of misinformed groups, articles, channels and individuals hosted by the social media giant. Since the spread of the Covid-19 virus and acknowledging it as a global pandemic, the world witnessed a high level of panic and unrest due to the limited information regarding the virus. Many people came up with conspiracy

theories trying to explain varying agendas regarding the Covid-19 virus, many of which shaped the perception of consumers of Facebook as a source of information to date.

Even though a year has elapsed since the first reported incident of the virus and the establishment of accurate data regarding the virus, the development and large scale production and supply of the various Covid-19 vaccines has witnessed another wave of misinformation and fake news regarding the contents and legitimacy of the vaccines being administered. An in-depth review of past researches regarding the same suggests that the level of vaccination among consumers of Facebook as a source of information regarding the Covid-19 pandemic was significantly lower compared to that of consumers of other sources of news. Similarly, the consumers of face book as a source of Covid-19 information was quite significant, even matching that of international conventional sources such as CNN or Fox news , but when it comes to general engagement, Facebook topped the charts a the one with the highest level of user engagement.

The availability of the freedom of expression especially in social media has been a major contributing factor that has fastened up the spread of misinformation and fake news. Although the social media companies like Facebook claims to have set aside legal measures to curb the "infodemic" as termed by Tedros Adhanom Ghebreyesus, the Director-General of the World Health Organization (Tedros Adhanom, February 2020) , following the depth of the issue it might prove to be impossible if not very difficult. Either way, information from media sources like Facebook shape the way people respond to a pandemic situation. It is how people perceive the pandemic that shapes how they react and not the real situation of the pandemic, pseudo-environments, in Walter Lippman's terms (Glik, 2007).

1.2 Statement of Research Problem

Since the global outbreak of the Covid-19 virus, misinformation has proved to be an even bigger problem than earlier anticipated. The never ending need for information has led to the spread of unverified, false, bias information regarding the same. The use of a social platform to access official information is also something to be addressed. The fact that social media platforms comprises of all kinds of people with various motives, ideas and agendas, the truthfulness of information obtained from such platforms needs to be reconsidered. While youth might find obtaining official information regarding the pandemic easy and convenient due to its nature as a social media platform, an entertainment hub and a news hub, there is need for creation of awareness regarding the validity of obtained information because again it is how people perceive the pandemic that shapes how they react and not the real situation of the pandemic, pseudo-environments, in Walter Lippman's terms (Glik 2007).

1.3 Purpose of the Study

This study sought to address the issue of misinformation and fake news from social media during the Covid-19 pandemic. This is in realization that misinformation in social media especially Facebook is the largest social media firm that shapes the youths perception of the pandemic. It also looks at the level of awareness of the consumers of social media, the focus being Facebook.

1.4 Specific Objectives

i. To investigate the level of misinformation regarding the pandemic in social media platforms.
ii. To study how the youth are affected by the misinformation.
iii. To examine the level of awareness of misinformation by social media consumers.

1.5 Research Questions

This research seeks to answer the following questions;

i. What is the level of misinformation regarding the pandemic in social media platforms?
ii. How are the youth affected by the misinformation?
iii. What is the level of awareness of misinformation in social media consumers

2. Discussion

2.1 Level of Covid-19 misinformation

According to Mallik Sallam, Deema Dababseh and seven other scholars published on December 3, 2020, COVID-19 misinformation: Mere harmless delusions or much more? Since the outbreak of the latest coronavirus pandemic 2019 (COVID-19) and its propagation as a pandemic, the media has been inundated in misinformation, resulting in psychological, social, and economic ramifications for the global population. Examining public perceptions of this emerging infectious disease is required in order to identify knowledge gaps and sources of misinformation, which will aid public health efforts in developing and implementing more focused interventional strategies. The study demonstrated the potentially negative consequences of disinformation on the general people, emphasizing the importance of providing early and correct information about the pandemic in order to reduce the disease's physiological, social, and psychological effects. According to a knowledge and attitude cross-sectional study among the general public residing in Jordan, 47% of its target population believed that Covid-19 was part of a Global conspiracy, 57% believed that Covid-19 is part of a biological warfare among states, 21% believed that 5G network had a role in the spread of Covid-19 virus and 82% believed that Covid-19 is part of spiritual test and that it was a prophetic revelation of the various religious books. From the statistics above it is clear that Covid-19 misinformation is a pandemic within a pandemic.

2.2 Effects of Covid-19 misinformation on the youth

In December 2020, research conducted by Zapan Barua, Sajib Barua et al on Effects of misinformation on COVID-19 individual responses and recommendations for resilience of disastrous consequences of misinformation, because of the rapid communication and publication, the public all over the world has acknowledged COVID 19's severe devastation. COVID-19, the world's first social media pandemic and a catastrophic calamity in the twenty-first century, was not immune to the spread of misinformation. The World Health Organization's (WHO) Director-General has announced that the COVID-19 disease is undergoing a 'infodemic' of misinformation. On March 28, UN Secretary-General Antonio Guterres tweeted on his personal Twitter account, "Our shared adversary is COVID19, but our opponent is also an 'infodemic' of misinformation," in accordance with WHO. Furthermore, researchers discovered that medical disinformation about the COVID-19 epidemic is spreading at a worrisome rate on social media. Because of the widespread usage of mobile devices and accessible and low-cost internet connectivity around the world, the internet has become the most important source of health information on the planet. According to Barua et al., internet technologies are becoming more affordable and accessible.

According to April 2019 data from Statista, the global mobile population has surpassed 4 billion unique users, and as of February 2019, mobile devices accounted for 48 percent of all online page views, with Asia and Africa leading the pack. According to Li et al., over 70% of adults utilize the internet to look for healthcare-related information. During the early stages of the COVID-19 pandemic, 93.5 percent of the general people in China used the internet as their primary source of health care information, according to C.Wang, a psychological researcher. According to H.O.Y Li, a researcher on the use of YouTube as a source of health information, between 23 and 26 percent of YouTube videos are false. According to Facebook, the body issued warning labels on around 90 million pieces of content in March and April 2020 because they are linked to Covid-19 disinformation such as fake remedies, anti-vaccination campaigns, and conspiracy theories. According to BBC, the repercussions of misinformation might be enormous because it weakens public health initiatives regarding the pandemic. It can exacerbate racism, anxiety, and stigma, as well as cause unconstructive and aggressive conduct, according to experts. Fear has caused the people to behave in an atypical way when it comes to acquiring personal protection equipment. Health misinformation on social media, according to some, can lead to people using harmful substances. COVID-19 misinformation, as well as that of other players, can add to stress and psychological morbidity. Health anxiety can be triggered by inaccuracies, disinformation, or overstated information. Furthermore, the misinformation impact is linked to buying and consuming medications without a prescription from a medical professional. As a result, misinformation in many media, including social media, can have a life-or-death influence during a pandemic.Covid-19 had an effect on the youth's perception of the whole idea of Covid-19. Misinformation molded how they responded to government enforced rules and regulation set to counter the spread of the virus, what they thought or rather believed to be the causes or origin of the virus, how the virus was spreading or what increased the rate of infection of the virus, whether or not to take the Covid-19 vaccines, the believed effects of the vaccine and also increased the level of panic and anxiety among the misinformed individuals.

2.3 Awareness of misinformation

According to the Edelman report on mistrust levels during the Covid-19 pandemic and even earlier before the outbreak, there was an imminent growth of mistrust by the general public towards the government, conventional media and mostly social media. As a result of the global surge of mixed information, the level of mistrust of the media has grown. The constant flow of controversial information regarding the Covid-19 pandemic has eluded a certain level of mistrust among the audience of media. A survey on the global intensity of mistrust of the media by Edelman data and intelligence shows a shocking drop in global media trust in general. A clear indication that members of the public are aware of misinformation from the media in general. The idea of secret government agendas has fueled the level of mistrust among the general public. The outbreak of the pandemic was the last straw that broke the camel's back due to little information and mixed perceptions on the idea of the Covid-19 pandemic as well as the spread of misinformed conspiracy theories regarding the pandemic.

3. Methodology

3.1 Research Design

Due to limited resources**,** an inductive research approach was used to obtain generalized information regarding the research topic. Information gathered from the available resources were used to provide a general final idea, a fair representation of the information gathered. According to this approach,

researchers begin with specific observation which are used to produce generalized theories and conclusion drawn from the research. The reasons for occupying the inductive approach was that it takes into account the context where research effort is active while it silos most appropriate for small samples that produce qualitative data. However, the main weakness of the inductive approach is that it produces generalized theories and conclusions based on a small number of observations, theory the ability of research results being under questions (Debzin & Lindn, 2005).

3.2 Target Population

The research targeted young consumers of social media as well as individuals who had an interest in information regarding the Covid-19 pandemic within the youth target age group. A research population is generally a large collection of individuals or objects that is the main focus of a scientific query. This is the reason why researchers rely on sampling techniques , a research population is also known as well denied collection of individuals or objects known to have similar characteristics.

3.3 Data Collection Techniques

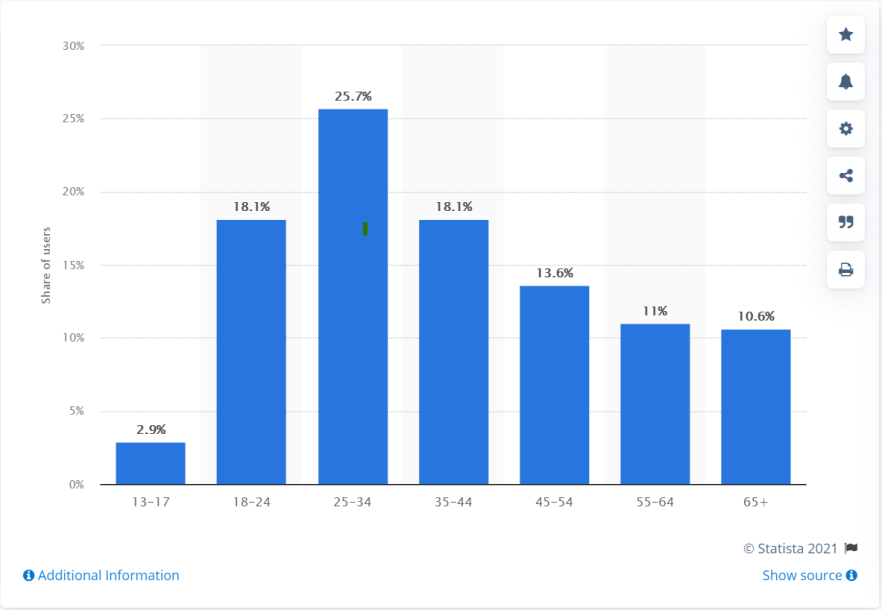
Data were collected from past studies and literatures relevant to the research topic in question. Most of the data was collected from literatures published by internationally approved publishers and government researchers found in the internet.

4. Findings and Discussion

4.1 Findings

Based on the research questions and research objectives derived from the research topic, the following findings were reached at;

A research done by Statista on the age distribution of Facebook users as of July 2021, the youth were the majority as graphically displayed below.



Even earlier before the Covid-19 pandemic, Facebook was already a leading platform when it comes to misinformation. In a 2016 publication, in the journal *Nature: Human Behavior*, statistics showed that it had the highest misinformative leads. According to a team of researchers led by Princeton University's Andrew Guess monitored the internet usage of over 3000 Americans. They discovered that Facebook was the referrer site for untrustworthy news sources 15% of the time. Facebook, on the other hand, only led users to authoritative news sources 6% of the time.

"This pattern of differential Facebook visits immediately preceding untrustworthy website visits is not evident for Google (3.3 percent untrustworthy news against 6.2 percent hard news) or Twitter (1% untrustworthy versus 1.5 percent hard news)," the authors write. Below is a graphical representation of the same.

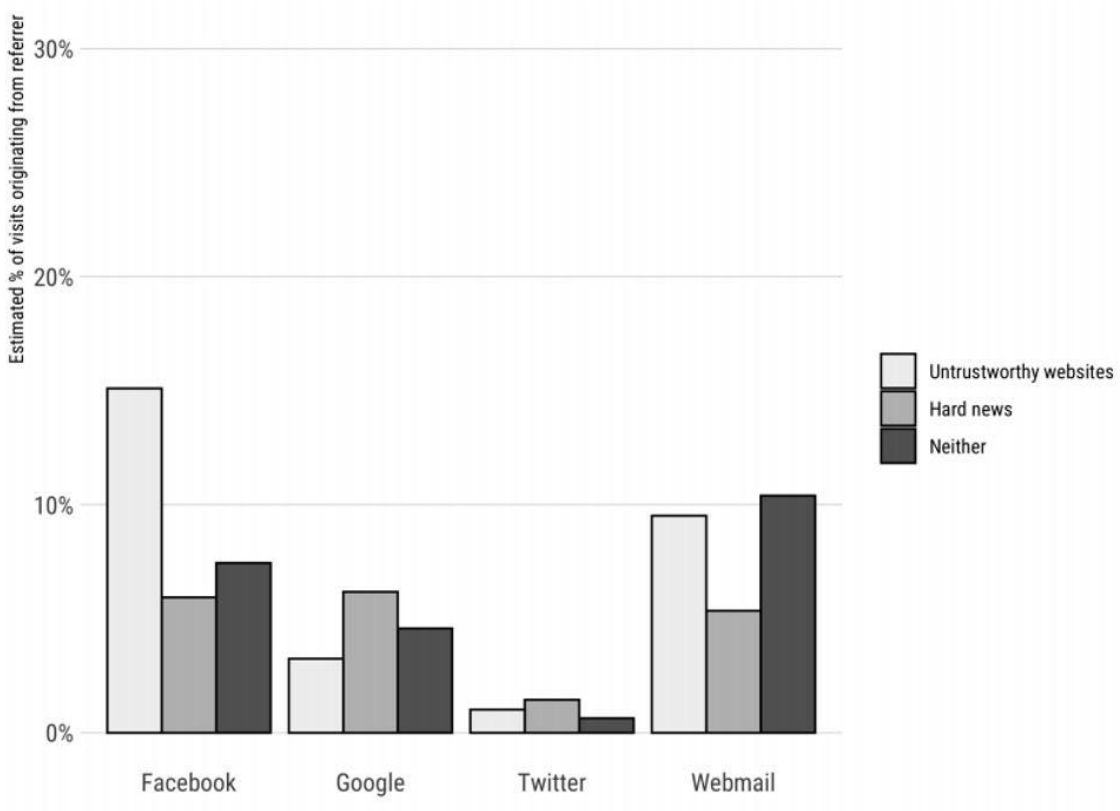


Figure 1.

Similarly, according to Ethan Zuckerman, an associate Professor of Public Policy, Communication, and Information, University of Massachusetts Amherst, according to leaked internal documents, Facebook ,which just renamed itself Meta ,is performing significantly worse than it says when it comes to reducing Covid-19 vaccination misinformation on its social media platform.

Misinformation regarding the virus and immunizations is a big source of anxiety on the internet. Respondents who got part or all of their news from Facebook were substantially more likely to oppose the Covid-19 vaccine than those who got their news from mainstream media sources, according to one study.

Still on the same, Dan Milmo, a Global technology editor on Tue 2 Nov 2021 at 00.01 GMT said that according to a research, misinformation and skepticism about Covid-19 and vaccinations have been

permitted to propagate on more than a dozen Facebook and Instagram accounts, sites, and groups, which have accumulated 370,000 followers in the last year.

Posts in Facebook groups claiming that children are being "murdered by the experimental jab they're being pressured to take" and an Instagram account promoting a documentary by Andrew Wakefield, one of the key figures in promoting discredited links between MMR inoculation and autism, are among the misinformation and promotion of vaccine hesitancy.

Subject to the demographic position of the audience, research outcomes may vary. Due to the limited researches and graphically detailed information regarding the relationship between Covid-19 and media, the research was based mainly on the data that was readily accessible like the research conducted on the Portuguese regarding the various forms of media and their choices.

Similarly, information regarding the dependency between people and the media was based on old hypothesis developed as early as the 1970's, which may not be a reliably true reflection of the society today.

5. Conclusions and Recommendations

Based on the findings, statistics show that the youth are indeed the largest members of Facebook by age group that is from ages 15-35. Similarly, according to the findings, misinformation in social media platforms, Facebook to be specific, traces way back before the Covid-19 pandemic. When compared to other forms of media like conventional media, social media is by far a leader of misinformation and fake news. Facebook also displayed a very low level of trustworthy information and news regarding the Covid-19 pandemic.

Despite this negative display of Facebook's position on misinformation, it has done so little to counter fight this vice. Despite claiming to have placed certain regulatory measures on the type of information being spread in its platform, the measures seem to be futile. Based on the findings such levels of misinformation and fake news may cause some serious health implications especially when it comes to people's perception of the pandemic since it is this perception that shapes how they react to vaccination, control measures and prevention measures set aside to counter the pandemic.
At this point it is best to critically analyze information from whatever source before letting such information mold our knowledge on the same. In feature studies on the same research topic .I would recommend a revisit on the review how Facebook and other social media platforms have acted on the issue of misinformation and fake news. Just as I said in the beginning of the research, social media today has become a significant technological advancement in the field of media and entertainment and yet still a major vice on the same. Let's make it a technological blessing.

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Influence of Gender Based Violence and Covid-19 on Girls and Women Status and Education

By Lucy Kibera – University of Nairobi

Abstract

This paper sought to establish the influence of gender-based violence (GBV) on status of women and education in society. The review of literature established that out of 750 million illiterate adult population in the world, two thirds are women. This is because there is a preference for investment on education of boy in most societies. Women also own less than 20% of land, a resource for economic empowerment though their contribution to workforce is 70%. Further, by and large inheritance in terms, of land, finances and other immovable assets are passed to the male children by the parents. The female gender is also vulnerable to sexual harassment and this often leads to transmission of sexual related diseases and unwanted pregnancies. Towards elimination of marginalization of females, a new thinking that encourages equality between women and men should be nurtured at the family, societal and national levels.

Keywords: Gender, Gender Based Violence, Education, Marginalization

1. Introduction

The article has examined the concept of gender and gender-based violence and its causes. In addition, it has defined the concept of education and its benefits to the individual and society. Finally, the paper has examined the effects of Covid-19 pandemic on education of girls and has suggested strategies for cushioning girls against adverse influence of socio-cultural, economic and pandemic factors such as Covid-19.

2. Gender and Gender-based Violence and its Influence on Girls and Women

To comprehend gender-based violence, it is critical to have a grasp of the concept of the word gender. The term gender is normally used to categorize women and men on socially constructed constructs rather than innate biological sex traits. Gender differences represent expectations which society has about individuals on basis of their biological sex, that is, female or male sex organs. Further, term gender is a construct coated with cultural, psychological and intellectual characteristics assumed to be appropriate for females and males in a particular society. For instance, in most societies boys and men are considered to have superior intellectual power, stamina, wisdom and courage compared to their female counterparts. Gender differentiation is often associated with inequality and restrictive tendencies and especially on girls and women. The female gender is perceived to be emotional and lacking in intelligence. These gender prejudices against the female gender often lead to marginalization of women as well as violence on women. Gender based violence is any form of violence that is directed at an individual based on her/his biological sex or innate gender identity. It includes physical, sexual, verbal, emotional, and psychological abuse, threat, coercion, economic, social and educational deprivation meted out to an individual in both public and private life because one is a woman or man.

3. Concept of Education

Etymologically, the term education is derived from two Latin words "educare" and "educatum". The term "educare" means to train or mould. It also means to bring up or to lead out or to draw out from inward to outward. The word "educatum" thus denotes a process of bringing out and facilitating the development of an individual's physical, intellectual, psychological and spiritual potentials to the fullest. Plato (428–c. 348 BCE) stated that "education is the creation of sound mind in a sound body". Its role is to develop a person's faculty especially the mind so that an individual is able to enjoy the contemplation of supreme truth, goodness and beauty. Plato is one of the earliest scholars to advocate for the education for both females and males on equal basis. However, Jean Rousseau (1762) in his pedagogical treatise, titled "Emile" recommended that women should receive education that would equip them with skills to nurture children properly.

The perception of education for women as prescribed by Rousseau has persisted to the present society. This type of education located women in the domestic sphere while that of men prepared them for work outside domestic sphere. This state of affairs has continued to some extent to the 21st century in that fewer female than men access education. In addition, the majority of women who have had opportunities to access education have not specialized in Science, Technology, Engineering and Mathematics which eventually lead to lucrative careers.

The state of education for women has continued to lag behind that of men in spite of the fact of various international conventions such as Universal Declaration of Human Rights (1948), International Convention on Elimination of All Forms of Racial Discrimination (1965), International Covenant on Civil and Political Rights (1966), and Convention on Elimination of All Forms of Discrimination against Women (1979) have outlawed exclusion of individuals (female and men) from access to justice in all domains human endeavour and interaction. The United Nations, Millennium Development Goals (2000) also committed world leaders to combat poverty, hunger, disease, environmental degradation, and discrimination against women. Further, United Nations Sustainable Development Goals of (2015) and Millennium goals (2000) have committed states and governments of the world to achieve gender equality. In particular, goals 2 and 3 of millennium goals' tasked nations to achieve universal primary education and gender equality. Similarly, Sustainable Development goals 4 and 5 have committed states to provide quality education for all and to attain gender equality respectively.

4. Benefits of Educating Women to Society in the World

UNESCO (2013) and World Bank.org 8th March (2021) enumerate a number of reasons in favour of education the girl child. These benefits suggest that: educated women are less likely to die in childbirth because they will not marry young when their bodies and psychological states are not mature and will also eat well and attend pre-natal and post-natal clinics. It has also been postulated that if all women attain primary level of education, there would be 15 percent fewer child death due to neglect and malnutrition. Educating girls to secondary level would further reduce maternal deaths by half because educated mothers would improve their nutrition and thus improve their health status as well as shield their children from malnutrition and related diseases. Further, attainment of high levels of education would help to forestall marriage of girls at an early age, thus postponing marriage and effectively bringing down population growth rates. Finally, education would narrow pay gaps between men and

women making them get productive work and thus add to financial power of the family. Essentially, education for women is one of the greatest weapons against circle of poverty, ignorance and diseases.

5. Status of Literacy of among Females in the World

In spite of the benefits of educating girls and women, UNESCO Report (2020) has indicated that 750 million of adult population are illiterate and two-thirds of them were women. Currently, literacy rate of women stands at 82.7% while that of males is at 90%. This is not in keeping with Dr. Aggrey's advice who in 1920's posited that when you "educate a woman you educate a nation". There is evidence that nations with educated women and men are well ahead in socio-economic development compared to nations whose populations of females are illiterate. This is particularly true of nations where education for both women and men is at par and/or near parity. Examples of such countries with high literacy rate for both genders include Central Asia at (100 percent), Europe and Northern America (100%) respectively (UNESCO, Institute of Statistics, July, 2017). The regions of the world that have not yet attained gender parity in education are Eastern and South-Eastern Asia at (97) with literacy level for males and (94) percent females, Latin America and the Caribbean (94) percent males and (93) percent females, Northern Africa and Western Asia (86) percent males and (74) percent females, Southern Asia (83) percent males and (63) percent females and Sub-Saharan Africa (72) percent males and (57) percent females (UNESCO, Institute for Statistics, July, 2017). As expected, illiteracy for girls and women is highest among the underdeveloped nations and especially African countries.

6. Causes of Marginalization of Women in Education

The gender gap in education can be attributed to a number of factors. Historically, it has been assumed that boys and men are innately and intellectually superior and especially in scientific, mathematical and technology fields. However, most research carried out in the late twentieth and twenty first centuries have shown very little difference in educational achievement of girls and boys. Girls tend to do better in almost all subjects particularly in early grades (Trawler, 1995 & Goldstein, 1987). Unfortunately, as they move up the educational ladder their academic performance declines due to a number of factors. Some of the factors include socialization, culture, school learning environment, hidden curriculum, sexual harassment and pandemics such as Covid-19.

6.1 Early Socialization

Norman et al (1988) pointed out that before children start school, socialization and conditioning geared towards sex stereo-typing have been ushered in by the types of play that girls and boys are encouraged to engage in and the types of toys they are provided to play with. Girls are likely to have their educational aspirations affected through playing with dolls and other toys which reinforce the stereotyping of women as "caregivers". Boys on the other hand, are encouraged to be more active compared to girls in their play and this is reflected in the kinds of toys they are exposed to such as constructional toys which can help them to develop scientific and mathematical concepts. The stereotyping of boys and girls is further reinforced through media, books, comics, television, and various types of advertising. These often portray girls as homemakers and service-oriented workers such as nurses, teachers, caregivers and sexual entertainers. On the other hand, boys are painted as innovators, scientists, pilots, mathematicians, laboratory technicians, engineers and leaders among others.

6.2 Culture

In poor and developing countries, there is cultural preference to educate boys versus girls (Kibera et al., 2007 & Douglas, 1964). Most societies in the past had preferred to educate boys rather than girls. Furthermore, property was bequeathed to males because societies believed and some still subscribe to the fact that girls are "visitors" and/or "flowers" in their biological home on account that on marriage they will acquire another home and family; thus, investment in a girl's education is perceived to be essentially beneficial to her "new" home and family by marriage and not the biological family. In fact, women who constitute 49.6% of the world population own less than 20% of land (World bank, 2017). This is in spite of the fact that nearly 70% of women work on agricultural farms and especially in sub-Saharan Africa (World Economic Forum, weforum.org, March, 2018).

6.3 Sexual Harassment and School Learning Environment

Learning environment for girls has not been conducive most of the time. Most schools, for example, in Kenya and many other countries are co-educational and therefore girls are exposed to sexual harassment by their male counterparts and male teachers. For instance, in 1991 nineteen (19) girls were killed and 71 others raped by their male colleagues at St. Kizito Mixed Secondary School in Meru in Kenya (Mackenzie, 1993). The Guardian of December, 2017 reported that one in three girls or (37 percent) in mixed or co-educational secondary schools were sexually assaulted in school. Most recently, six (6) male students sneaked into neighbouring dormitory for girls in Kiambu County on 22nd October, 2020 (https://www.tuko.co.ke>kenya...). Unfortunately, one of male students was caught and lynched. It is assumed the male students had purposed to sexually harass girls. According to National Crime and Research (2020) gender-based violence in 2020 in Kenya increased by 92% compared to the previous year. This increase is mostly attributed to Covid-19 which forced incompatible people be together due to lockdown during the day and night.

6.4 Learning Resources

In addition to threatening school environment, secondary schools attended by most girls are day and mixed and are not well endowed with teaching and learning materials compared to single sexed schools which have good teachers and learning resources. Undoubtedly, differential allocation of teaching and learning resources leads to differential learning outcomes and lower educational aspirations and especially among girls (Kibera, 1995). Further, most girls and particularly those from poor resource families often miss school due to lack of sanitary towels for management of menstrual flow for about 5 days per month. According to UNICEF (2020) many girls miss school or even drop out of school due to menstruation (https://www.unicef, May 28th, 2020). In Kenya a large number of girls miss an average of 4 days of school each month during their menstrual flow period (Business Daily, June 1st, 2017).

6.5 Hidden Curriculum and Gender Gap in Education

The hidden curriculum refers to the unwritten rules, values, beliefs and normative patterns of behaviour which both girls and boys' which pick up from classroom and other social interaction without a formal lesson. For example, when textbooks are available for the classroom teaching process are dominated by male illustrations as strong and being doctors, dentists, policemen, pilots, head of states and government while females are depicted as pretty and doing cooking and plaiting hair they are likely to communicate superiority of men over women (Global Monitoring Report, 2016; Kibera & Kimokoti, 2007; Kibera, 1995 & Obura, 1991). Use of male specific images marginalizes and silences girls and women not only in educational institutions but also other sectors of the society.

7. The Influence of Covid-19 on Female Education in Kenya

The onset of Covid-19 pandemic in Wuhan China on 19th December, 2019 quickly spread to the rest of the world and added onto many challenges that were already impacting negatively on the status of the female gender including education. This led to closure of educational institutions worldwide. According to Plan International by September (2020), 1.5 billion learners were out of school and of these 743 million were girls. It was estimated that about 11 million girls were likely to drop out of school mainly due to teen pregnancy.

In March, 15, 2020 the Kenyan Government effected a nationwide closure of schools and universities in response to the pandemic. During the closure of educational institutions, the government recommended online learning or technology mediated learning through television, radio and smart mobile phones. Availability of technology-mediated learning was a challenge given that, it is dependent on electricity which is not readily available in rural Kenya. Even in urban areas, where electricity is fairly available a large proportion households and especially informal settlements, may not have had smart phones, radios and television sets necessary for technology mediated learning. In almost all cases, scarcity of resources affects girls and women more than boys and men because of deep-rooted economic disparity between the two genders. It is therefore assumed that more boys than girls were in possession of smart phones and thus were be able to access online learning more readily compared to their female counterparts. Further, girls were unlikely to access other essential learning materials such as pencils, paper, and conducive learning environment.

Generally, boarding schools provided a refuge for young girls from challenges that distract them from effective participation in education. Essentially, schools give girls a secure place to learn and an opportunity to pursue higher levels of education. Further, girls enrolled in boarding schools are provided with regular and balanced meals, clean environment, sanitary towels and counselling and guidance services. Definitely, closure of schools for six months must have had negative effect on the education of girls.

The pandemic also shrank the economy leading to loss of jobs and businesses making communities poorer. This meant that women and girls who were already economically disadvantaged felt the full weight of the pandemic not only in economic terms but also in other forms of gender related violence. For instance, forced early marriage, sexual violence and negative cultural practices such as circumcision became more frequent. This was in spite of the fact that circumcision of girls was outlawed in Kenya in 2011. For instance, by 21st October 2020, almost 3,000 girls from the Kuria community underwent circumcision (http://www.the gurdian.com.>…).

Further, closure of schools due to Covid-19 is said to have exacerbated teenage pregnancy. It was reported that closure of schools led to about 4000 teen pregnancies between 15th March and May 2020 in Machakos County (www.thenewhumanitarian.org>news>news>13/7/2020). However, The African Institute for Development Policy (AFIDEP, 2020) after comparing pregnancy rate of adolescents (age 10-19) has indicated that pregnancy rate among girls was higher in 2019 compared to 2020. Apparently, between January, 2019 and May 2019 4710 girls became pregnant compared to 3966 girls between January and May 2020 in Machakos County. The slightly lower rate of pregnancy among teenage girls during Covid-19 period may be attributed to failure to collect data using face-to-

face interviews and non-return rate of questionnaires among others during this period. Thus in 2019, there were 175, 488 reported teen pregnancies between January 2019 and May 2019 as compared to 151,433 teen pregnancies within the same period in 2020 among school girls in Kenya. It was reported that 652 girls, did Kenya Secondary Certificate of Education (KSCE) after giving birth (https//: www.star.co.ke>news, 11th May, 2020).

On basis of the discussion hereabove, it is evident that teenage pregnancy is a major obstruction to girls' education in Kenya. Some of the factors associated with high rate of teenage pregnancy include, lack of information about sexual and reproductive health and rights, inadequate access to services tailored to young people, failure of the family and community to provide information on sexuality and its management, lack of role models, peer pressure to engage in sexual activities, cultural practices and forced marriages.

8. Strategies towards Elimination of Gender-based Violence and Marginalization of Girl's Education

Towards elimination of gender-based violence which includes all forms of exploitation and marginalization based on misconceptions about their female and male gender require concerted effort by the state and all government institutions in implementing laws that prohibit victimization of women. Social structures should give both females and males equal opportunity to develop to their fullest potential in education, employment, and ownership of material resources among others. Unity and complementarity and not division and competition should be the guiding principle towards equitable gender relations.

Further, achievement of gender parity requires deliberate conscious effort and commitment by socio-political institutions in degendering society. The process should aggressively address all areas in which gender disparities have been anchored falsely on biological superiority of the male sex. To this end, all state and government institutions should resocialize society about myths that perpetuate disparities between girls and women and boys and men. Therefore, all Declarations, Conventions and Protocols by various bodies of United Nations outlawing gender inequality must be enforced. The implementation of these Declarations, Conventions and Protocols to the letter and spirit, is likely to make females and males enjoy similar opportunities, rights, entitlements and responsibilities in various facets of human interaction. The participation of both genders in the affairs of the society is a catalyst to sustainable development.

9. Conclusion

Equitable distribution of material related resources and socio-cultural capital between females and males will entail: compiling comprehensive data on the situation of girls and women with particular reference to poor urban, poor rural, nomadic regions, school dropouts, girls and boys with special needs education and adolescent mothers. This data will facilitate planning and allocation of resources to give affected girls a second chance after delivery in education. In addition, schools should be built close to children's homes to avoid children getting fatigued from walking for long distances and also being exposed to sexual harassment especially girls.

Further, boarding schools and especially for girls should set up among sparsely populated areas in order to give them equal access to education. Further, all segments of society such as parents, teachers and society at large should be sensitized on the importance of educating girls through media, public lectures and songs. Girls should be educated about their sexuality through a formalized curriculum on how they can deal with teenage girl and boy relationships from the upper primary classes onwards in order to avoid unwanted pregnancies. Outlawing sexual harassment, provision of educational materials appropriate for digital learning, and textbooks that only portray girls and women only in their traditional roles should be eliminated. Finally, a new way of thinking that values abilities and capabilities of both women and men equally though resocialization of society into accepting equality of both genders as beneficial should be adapted otherwise realization of gender parity may take a long time to the detriment of peaceful co-existence, and sustainable development. To achieve this, woman who constitute nearly half of the world population should be given every opportunity to develop their abilities and capabilities to the highest level possible for the good of society.

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Misamikorona: Ulinganishaji na Ulinganuzi wa Kiingereza na Kiswahili

Na Edwin Muna - Chuo Kikuu cha Gretsa

Iksiri

Tangu kuzuka kwa Uviko-19 miaka miwili iliyopita, lugha mbalimbali duniani zimeunda misamiati mipya inayohusiana na gonjwa hili. Makala hii inalinganisha na kulinganua misamikorona katika Kiingereza na Kiswahili katika nyanja za utabibu, isimu na uchumi. Kiswahili na Kiingereza ni lugha rasmi nchini Kenya na Tanzania na hivyo hutumika katika mawasilaino katika nyanja rasmi. Kwa hivyo, makala hii inachunguza ikiwa lugha hizi mbili zimelingana au kutofautiana katika uundaji wa misamikorona. Makala ililenga kubaini ikiwa lugha mojawapo kati ya Kiswahili na Kiingereza imeunda misamikorona mingi kuliko nyenzake. Kutambua mianya iliyopo ni muhimu katika kuwaongoza wanaisimu kuunda misamiati ya kuiziba. Utafiti huu ulitumia mbinu ya kimaelezi. Data zilizokusanywa ni misamiati ambayo imetumiwa kuzungumzia gonjwa la Uviko-19 na maswala yanayohusiana nalo katika nyanja za utabibu, uchumi na isimu. Data hizi zilikusanywa moja kwa moja katika magazeti na majarida mitandaoni na mitandao ya vyombo vya habari yaliyochapishwa kati ya Januari 2020 na Novemba 2021. Magazeti, majarida na machapisho husika yaliteuliwa kimakusudi kwa kuzingatia anwani na tarehe zao. Makala hii ilibaini kuwa lugha ya Kiingereza imeunda misamikorona mingi katika nyanja zote tatu kuliko Kiswahili. Hali hii imechangiwa na kuashiria nafasi na hadhi kuu ya Kiingereza kama lugha yenye msambao mkubwa ulimwenguni, na vilevile, matumizi tukizi ya Kiswahili katika nyanja rasmi hasa nchini Kenya.

Maneno makuu: msamikorona, Uviko-19, Kiswahili, Kiingereza

1. Utangulizi

Jukumu kuu la lugha yoyote ile ni kuwezesha mawasiliano katika jamiilugha. Lugha husika hutekeleza jukumu la mawasiliano kwa ukamilifu inapowawezesha wazungumzaji wake kuyazungumzia yaliyomo katika mazingira yao. Ili kukidhi mahitaji ya kimawasiliano ya jamiilugha, lugha husika sharti iwe na misamiati faafu kuzungumzia yaliyomo katika mazingira yake. Hivyo basi, kila kunapozuka jambo au kitu kipya katika mazingira ya jamiilugha yoyote ile, msamiati mpya sharti uundwe katika lugha husika ili kukidhi mahitaji yaliyopo ya kimawasiliano. Asif, Zhiyong, Iram na Nisar (2021) wanaeleza kuwa lugha ya binadamu ni chombo bunifu na hubadilikabadilika. Asif na wenzake wanaongeza kuwa sifa hii husaidia lugha kujiendeleza na kukua. Vilevile, wanasema kuwa misamiati ya lugha zote hukua siku baada ya siku. Hali hii imedhihirika katika lugha zote katika historia zao.

Uundaji wa msamiati katika lugha, hivyo basi, hauna kikomo kwa kuwa kila mara mambo na vitu vipya huchipuka katika jamiilugha na sharti vileksishwe katika lugha husika. Leksimu mpya sharti ziundwe ili kuyazungumzia mapya katika mazingira ya jamiilugha husika. Hali hii ndiyo iliyotokea na inaendelea kushuhudiwa katika lugha zote duniani baada ya kuzuka kwa gonjwa la korona ambalo tunalirejelea hapa kama Uviko-19.

Neno Uviko-19 limeundwa kwa kutumia mbinu ya usinonimi kutoka katika kifungu ***U****gonjwa unaosababishwa na* ***Vi****rusi vya* ***Ko****rona uliozuka mwaka wa 20****19***. Mbinu sawa na hii ndiyo iliyotumiwa katika Kiingereza kuunda neno *Covid-19*. Kwa kuzingatia maana ya neno *neologism* ilivyoelezwa na Frank (2021), tulitumia neno *msamikorona* katika utafiti huu kurejelea msamiati au neno lolote ama kifungu chochote kipya ambacho kimeundwa kuhusiana na gonjwa la Uviko-19. Neno *msamikorona* tumeliunda kwa kutumia mbinu ya uhulutishaji: ***msami****ati wa* ***korona***. Wingi wake ni *misamikorona*. Vilevile, maana ya neno msamikorona imejumuisha maneno ambayo yamekuwapo katika lugha lakini maana zao zikabadilika au kupanuliwa kutokana na kuzuka kwa gonjwa la Uviko-19.

Gonjwa la Uviko-19 limeyakumba mataifa yote duniani. Hivyo basi, jamiilugha mbalimbali kote duniani zimelazimika kuunda msamiati mpya wa kulizungumzia janga hili. Jamiilugha ya Afrika Mashariki pia haikusazwa na janga la Uviko-19. Katika janibu hizi, lugha mbili zinazoshamiri ni Kiswahili na Kiingereza. Kiswahili ni lugha ya Kiafrika inayozungumzwa na idadi kubwa zaidi ya watu waliomo katika Afrika Mashariki. Okombo na Muna (2017) wanaeleza kuwa kitovu cha Kiswahili ni Afrika Mashariki, hususan upwa wa pwani baina ya Kenya na Tanzania, lakini lugha hii imesambaa na kinatumika katika nyanja mbalimbali katika mataifa mbalimbali ya dunia. Kiswahili, kama ilivyo lugha ya Kiingereza ni lugha rasmi nchini Kenya na Tanzania. Hivyo basi, hutumika kufanikisha mawasiliano katika nyanja rasmi ikijumuisha utabibu, uchumi na isimu. Vilevile, Kiswahili huzungumzwa na idadi kubwa katika nchi za Uganda, Rwanda, Burundi, Jamhuri ya Kidemokrasia ya Kongo, Somalia na Msumbiji. Jamiilugha hii pana ya Kiswahili imeathiriwa na Uviko-19 na ipo haja kubwa ya kuleksisha dhana zinazohusiana na gonjwa hili katika Kiswahili ili kuiwezesha kufanikisha mazungumzo kuhusu gonjwa lenyewe.

Kwa upande mwengine, lugha ya Kiingereza ni lugha ya kimataifa na lingua franka katika sehemu kubwa sana duniani, ikiwa si katika dunia nzima (Bakhmat, Panchenko na Nosach, 2021). Fauka ya hayo, Kiingereza ni lugha rasmi katika nchi nyingi duniani na hivyo hutumika katika miktadha mbalimbali rasmi. Ni lugha ambayo inatumika kwa mapana katika tafiti mbalimbali zikijumuisha zile za uwanja wa utabibu, elimu, isimu, uchumi na usambazaji wa habari. Matokeo ya tafiti nyingi zinazohusu magonjwa mengi duniani zikijumuisha zile za Uviko-19 yamechapishwa kwa lugha hii. Lugha ya Kiingereza inatumika kama lugha ya kufunzia katika taasisi za elimu katika nchi kadha duniani. Vilevile, inatumika kwa mapana katika vyombo vya habari vya kimataifa kama BBC, VOA, na Radio Deutschevelle. Kutokana na majukumu haya muhimu ya Kiingereza, ni wazi kuwa lugha hii sharti iwe na misamiati ya kuwawezesha wazungumzaji wake kuyazungumzia mambo mbalimbali katika nyanja hizi na zaidi.

Watumizi mbalimbali wa lugha hizi hivyo basi, wamewajibika kuunda misamikorona ili kuwawezesha wao pamoja na wazungumzaji wenzao kuzungumzia janga la korona. Baadhi ya misamikorona hiyo imetafitiwa na kuangaziwa na watafiti mbalimbali kama inavyoonyeshwa katika sehemu inayofuatia.

2. Tafiti za Awali

Kulingana na tafiti ambazo zimefanywa na wanaisimu mbalimbali duniani, ni wazi kuwa Kiingereza kimeunda misamikorona mingi ambayo inatumika katika nyanja mbalimbali, rasmi na zisizokuwa rasmi. Tafiti hizo ni pamoja na zile zilizofanywa na Mweri (2021), Roig-Marin (2021), na Bakhmat, Panchenko na Nosach (2021).

Mweri (2021) anaangazia athari za Uviko-19 katika matumizi ya lugha ya Kiingereza. Anaangazia mbinu za uundaji msamiati mpya ambazo zimetumiwa katika Kiingereza kuunda misamikorona. Baadhi ya mbinu anazozibainisha Mweri ni ufupishaji, usinonimi, uhulutishaji, na uambatishaji. Mweri anaorodhesha maneno kama vile *BC* (before corona), *AC* (after corona), na *Rona* (ufupishaji wa corona). Vilevile, anabainisha maneno ambayo yamekuwapo katika lugha ya Kiingereza lakini yamekumbwa na badiliko la kisemantiki lililochochewa na kuzuka kwa janga la Uviko-19. Maneno hayo ni pamoja na *lockdown, symptomatic, asymptomatic, contact tracing, intubation, epidemic, pandemic, incubation period, screening, ventilators, respirator, quarantine, isolation, flattening the curve, herd immunity,* na *frontline soldiers.* Maneno haya yaliyoorodheshwa na Mweri yamepanuliwa maana zao ili kuelezea mambo yanayofungamana na Uviko-19. Mbinu hii ya upanuzi wa maana wa maneno ambayo tayari yamo katika lugha ili kuelezea mambo mapya hutumika kote duniani. Kwa hivyo, katika ulinganishaji na ulinganuzi wetu, tuliweza kuzingatia matumizi ya mbinu hii kuunda misamikorona katika Kiswahili na Kiingereza. Mbali na Mweri, Roig-Marin (2021) anatathmini misamikorona iliyoundwa katika Kiingereza kwa kutumia mbinu za uhulutishaji na uambatishaji. Anatambua misamikorona kama vile *coronacation (corona + vacation), quaranteams (quarantine + teams), coronababy (corona + baby) na coronaparty (corona + party).* Roig-Marin anadhihirisha kuwa idadi kubwa ya misamikorona ya Kiingereza imeundwa kwa kutumia mbinu za uhulutishaji na uambatishaji. Utafiti huu ulilenga kulinganisha na kulinganua misamikorona ya Kiswahili na Kiingereza. Kwa hivyo, utafiti huu wa Roig-Marin unatupatia maelezo ya kina kuhusu matumizi ya mbinu za uhulutishaji na uambatishaji kuunda misamikorona katika Kiingereza. Tuliweza kulinganisha an kulinagnua jinsi watumiaji wa Kiswahili walivyotumia mbinu hizi kuunda misamikorona.

Kwa upande wao, Bakhmat, Panchenko na Nosach (2021) wanashughulikia mabadiliko ya kisemantiki yaliyotokea katika lugha za Kiingereza na Kiukraini na misamiati mipya iliyoundwa kutokana na kuzuka kwa Uviko-19. Wanataja mfano wa akronimu *BC* ambayo, kwa muda mrefu, ilitumika kurejelea *before Christ* lakini baada ya kuzuka kwa Uviko-19 imepata maana mpya ya *before corona*. Kwa kiwango fulani, uundaji wa msamikorona katika Kiswahili haujashughulikiwa ipasavyo. Hivyo basi ni muhimu kuiangazia katika utafiti huu kisha kuilinganisha na kuilinganua na ile ya Kiingereza kwa kuwa lugha zote mbili ni lugha rasmi nchini Kenya na Tanzania. Ulinganishaji na ulinganuzi wa msamikorona katika Kiingereza na Kiswahili kutaweka wazi mianya iliyopo na inayopaswa kuzibwa na lugha ya Kiswahili ili kuiwezesha kufanikisha mawasiliano katika nyanja mbalimbali rasmi.

Tulivyotaja awali, misamikorona inayolengwa katika utafiti huu inahusu nyanja za utabibu, isimu na uchumi. Janga la Uviko-19 ni la kimatibabu; linaathiri afya ya binadamu. Kwa hivyo, lazima kuwapo misamikorona ya kulizungumzia katika uwanja huu wa utabibu. Wanavyosema Asif n.w. (2021), karibu kila siku tunakumbana na msamiati mingi ya kitabibu na maneno mengi pamoja na virai vinavyohusiana na Uviko-19. Wanavyoshadidia Bakhmat, Panchenko na Nosach (2021), misamikorona mingi katika Kiingereza ilizuka katika uwanja huu wa utabibu. Isimu nayo huchunguza

lugha kwa kutumia mbinu za kisayansi. Uchunguzi huo huhitaji msamiati mwafaka kuizungumzia mada inayoangaziwa. Kwa hivyo, wanaisimu wamelazimika kuunda misamikorona ya kuwawezesha kushughulikia mada zinazohusiana na Uviko-19. Kwa kuwa janga la Uviko-19 limesababisha mtafaruku wa kiuchumi, misamikorona imeundwa vilevile ya kuzungumzia athari za gonjwa hili kwa uchumi.

3. Mbinu za Utafiti

Utafiti huu ulitumia mbinu ya kimaelezi ambayo humwezesha mtafiti kuchunguza swala kimfumo na kwa umahususi. Data zilizokusanywa ni maneno ambayo yametumiwa kuzungumzia gonjwa la Uviko-19 na maswala yanayohusiana nalo katika nyanja za utabibu, uchumi na isimu. Data hizi zilikusanywa moja kwa moja kutoka katika magazeti na majarida mitandaoni na mitandao ya vyombo vya habari iliyochapisha habari kuhusu gonjwa la korona kati ya Januari 2020 na Novemba 2021. Magazeti, majarida, makala katika majarida, na machapisho husika yaliteuliwa kimakusudi kwa kuzingatia anwani na tarehe zao.

4. Matokeo ya Utafiti

Data tulizozikusanya katika mitandao ya magazeti na majarida yanawasilishwa hapa chini. Tulianza kwa orodha za jumla kabla ya kujumuisha zile zinazoonyesha ulinganishaji na ulinganuzi wa misamikorona katika Kiswahili na Kiingereza.

4.1 Misamikorona ya Kiswahili

Ifuatayo ni orodha ya misamikorona ya Kiswahili tuliyoikusanya pamoja na viunganishi vya mitandao ambako misamikorona hiyo ilikotumika au kupatikana:

Chanzo	**Msamikorona**
https://www.voaswahili.com/a/5811635.html	Afueni ya korona
https://www.voaswahili.com/a/ukosefu-wa-mafuta-wasababisha-taharuki-uingereza/6253374.html	Janga la Covid/janga la COVID-19
https://www.voaswahili.com/a/6295106.html	Chanjo ya korona
https://www.voaswahili.com/a/6295106.html	-pata chanjo dhidi ya virusi vya corona
https://www.mwananchi.co.tz/mw/habari/kitaifa/watafiti-uganda-wagundua-virusi-vya-corona-kwenye-mwili-wa-ngamia-na-popo-3009412 *https://www.standardmedia.co.ke/mobile/amp/article/2001363859/virusi-vya-korona-vyatajwa-kuwa-janga-la-kimataifa*	Virusi vya korona
https://www.voaswahili.com/a/kenyatta-alegeza-masharti-ya-covid-19-kaunti-tano-/5874501.html	Ugonjwa wa Covid-19
bbc.com/swahili/habari-57976386	Ugonjwa wa korona
bbc.com/swahili/habari-57976386 / https://www.ippmedia.com/sw/node/74391 https://www.voaswahili.com/a/wahudumu-wa-afya-kenya-hawana vifaa-kinga-vya-kutosha-dhidi-ya-covid-19/6282070.html	barakoa/kitambaa cha puani
https://voaswahili.com/a/cdc-ongezeko-la-maambukizi-marekani-lawakumba-wasiochanjwa/5969430.html	-chomwa chanjo

https://www.voaswahili.com/a/wahudumu-wa-afya-kenya-hawana-vifaa-kinga-vya-kutosha-dhidi-ya-covid-19/6282070.html	Vifaa kinga

4.2 Misamikorona ya Kiingereza

Ifuatayo ni orodha ya misamikorona ya Kiingereza tuliyoikusanya pamoja na viunganishi vya mitandao ambako misamikorona hiyo ilikotumika au kupatikana:

Chanzo	**Msamikorona**
https://www.the-star.co.ke/business/kenya/2021-12-22-kenyans-find-rural-lifeline-after-covid-city-exodus/	coronavirus
https://www.voanews.com/a/covid-19-pandemic_indias-rising-infections-spark-concerns-second-pandemic-wave/6203417.html	Corona caseload
Roig-Marin (2020)	Physical distancing
Roig-Marin (2020)	Social distancing
https://www.bbc.com/news/uk-england-lancashire-5738257	screenin
https://www.voanews.com/a/chinese-students-in-us-reflect-on-covid-chaos/6313821.html	masking
https://www.bbc.com/news/uk-england-lancashire-57382579	Infection rate
https://www.bbc.com/news/articles/c9z71qz9dyjo	RT-PCR test
https://www.standardmedia.co.ke/opinion/article/2001368015/how-novel-coronavirus-is-changing-the-world	novel coronavirus
https://www.standardmedia.co.ke/nairobi/article/2001365400/self-quarantine-heavy-price-awaits-travellers-arriving-in-the-country	quarantine
https://www.bbc.com/news/uk-england-lancashire-57382579	Super spreader
https://www.voanews.com/a/covid-19-pandemic_scotland-reduces-covid-19-isolation-time/6199472.html	Self-isolation
https://www.standardmedia.co.ke/nairobi/article/2001365400/self-quarantine-heavy-price-awaits-travellers-arriving-in-the-country	Self-quarantine
https://nation.africa/kenya/brand-book/second-national-legal-aid-conference-why-forum-organised-by-egerton-university-is-special-3639184	Lockdow
https://www.bbc.com/news/av/uk-wales-58467411	PPE
https://www.bbc.com/news/business-58662455	Working from home
https://www.bbc.com/news/uk-england-56469395	WFH
https://www.bbc.com/news/av/world-us-canada-54997141	Intubation
https://www.cuimc.columbia.edu/news/proning-covid-19-patients-reduces-need-ventilators	Proning
	Respirator
https://www.bbc.com/news/uk-northern-ireland-58157207	Ventilator
https://www.voanews.com/a/covid-19-pandemic_scotland-reduces-covid-19-isolation-time/6199472.html	Self-quarantine/ self-isolation
https://www.bbc.com/sport/football/56400106	Covid pneumonia
https://www.bbc.com/news/av/uk-scotland-57867125	Covid toes
https://www.bbc.com/news/57229390	Herd immunity
https://nation.africa/kenya/brand-book/second-national-legal-aid-conference-why-forum-organised-by-egerton-university-is-special-3639184	Covid-19

https://nation.africa/kenya/brand-book/second-national-legal-aid-conference-why-forum-organised-by-egerton-university-is-special-3639184	lockdown
https://www.bbc.com/news/world-europe-jersey-57593710	Contact-tracing
https://www.bbc.com/news/uk-politics-59052997	Covid economy
https://economictimes.indiatimes.com/blogs/et-editorials/coroneologisms-are-going-viral/?source=app&frmapp=yes	quarantough
https://www.step5group.com/how-can-businesses-maintain-human-connections-in-an-increasingly-virtual-world/	videofurbishing
https://www.k2e.com/articles/the-rise-of-covid-preneurs/	covidpreneurs
https://www.collinsdictionary.com/submission/22664/coronacation	coronacation
https://www.globalgiving.org/projects/coronavirus-relief-fund/	Corona relief fund
Mweri (2020), Roig-Marin (2020)	Coroneologisms
Bakhmat, Panchenko na Nosach (2021)	Coronacronym
Bakhmat, Panchenko na Nosach (2021)	corodictionary

5. Ulinganishaji na Ulinganuzi wa Misamikorna ya Kiswahili na Kiingereza

Majedwali yanayofuata yanadhihirisha ulinganishaji na ulinganuzi wa misamikorona ya Kiswahili na Kiingereza. Tumeyaratibu majedwali yenyewe kwa kuzingatia nyanja tatu ambazo tumeziangazia katika utafiti huu.

Utabibu	
Kiingereza	**Kiswahili**
Coronavirus caseload	
Corona virus	Virusi vya corona
Covid-19	Uviko-19
Physical distancing	Utengano kati ya mtu na mwenzake
Social distancing	Utengano kati ya mtu na mwenzake
Screening	
Masks	Maski, kitambaa cha pua, barakoa
Masking	Uvaaji maski
Infection rate	Kiwango cha maambukizi
RT-PCR test	
Novel coronavirus	Virusi vipya vya corona
Quarantine	Karantini
Super spreader	
Herd immunity	
Self-isolation	-jitenga
Self-quarantine	
Lockdown	Kanuni au amri ya kutotembea
PPE	Vifaa kinga
Intubation	
Proning	
Respirator	
Ventilator	
Covid-pneumonia	
Covid toes	
Contact tracing	

Jedwali: *Ulinganishaji na ulinganuzi wa msamikorona katika uwanja wa utabibu*

Uchumi	
Kiingereza	**Kiswahili**
WFH	
Working from home	-fanya kazi nyumbani
Quarantough	
Covid economy	
Videofurbishing	
Covidpreneurs	
Coronacation	
Corona relief fund	Mafao ya korona

Jedwali 2: *Ulinganishaji na ulinganuzi wa msamikorona katika uwanja wa uchumi*

Isimu	
Coronacronym	
Coroneologism	Umviko-19
Covidictionary	

Jedwali 3: *Ulinganishaji na ulinganuzi wa msamikorona katika uwanja wa isimu*

Katika utafiti huu tulibaini kuwa lugha za Kiingereza na Kiswahili zimeunda misamikorona katika nyanja zote tatu za utabibu, uchumi na isimu. Idadi kubwa ya misamikorona katika Kiingereza na Kiswahili imeundwa katika uwanja wa utabibu. Hali hii bila shaka inachangiwa na msingi kwamba Uviko-19 ni gonjwa na waathiriwa wake hushughulikiwa kwa kutumia maarifa na vifaa vya kitabibu. Misamikorona katika uwanja wa uchumi unafuata ule wa utabibu katika idadi. Mkurupuko wa Uviko-19 uliathiri pakubwa sekta ya uchumi hasa kutokana na hatua zilizochukuliwa kudhibiti msambao wake. Hata hivyo, data zilizokusanywa zadhihirisha kuwa Kiswahili kina upungufu wa misamikorona linganifu kwa ile iliyomo katika Kiingereza katika nyanja hizi tatu. Misamikorona ya Kiswahili katika nyanja tatu tulizoziangazia humu ni chache mno ikilinganishwa na ile ya Kiingereza. Vilevile, tumebaini kuwa wanaisimu wametumia mbinu za usinonimi, uhulutishaji, ufupishaji, upanuzi wa maana na uambatishaji kuunda misamikorona katika Kiingereza. Mbinu ya usinonimi imetumika kuunda maneno *WFH, BC, AC*, na *PPE*. Wanaisimu wametumia usinonimi na uhulutishaji kuunda misamikorona kama vile *Covid-19*. Mbinu ya uambatishaji imetumika kuunda maneno kama *covid toes, covid pneumonia, coroneologisms, na covidictionary.* Mbinu hizi, wanavyodhihirisha Iribemwangi na Mukhwana (2011), zinaweza kutumika katika kuunda misamiati mipya katika Kiswahili pia. Hata hivyo, data ambazo tulizikusanya zaonyesha kuwa wazungumzaji wa Kiswahili wametumia sana vifungu vya maneno kueleza dhana zinazofungamana na Uviko-19 badala ya neno moja moja. Wakati uo huo, wazungumzaji wa Kiswahili wametumia mbinu za ukopaji na utohozi, tafsiri mkopo, na uhulutishaji kuunda misamikorona, japo kwa uchache.

6. Hitimisho

Upungufu wa misamikorona katika Kiswahili katika nyanja zote tatu ni tokeo la matumizi tukizi ya lugha ya Kiswahili katika nyanja hizi, hasa nchini Kenya. Ingawa Kiswahili ni lugha rasmi nchini Kenya, matumizi yake katika miktadha rasmi yanatatizwa mno na ubabelugha wa Kiingereza ambacho bado kinaonekana kama lugha faafu katika miktadha hiyo. Hali hii imechangia pakubwa katika matumizi tukizi ya Kiswahili katika miktadha rasmi. Utukizi huu katika matumizi ya Kiswahili katika nyanja hizi unapunguza hitaji la kuunda misamikorona kufanikisha mawasiliano ndani yazo.

Uundaji wa misamiati mipya ni mchakato wa kimakusudi unaotekelezwa ili kukidhi mahitaji ya kimawasiliano. Mahitaji hayo hujitokeza ikiwa kuna dhana au mambo mapya ya kueleza kwa kutumia lugha husika. Kukosa kutumia lugha ya Kiswahili au kutumika kwake kwa uchache katika nyanja tulizoziangazia humu kunapunguza hitaji la kuunda misamiati mipya ya kufanikisha matumizi yake katika nyanja zizo hizo.

Hali nyingine ambayo huenda imechangia upungufu wa misamikorona ya Kiswahili katika nyanja hizi ni kule kusitasita kwa taifa la Tanzania kukubali kuwapo kwa virusi vya korona. Huku kusitasita kunawezekana kulichangia kukosekana kwa msukumo wa kuunda misamikorona ya kulizungumiza gonjwa hili. Nchi ya Tanzania inavyo vyombo vya usanifishaji lugha hususan Baraza la Kiswahili la Tanzania (BAKITA) na Taasisi ya Taaluma ya Kiswahili (TATAKI) na vilitarajiwa kuchangia pakubwa katika uundaji wa misamikorona katika Kiswahili.

7. Mapendekezo

Ni wazi kuwa ipo haja kubwa ya wanaisimu na wataalamu mbalimbali wa lugha ya Kiswahili kuunga juhudi zao pamoja kuunda misamikorona ili kuziba mianya ambayo imedhihirika na kuwezesha matumizi makamilifu ya Kiswahili katika nyanja ambazo tumeziangazia katika utafiti huu. Misamikorona ambayo ni vifungu virefu vya maneno pia vifupishwe au maneno mapya yaundwe kuchukua nafasi zao. Vilevile, tunapendekeza kuwa neno *misamikorona* litumike na wanaisimu na watumiaji wengine wa Kiswahili kurejelea maneno yoyote mapya yaliyoundwa au yatakaloundwa kutokana na janga la korona pamoja na yale ambayo yamekuwapo katika Kiswahili lakini maana zao zimepanuliwa kutokana na mkurupuko wa Uviko-19. Fauka ya hayo, vyombo vya habari navyo vinapswa vikoleze matumizi ya misamikorona kama vile *Uviko-19* badala ya kutumia maneno ya Kiingereza au utohozi wao. Neno *corona* nalo liendelezwe kwa kutumia herufi **k** badala ya **c** katika Kiswahili ili kuoana na hali halisi katika fonolojia ya Kiswahili.

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Parents' Preparedness for the Successful Implementation of the Competency Based Curriculum in Bungoma North and Ruiru Sub Counties, Kenya

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Abstract

As part of curriculum reforms, the Kenyan government through the Kenya Institute of Curriculum Development adopted a Competency Based Curriculum (CBC) in 2017 and rolled it out in 2019 in the early year's education. CBC requires full engagement by the parent in the activities of the school where their child is a learner. This study sought to assess the Preparedness of parents for the successful implementation of the Competency Based Curriculum in Bungoma and Ruiru Sub Counties. The objectives were to find out if parents are actually aware of these roles; if they are carrying out these roles; their opinion about CBC and the challenges they encounter in discharging their roles in CBC implementation. The study adopted a descriptive survey research design. The target population of the study was 75 primary schools: 40 schools in Bungoma North Sub County, Bungoma County and 35 schools in Ruiru Sub County; 1860 parents with children in grades 1, 2, 3, and 4 and 212 lower primary school teachers. The sample for this study included 20 primary schools: 10 schools in Bungoma North Sub County, Bungoma County and 10 schools in Ruiru Sub County; 126 parents and 21 lower primary teachers. Stratified sampling was used to select the schools while purposive and simple random sampling was used to select the respondents. Interview schedules and survey questionnaires were used in the collection of data. Pilot-testing with the instruments was conducted in two schools. The researcher found out that parents were not well prepared to undertake their roles in CBC implementation and that they were faced by different challenges. Quantitative data was gathered from questionnaires and analyzed using descriptive statistics e.g. percentages and frequencies and presented using frequency distribution tables. Qualitative data was analyzed thematically and presented via narration. The school administrators and KICD personnel would use these findings as a basis for assessing the status parents' preparedness in the respective schools and address the challenges highlighted by parents in CBC implementation. The study recommends that monitoring and evaluation of the CBC should be made a continuing and in-built process. Allow the implementers and other stakeholders to poke holes in both the design and implementation of the curriculum and where some of the views are relevant, use them to improve CBC.

1. Introduction

Whenever we talk about curriculum implementation, preparation of teachers is a factor that is emphasized. And even with the implementation of CBC, teacher preparedness was the key to its implementation. Teachers were therefore retrained/re-tooled through the in-service programs organized by the MOE. However, the same weight has not been given to the preparation of parents yet they play a very pivotal role in CBC implementation if it has to be efficient.

Just the way we talk of the new normal in this Covid-19 pandemic…putting on masks, social distancing, washing hands etc., CBC has become the new normal for parents. Gone are the days when parents would simply sign report cards, exercise books and diaries as a sign of engaging in their children's' learning. Their role was merely supervisory and confirmatory.

In the Competency Based Curriculum, parental empowerment and engagement in the learning process has been identified as essential to the learner's growth, development and achievement. The curriculum framework has created opportunities for parents to be engaged in their children's learning at home and in school. The framework also has a provision for community-based education which is aimed at helping the learners understand their communities and fit in them. Parents will need to play a key role in guiding their children to appreciate and serve their communities.

CBC requires full engagement by the parent in the activities of the school where their child is a learner. When a parent is engaged in their child's learning, they work closely with the teachers and the school to impart knowledge, skills, competencies, values and attitudes to the child. Involving parents boosts teachers' self-perception and job satisfaction, which often leads to high productivity. They also monitor the academic progress of the child, identifying areas of weakness and together put interventions to ensure improvement in the child's achievement. When parents are engaged, they provide informal education at home and in the community, which complements and supplements what the child learns in school. This has not been easy for parents most of whom are not prepared to accept the teaching role, which they perceive to be that of the teacher.

During long holidays in the past, parents in Kenya complained that they did not know what to do with the presence of the children at home. To resolve this, many parents would engage their children in private tuition outside the home. These parents would not monitor to ascertain the content, methods or value of this tuition. Further, many parents prefer to take their children to boarding schools at an early age, thus expecting the teachers to play the role of the teacher and that of the parent.

In the 21st century, children will require knowledge and many skills to survive and thrive. Such knowledge and skills cannot be obtained only in the classroom. Parents need to take charge of their children's education by providing opportunities for lifelong learning. Parents need to embrace the concept of lifelong learning and continue learning together with their children. Parents should always involve their children in family activities to give them a strong sense of identity and connectedness to the family, the community and the country. This can be achieved only when parents work closely with teachers and community members. Children need to acquire critical life skills like cooking, cleaning, washing, making beds and gardening. They need to learn to work with others and to be innovative, creative and useful around the home. Most of these skills are best imparted by parents in a friendly secure home environment. The children need to acquire values such love, hard work, honesty, integrity, strength, resilience and a sense of responsibility. These values are best instilled by the parents, who should be the best role models for their children.

As part of curriculum reforms, the Kenyan government through the Kenya Institute of Curriculum Development adopted a Competency Based Curriculum (CBC) in 2017 and rolled it out in 2019 in the early year's education (Republic of Kenya, 2017). The curriculum gives learners an opportunity to be actively involved in learning. It facilitates identification and development of learner's unique talents and abilities through different career pathways after grade 9. CBC assists learners acquire, nurture

and apply values in their day to day living. Despite initial resistance, this curriculum is now under implementation in Kenya after a pilot study conducted across counties.

The fifth guiding principle of the curriculum is parental empowerment and engagement which highlights the importance of parent-teacher collaboration in nurturing the learner's potential (Republic of Kenya, 2017).

CBC requires full engagement by the parent in the activities of the school where their child is a learner. When a parent is engaged in their child's learning, they work closely with the teachers and the school to impart knowledge, skills, competencies, values and attitudes to the child. Involving parents boosts teachers' self-perception and job satisfaction, which often leads to high productivity. They also monitor the academic progress of the child, identifying areas of weakness and together put interventions to ensure improvement in the child's achievement. This, however, has not been easy for parents most of whom are not prepared to accept the teaching role, which they perceive to be that of the teacher.

Studies conducted in Kenya on parental involvement in the education of their children emphasize on the crucial role of this engagement in the learners' educational outcomes (Kibaara & Ndirangu, 2014). However, these studies were in reference to the former curriculum, the 8-4-4 system of education. There is inadequate documented empirical research on parental involvement and preparedness since the introduction of the competency-based curriculum in Kenya.

Parents are required to carry out the following general roles to support the learning of children in CBC: Provide basic necessities, instill and nurture morals and values, teach and guide children to make the right choices and make them aware of consequences, teach and model proper use of resources, instill a sense of responsibility by ensuring children participate in age appropriate chores, help in enhancing learning achievements in the child as guided by the teacher, engage with the teacher to enrich the child's learning experiences, monitor the child's growth and development and also identify any signs of disability for early intervention, identify the child's natural talents and abilities, and work with the teachers to nurture them, discuss observed character, behavior and indiscipline issues regarding the child with teachers and take necessary action; engage in peaceful and prompt resolution of conflicts that may arise. The researcher intends to find out if parents are actually aware of these roles; if they are carrying out these roles; their opinion about CBC and the challenges they encounter in discharging their roles in CBC implementation.

2. Problem Statement

The Competency Based Curriculum (CBC) is based on learners demonstrating the ability to apply the knowledge, skills, attitudes and values they acquire as they progress through their education. Successful implementation of this curriculum requires the concerted efforts of teachers and parents. Proponents of this curriculum emphasize that parental involvement has a positive impact on a child's academic success. However, the reality on the ground is that parents are contending with their increased new role as co-educators as stipulated in the CBC. Media reports indicating the negative perception majority of the parents have towards CBC cannot just be swept under the rug. Parents claim they have neither the time to spend at the end of a long day to help with homework, nor the money to buy the materials needed especially with the reality occasioned by the Covid-19 pandemic.

3. Objectives

I) To determine the extent to which parents are aware of their roles in successful implementation of CBC
ii) To establish the perceptions of parents about CBC and their opinions regarding their role in CBC implementation
iii) To identify some the challenges parents encounter in executing their role as co-educators

4. Methodology

The study adopted a descriptive survey research design. The study targeted 75 primary schools: 40 schools in Bungoma North Sub County, Bungoma County and 35 schools in Ruiru Sub County; 1860 parents with children in grades 1, 2, 3, and 4 and 212 lower primary school teachers. The sample for this study included 20 primary schools: 10 schools in Bungoma North Sub County, Bungoma County and 10 schools in Ruiru Sub County; 126 parents and 21 lower primary teachers. The study employed stratified sampling to select the 20 schools out of the 75 primary schools in the two sub-Counties. The researcher used simple random sampling to select the 126 parents from the selected schools. Purposive sampling was used to select 21 teachers from the sampled schools. Data was collected through questionnaires for parents shared via a link sent to the 21 teachers who later printed and gave to the pupils to take to their parents. Interviews for the teachers were conducted via phone calls. Pilot-testing was done in two primary schools. Reliability of the instruments was assessed by using the test-retest method, and their validity was ensured by constructing them in line with the set objectives. These research tools helped the researcher to obtain qualitative data that was categorized under various themes and concepts, earlier discussed on the basis of opinions from the various respondents and presented via narration. From these discussions, the researcher was able to make conclusions with regard to the challenges encountered by Student Councils. Quantitative data was gathered from questionnaires and analyzed using descriptive statistics e.g. percentages and frequencies and presented using frequency distribution tables.

5. Findings and Discussions

This study was carried out to explore the preparedness of parents for the successful implementation of the Competency Based Curriculum in Bungoma and Ruiru Sub Counties. From the study, the researcher found out that parents were not well prepared to undertake their roles in CBC implementation and that they were faced by different challenges, some of which emanated from the school administration and the teachers and others were related to themselves. The researcher, therefore, categorized the findings and discussed them under the following themes:

I. Parents' Awareness of their Roles in CBC

When the parents were asked to indicate the level at which they were aware of their roles in CBC implementation, majority of them indicated that they were actually not aware of these roles.

Level of parents' awareness	**Frequency**	**Percentage**
Aware of the all the roles	11	10.6%
Aware of most of the roles	18	17.3%
Aware of some of the roles	25	24.0%
Not aware of the roles	28	26.9%
Not sure of my role	22	21.1%
Total	**104**	**100.0**

From the findings, 24.0 % of the parents indicated that they were aware of some of their roles in CBC implementation. However, 26.9% stated they were not aware of their roles in CBC implementation yet they are considered as a key component in CBC implementation. Consequently, 21.1% of the parents admitted that they were not sure of their role in CBC. This is a high figure to be ignored.
In an interview with one of the teachers, reported that majority of the parents did not even know CBC in full yet the Ministry of Education through KICD had spent a lot of resources creating awareness about CBC. They just knew that there is a new system of education called CBC which is very expensive. The teacher said:

'It is very unfortunate that most of the parents seem not to understand what CBC is and their role in its implementation. They just know CBC as a new education system; very expensive compared with the 8.4.4 system and a system that has turned them into learners. Some parents especially here in the rural areas are not making any effort in trying to understand what CBC is and its benefits to the learners.'

II. Extent to which Parents Helped their Children in Doing Homework and Assignments

When the parents were asked to indicate the extent to which they helped their children in doing homework and assignments, the following were the findings:

Extent of Assistance Given	**Frequency**	**Percentage**
Do all the work	24	23.1%
Do most of the work	38	36.5%
Do some of the work	18	17.3%
Only provide resources	9	8.7%
Child does the work alone	15	14.4%
Total	**104**	**100.0**

From the table above, 36.5% of the parents reported that they did most of the work given to their children as homework by the teachers. A substantive 23.1% admitted that they did all the homework on behalf of their children. This is unfortunate because it is a wrong interpretation of what is expected from parents in CBC. They are only required to provide guidance and required materials as the children carry out the assignments and not do the assignments. Parents are only required to enhance the learning achievements of their kids as guided by the teacher (KICD, 2020). Those who did most of the work for their children justified their actions indicating that some of the assignments were beyond the level of the learners. Some required printing, recording and some advanced practical skills which the children could not handle at their age. Some did it just to save on time to work on other duties in the house.

Majority of the teachers (78%) of the teachers confirmed that most of the work they gave was actually done by the parents. The children reported so to the teachers. One of the teachers said:

'*We give the assignments so that parents can guide their children and not to be done by parents. Some parents say they do them because they want to save on time and do other things. Some do them to avoid the materials being wasted by the children. Some do them so that their children can emerge the best. We also have parents who do not understand anything and so their children just come back to school with untouched assignments*.'

When parents were asked to describe what their perceptions regarding CBC were, majority (60%) of them did not seem to understand it except being a new syllabus. This same group did not quite understand their role in CBC implementation. They knew CBC as an expensive system of education that has taken away play time for the children as they had to work on assignments all the time on weekdays and even weekends. One parent wrote:

'*To me CBC is just a burden. The teachers are giving children assignments that are ridiculous. We don't have some of the materials required to work on the assignments. It has made parents to be doing homework yet we have to cater for the needs of our families.*

Another parent wrote:

"*The new syllabus is costly and too demanding. We spend a lot of time to monitor the children's homework. Many of the parents are still unaware of their duties under the new education system."*

During the interviews with the teachers, it was noted across the board that parents had not fully accepted CBC. They did not also understand clearly what their role was. Most of the parents complained about the CBC expensive books they are required to buy especially in the private schools. One of the teachers said:

"*I don't think CBC is as costly as parents claim. Some of the assignments do not require spending any money. For instance, an assignment that simply requires drawing a family tree diagram does not involve any money. It only requires parents to spare some time to help their children do this; something parents are resisting because of their busy schedules and pressures at the work place*."

These findings are in agreement with those of Oduor (2020); that there is confusion in the CBC implementation in schools as many parents are still unaware of what their responsibilities are; parents keep visiting schools to inquire what their obligations under CBC are as they are not sure how to manage their children when they return home early. Consequently, Waihiga (2021) also reported that parents were finding it difficult adjusting to the requirements of CBC. He said most parents were financially constrained, especially with the impact of Covid-19 pandemic, and could not, therefore, meet requirements of CBC.

However, there was a set of parents (30%) of the parents who commented positively about CBC. To them, CBC was a good system as it enabled them to create time for their children. It also enables them to identify not only the strengths and weaknesses of their children but also the talents, hence nurture them from an early age. One of the parents wrote:

"*CBC is a great system as it encourages bonding between children and their parents. From the homework, you get to understand your child more and she/he also gets to know you.*

Another parent added that:

"Homework activities keep children busy. They don't spend much time on the screen. I really do not understand the CBC, but I think it is a good system. The only challenge with it is that it is quite costly.

III. Challenges Encountered by Parents in CBC Implementation

When parents and teachers were asked to mention some of the challenges they encountered while discharging their roles in CBC implementation, several challenges were cited and key among them were:

- Huge cost implications; there were many hidden costs as some of the assignments required printing
- Inadequate information and sensitization about the roles of parents in CBC
- Time constraint; the curriculum is time consuming yet parents still had other responsibilities in the house and at the work place besides helping their children in doing homework.
- Heavy workloads; that some of the assignments given were too demanding on the part of the parents. Some were actually unrealistic considering the level of the children.
- Resistance to change from some of the parents
- Negative attitude of most of the parents towards the whole process.
- Insensitivity to the unequal economic status among parents

6. Conclusions

The study concludes that:

- Parents have no clear vision of the role they should play in CBC implementation
- Parents have negative perceptions about the Competency Based Curriculum
- Parents are not prepared to handle the task they have to deal with in CBC implementation
- CBC implementation is more costly in private schools compared to public schools because of the need to buy CBC textbooks
- Parents in urban settings have some understanding about CBC as compared to those in the rural settings

7. Recommendations

The following recommendations are made to help improve the preparedness of parents in their roles in CBC implementation in Bungoma North and Ruiru Sub Counties and Kenya at large if adopted:

1. The CBC implementation should result in the regulation on the demands that teachers give to parents in form of homework to ensure that parents are not overloaded with the assignments and cost of materials. Quality assurance officers can work with teachers and parents' representatives to ensure that items required are accessible within the learner's environment.
2. There is also need for the Ministry of Education to undertake proper sensitization of parents on CBC to enable them to understand their roles in the new syllabus. The parental obligation that has come with the new curriculum should be well explained publicly so that parents are aware of their roles.
3. There is need for continuous re-tooling of teachers in the CBC to avoid overloading parents with assignments
4. Teachers and the parents/guardians should hold conferences/seminars together so that the two parties have a clear picture of what is expected of them in CBC implementation
5. There is need for a manual/hand book for parents/guardians on what constitutes their empowerment and engagement in the CBC. This should be done by the policymakers.

6. Monitoring and evaluation of the CBC should be made a continuing and in-built process. Allow the implementers and other stakeholders to poke holes in both the design and implementation of the curriculum and where some of the views are relevant, use them to improve CBC.
7. The same emphasis given to the role parents in CBC implementation in private schools should be applied in public schools. Similarly, the emphasis given to CBC implementation should be similar in urban and rural settings.

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University Students' Experiences with Online Teaching following Covid-19 Lockdown: A Perspective of a Private University in Kenya

By Peter Gakwa Njendu – Gretsa University

Abstract

From cities to rural areas the COVID-19 pandemic has created a public health crisis which has disrupted all aspects of our everyday life, including family, work, education and economy. Universities were forced to shift their learning to online following the lockdown. This study examined the experiences of Kenyan University students towards online learning amid Coronavirus (COVID-19). The study utilized a quantitative research design with a sample size of 200 participants drawn from Gretsa University in Kenya. The findings of the study reveal that majority of the participants had reservations about online/digital learning.

Key words: COVID-19 Pandemic, University Students, Online Learning.

1. Introduction

The COVID-19 pandemic has created a public health crisis. All aspects of our everyday life, including family, work, education and economy have been disrupted. Most countries temporarily closed educational institutions in an attempt to contain the spread of the virus and reduce infections (Tarkar, 2020). In Kenya, the move to online teaching and learning methods accelerated as a consequence of the physical closure of universities and colleges on 15 March 2020. Due to the COVID-19 lockdown, most educators had to change their approaches to most aspects of their work overnight: teaching, assessment, supervision, research, service and engagement (Ngwacho, 2020).

Following the lockdown, online learning for the continuation of academic activities and the prevention of dropouts from study programmes in higher education were given the highest priority (Kathula, 2020). Due to an extraordinary effort by both the administrative and academic staff, digital alternatives to the physical on-campus academic activities were offered to university student. Non-theoretical lectures (e.g. practical classes), were cancelled, and face-to-face exams were re-organized into digital alternatives in order to ensure normal teaching operations.

2. Online Teaching in Universities

The online learning is fundamentally different from the traditional classroom when it comes to aspects of learning such as learner's motivation, satisfaction and interaction (Adnan & Anwar 2020). There are different definitions of online teaching and learning, but the basic feature includes use of the web-based technology to access learning material and manage learning over the internet. Anderson (2008), defines online teaching and learning as an educational technique that supports learning via the application of information technology and communication, providing learners with access to all needed education programs.

In the context of this study, online teaching and learning refers to a technique of instruction and knowledge acquisition carried out in the educational environment using web-based technology over the internet (Anderson, 2008). As Keengwe and Kidd (2010) indicated, online learning is a subset of distance education and embraces a wide set of technology applications and learning processes including, computer-based learning, web-based learning, virtual classrooms, and digital collaborations.

3. Challenges of Online Teaching during the COVID-19 Pandemic

Many students who typically engaged in face-to-face learning had to make an overnight transition to online learning. While the merits of online learning have been well documented, Keengwe and Kidd (2010) suggest that students typically enjoy learning online when they have been prepared well in advance and the transition is smooth. The unexpected change to online learning became with several universities primarily focusing on the transfer of educational content to the digital platforms and not specifically on online teaching and delivery methods lead to social marginalization of students (Adedoyin & Soykan, 2020).

Lack of access to fast, affordable and reliable internet connections is another well documented challenge which negatively affects the process of online learning especially for those who are living in rural as well as marginalized communities in Kenya (Tarus et al., 2015). Lack of proper interaction with instructors is another major concern associated with online learning. Additionally, slow response time as been cited as hindrance to online learning in cases where a student wishes to discussed with the relevant course instructor.

Conventional classroom socialization is another major challenge in online learning. Students can only communicate with their fellows digitally and do not have the opportunity to interact with fellow students in person, and thus the real-time sharing of ideas, knowledge and information is partially missing from the online learning world (Tarus et al., 2015).

4. Opportunities of Online Teaching during the COVID-19 Pandemic

The current circumstances are unique; unlike normal online learning situations, it is more of crisis learning. The online learning during COVID-19 pandemic became less of an option and more of a necessity (Dhawan, 2020). The pandemic has forced both institutions and students, who were earlier reluctant to change, to accept modern technology. Universities academic institutions would not have been able to transform all of their curricula into online resource overnight were it not for COVID-19 pandemic.

Due to digital transformation of instructional activities during this pandemic the digital competencies of both students and faculty improved tremendously as noted by Mukhtar, et al. (2020). Online learning also has inherent advantages such as flexibility (Adedoyin & Soykan, 2020).

5. Purpose of the Study

The purpose of the study was to examine university students' perception towards online learning and various attributes which could make the online learning more effective and successful post pandemic with a view to informing educational practices in Kenya.

6. Objectives

The study was guided by the following objectives:

1. To assess how University students experienced the shift to digital teaching following university closure for on-campus learning at Gretsa University in Kenya.
2. To find out what might improve the learning outcomes in future online lectures and courses

7. Methodology

This study utilized a Quantitative research design. An invitation to participate was sent out to 200 eligible students via email. The only eligibility criteria were being a registered student in the year 2020 and having participated in online learning. The research team was heterogeneously composed of members from faculty and administration at the university. Data was corrected using online questionnaires administered through web survey. Items were measured on a five-level ordinal scale (Likert scale 0–5).

8. Findings

The findings of the study are important for universities across the country for two main reasons. Firstly, the shift to online mode has been an abrupt one due to unprecedented lockdown imposed to manage the COVID-19, and the institutes did not have time to design and adopt the course contents for online mode. In this context, experience of students can be incorporated to make online learning easy, efficient and productive. Second, even after lockdown is revoked, life after the COVID-19 pandemic will not be like before and online learning is here to stay, though in combination with regular offline classes. There is uncertainty about the length of the pandemic and chances of reinfections, the social distancing can become a new normal. So, all the universities need to be prepared to shift majority of the course content to e-learning platforms and modify the course structure and curriculum suitably. The findings of the study can be important input in deciding on the learning environment in online platform to promote effective learning.

8.1 Response Rate

Out of the sample size of 200, there were 148 (74%) of students who answered the questionnaires. The sample had an even distribution of female and male students. Among the respondents, 31 students (21%) reported having previous experience with online learning. 105(71%) expected that their learning outcome would be lower in virtual learning compared to physical learning, and, notably, none of the students expected that it would be higher. Most students reported that studying had become more difficult compared to the time before the pandemic. Several of the identified challenges with online education were reported by 108(72%) of the students. Key among the notable challenges was access to appropriate devices and reliable internet services.

Only 56 students (28%) agreed that they needed to increase their digital competence. But approximately 70% reported having technical challenges at home. All of the students agreed that the lack of contact with other students was a challenge. At the same time, all students wanted the return of on-campus learning. 112(76%) agreed that social interaction plays a role in learning outcomes and well-being. 120(81%) of the students were satisfied with the teaching and reported that the lecturers were competent in arranging online teaching. Finally, 61(41%) of students sampled felt that group projects and assignments could be completed online.

8.2 Discussion

Majority of the participants had reservations about online/digital learning. A growing body of research suggests that prior experience with online learning technology affects the attitudes and perceptions of students (Smart et al., 2006; Fedynich et al., 2015; Cranfield et al., 2021 & Cole et al., 2021). The more experience students have with online technology the higher the levels of their satisfaction in learning online. Considering that only 31 students (21%) reported having previous experience with online learning, it may explain the noted reservations about online/digital learning.

Another notable finding of this study is that 108(72%) participants reported lack of access to appropriate devices and reliable internet facilities as one of the key challenges. The student's socio-economic status come into play here, some of the students rely on the university IT infrastructure such as computers and free internet within the university (Cranfield et al., 2021), and due to the physical closure of universities, these set of students are likely to experience challenges. It is also undeniable that some parts of Kenya do not have internet connectivity especially the rural and marginalized areas which also present some of the students with challenges. Lack of proper interaction and contact with their fellow students were among other major challenges noted.

8.3 Conclusion

Overall, these students were satisfied with the ad hoc online teaching after the lockdown, it appears that they adapted quickly to the new situation, but they also reported difficulties with the transition to new teaching methods. Receiving teaching, supervision, exams and assessments solely through online solutions was a new experience for these students. Although the students reported reduced learning outcomes, they had positive attitudes toward use of digital learning materials and tools in future online course.

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A Critical Review of Literature on Early Marriages and Adolescent Pregnancies during the Covid-19 Pandemic in Kenya

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Abstract

Adolescent health and development are of global interest. The 1994 International Conference on Population and Development (ICPD) put it in records that governments needed to support the adolescents in meeting their basic needs and their dreams and thus abolish practices that were not in favour of the development and empowerment of children. Some of these practices included unwanted pregnancies and early marriages. According to WHO, about 12 million adolescent girls aged 15-19 give birth annually and most of these deliveries occur in developing countries (WHO, 2019). Governments and non-government organizations put tremendous efforts in fighting adolescent pregnancies and early marriages. However, with the arise of COVID-19 pandemic, the world has witnessed a surge in adolescent pregnancies and early marriages. In effort to curb the spread of the novel corona virus, governments have instituted measures such as school closures and lockdowns. On the other hand, these infection prevention measures have impacted negatively on the lives of the adolescents in that they have resulted into the adolescents indulging in activities that they would otherwise have not engaged in if the schools were open. According to various studies, adolescents have reported on having more than enough time to interact with members of the opposite sex and thus form sexual relationships in order to kill the boredom that comes with them not having substantive activities to engage themselves in. This paper is based on literature review to establish how COVID-19 pandemic has influenced the increase in early marriages and adolescent pregnancies in order to provide information that can be used in identifying appropriate measures to curb the issue.

Key words: adolescent pregnancy, early marriages, COVID-19, Kenya

1. Introduction

The impacts of COVID-19 pandemic are being experienced all over the world. The pandemic has touched on many aspects of people's daily lives including socioeconomic, educational, health and social. Adolescent pregnancies and early marriages are among the socioeconomic factors the pandemic has impacted on.

According to UN, 15 million girls are married before they celebrate their eighteenth birthday each year. In Sub-Saharan Africa, about 40% of the girls get married before celebrating their 18th birthday (Human Rights Watch, 2015). Adolescent marriage either delays or totally denies a girl the opportunity in life to ever reach her full potential Early marriages are also a major driver to lifelong oppression

and harm among the girls. Projections from UNICEF show that COVID-19 impacts are likely to see an increase of about 13 million of girls getting married between 2020 and 2030 if nothing major is done to curb this menace (UNICEF, 2021). It should be widely realized that as countries impose COVID-19 preventive measures such as lockdowns and school closures, many of the adolescents' lives are being adversely affected. The school closures in attempt the prevent the spread of COVID-19 have resulted to the adolescents having extra time to interact and form sexual relationships as a form of leisure. These sexual relationships have thereby led to pregnancies and or early marriages. Lockdowns have also hindered some of the parents and guardians from working effectively thereby forcing them to inability to provide to their adolescents their daily needs thus forcing the adolescents to look for other alternatives to meet their needs which includes engaging in transactional sex.

In Kenya, almost one out of every five girls between the ages of 15 and 19 is reported to be pregnant or has had a child already. (KDHS, 2014). In addition, about 13,000 girls drop out of school annually due to pregnancy (KDHS, 2014). This has escalated with the onset of COVID-19 which has immensely jeopardized tremendous efforts that have previously been put in place to curb this issue (Xiaonan & Stringer, 2021). If serious and concerted efforts are not taken by relevant stakeholders, more girls will be at risk of early marriage and teenage pregnancy with their related health consequences. In addition, early marriages subsequently result in increased population growth which has the potential to overwhelm the government's endeavors in ensuring sustainable development.

In Sub-Saharan Africa, adolescents continue to experience the disproportionately high burden of sexual and reproductive ill health (Phillips & Mbizvo M, 2016). A surge in adolescent pregnancies with adverse health and social consequences are urgent problems facing developing countries. Adolescents are likely to have complications of pregnancy including unsafe abortion and more likely to become young mothers a second time. Their infants are also more likely to be born prematurely and to die in the perinatal period. Babies born to adolescent mothers face a substantially higher risk of dying than those born to women aged 20 to 24 (Ganchimeg, Ota, Morisaki, Laopaiboon, Lumbiganon, Zhang J, et al.,2014). They are at risk of malnutrition, low mental and physical development, inappropriate social connection with parents and poor education. Unsupervised time occasioned by school closure due to COVID-19 created extra time for the adolescents to interact and form relationships with the opposite gender something that would not have been there if they were in school.

1.2 Purpose of the study

Identifying factors influencing early marriages and teenage pregnancies during the COVID-19 pandemic.

2. Methodology

The paper provided a critical review of literature on early marriages and teenage pregnancy. Peer reviewed and non-peer reviewed sources of literature were used. Peer reviewed sources included PubMed, MEDLINE, Web of Science and Google Scholar. Non-peer reviewed sources included blogs, and profit and non-profit organizational websites. Selection of sources was based on objectivity of the information therein before being considered for review.

3. Findings and Discussions

Literature review conducted was based on the study objective which was on factors influencing early marriages and teenage pregnancies during the COVID-19 pandemic and measures that can be used to curb the problem.

3.1 Teenage pregnancy

In Kenya, almost one out of every five girls between the ages of 15 and 19 is reported to be pregnant or has had a child already (KDHS, 2014). This trend has been consistent in Demographic and Health Surveys conducted between 1993 and 2014. Moreover, an estimated 14% of all births in Kenya occur among teens aged 15–19, with the majority (63%) being unintended (KDHS, 2014).

3. 1.1 Factors influencing teenage pregnancy

Majority of the articles reviewed indicated the following as among the factors ranked highest in influencing teenage pregnancy during the pandemic:

3.1.1.1 Closure of schools

According to studies done in Wajir, Nairobi and Kilifi by the Population Council (2021), adolescents reported to experience boredom during the time they were at home and hence looked for ways of breaking the monotony of which sexual engagement was one of the ways. They reported to have much time to interact and form relationships which they would otherwise not have formed if they were busy in school. They also had much time in the social media of which most of them engaged in watching materials that increased the urge for sexual involvement. According to Xianan and Stringer (2021) adolescents faced little to no parental supervision while at home which contributed to their indulgence in immoral behavior amongst them pornography and sexual activities.

3.1.1.2 Lack of finances

According to Mittal and Singh (2020), COVID-19 pandemic saw many parents and guardians laid off or otherwise facing reduced incomes. This therefore meant that most of these parents and guardians would no longer be in a position to provide their teenage girls and boys the kind of lifestyle they used to before. As such, most of these teens resulted to transactional sex in exchange for money to buy what they needed for instance food, clothing and pads. Most of these girls ended up becoming pregnant. Some adolescents engaged in transactional sex in order to feed their families (Omar, Jordan and Geiger, 2020).

3.1.1.3 Peer pressure

According to the Population Council (2021) idleness among adolescents, led them to form groups. They would then influence one another into various activities including sexual activities for instance in order to fit in the group. This behavior saw most of the adolescents become pregnant and others getting married in order not to be left behind by their peers. This finding is coherent with that of a study done in Homabay whereby 33% of the girls aged 15-19 were found to be mothers or pregnant and peer pressure was found to be a contributing factor (UNICEF,2020).

3.1.1.4 Family planning

According to Partridge (2020), lock down made it hard for young girls to access sexual and reproductive health services. Other factors included health care providers being hesitant at providing

family planning methods to teens, stockouts and also lack of money to purchase the contraceptives (Omar, Jordan and Gelger, 2020). The United Nations Population Fund warned that lockdown-related disruptions could leave 47 million women in low- and middle-income countries without modern contraceptives, resulting in 7 million additional unintended pregnancies (UNFPA, 2020).

3.2 Early Pregnancies

According to WHO (2019), factors influencing early marriages have been there even before the pandemic. However, COVID-19 pandemic had exacerbated the issue (Xiaonan and Stringer, 2021) Some of the adolescents have opted to get married due to the poverty levels in their homes that increased as a result of the pandemic. Some adolescents admitted that they got married after becoming pregnant as it was the only option since their parents were too hostile to tolerate them (Population Council, 2021).

4. Conclusion and Recommendations

Based on the available evidence, it is clear that COVID-19 has contributed to the increased level of teenage pregnancies and early marriages. Factors such as school closures, lack of money, non-utilization of family planning services and peer pressure were identified as the core contributors of teenage pregnancies and early marriages during the pandemic. Adolescents should therefore be engaged in decisions and actions that affect them by supporting their meaningful participation in COVID-19 response and recovery discussions. The government through the Ministry of Health should develop policies that address adolescent health and wellbeing In addition, the study recommends training of youths on life skills in order to make better decisions when faced by crises. Adolescents should also be taught on income generating activities in order to reduce poverty levels that could contribute to pregnancies and early marriages. More organizations whose goal should be to fight teenage pregnancies and early marriages should be established with the help of the Ministry of Health.

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Breastfeeding during COVID-19: A Literature Review

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Abstract

Breastfeeding is beneficial to both the newborn and the mother. During the COVID-19 pandemic, concerns have been raised on whether the SARS-CoV-2 virus could be transmitted from COVID-19 positive mother to the newborn through breastmilk. The purpose of this review was to examine the available evidence on the risks of transmission of infection from COVID-19 mothers to their newborns through breastfeeding. Current publications on breastfeeding (upto October, 2021) during the COVID-19 pandemic were examined to determine reports on the risks of transmission of COVID 19 from infected mother to her baby. Data is very limited in this regard, with only a few smaller case series, and case reports have been published so far. In most of the studies, breastmilk samples from COVID-19 mothers tested negative for the virus. In the case reports where the virus was detected in breastmilk and the infants were diagnosed with COVID-19, it remained unclear whether the disease was transmitted through breastmilk or direct contact or through delivery. Another hypothesis is that the viral antibodies could pass to the newborn passively through breastmilk of COVID-19 positive mothers and give immunity to the child, but data is minimal. Based on the currently available limited evidence and recognizing the benefits of breastfeeding, it may be concluded that if the health of the mother and her newborn allows, direct breastfeeding or extracted breastmilk should be encouraged by the healthcare providers after a careful discussion of the risks of vertical transmission to the mother and her family. Preventive measures should be taken by COVID-19 mothers to prevent droplet transmission of infection to the infants while breastfeeding.

Keywords: Breast milk, Breastfeeding, COVID-19, Pregnancy, SARS-CoV-2

1. Introduction

The novel corona virus (SARS-CoV-2) originated in Wuhan, China in December, 2019 and spread rapidly across China (Chen et al., 2020; Li et al., 2020). Almost half (49%) of the patients who presented with pneumonia were exposed to the Huanan Seafood Wholesale Market (Li et al., 2020). The virus then spread to other countries including Singapore, Japan, Australia, Thailand, Republic of Korea, the United States of America (Chen et al., 2020). Currently, the virus has spread across every continent in the globe. The World Health Organization (WHO) has since declared the outbreak of the disease as an international public health emergency (Cucinotta & Vanelli, 2020).

The Coronavirus Disease-2019 (COVID-19) pandemic has affected every area of life around the world (Kickbusch et al., 2020). It has raised many health concerns including the safety of breastfeeding for infants and children of affected mothers. These concerns led to anecdotal reports in the local and international news of mothers giving birth without partner or doula support, being separated from their infant after birth or being told that breastfeeding was not safe. Pregnant women and newborns are considered a high-risk population during the COVID-19 pandemic because their vulnerability to

acquire any infection is higher in general due to lowered immunity during this period. Even though initial data from smaller studies have suggested that the pregnancy does not increase the risk of getting COVID-19 infection and the severity of illness is not different from the general population, caution still must be exercised by both the pregnant women and their clinicians as there is a lot that we are not aware of this disease (Kunjumon et al., 2021).

Human breast milk is the best nutrition for infants as it supplies essential nutrients, antibodies and other bioactive compounds essential for the infants' development .WHO recommends exclusive breastfeeding for the first 6 months of life and continued breastfeeding with appropriate complementary feeds from 6 months up to at least 2 years (WHO, 2009). This review will make an account of the published data so far, regarding the transmission risk of SARS-CoV-2 via human milk. It will also present the current feeding recommendations, issued by several agencies for infants born to mothers suspected or positive for SARS-CoV-2. The recommendations on mother-infant contact and breastfeeding are based on a full consideration of not only of the potential risks of COVID-19 infection of the infant but also the risks of morbidity and mortality associated with not breastfeeding, the inappropriate use of infant formula milks, as well as the protective effects of skin-to-skin contact.

1.2 Purpose of the review

The purpose of the review is to examine the available evidence on the risks of transmission of infection from COVID-19 mothers to their newborns through breastfeeding.

2. Methodology

Current publications on breastfeeding (upto October, 2021) during the COVID-19 pandemic were examined to determine reports on the risks of transmission of COVID 19 from infected mother to her baby. Official documents available in English were included which included published and clinical research articles, as well as interim guides, expert reviews or guidelines/official statement documents from international associations. In addition, articles discussing the characteristics of COVID-19 were included with specific interest in vertical transmission potential in the perinatal period. Articles explaining how breastfeeding could protect against the virus were also included.

3. Results and Discussions

Since the Coronavirus is a novel virus, we have little re-search to work with and must explore the data that is available, as well as build on knowledge and experience of similar past viral outbreaks, including SARS-CoV-1 and Middle Eastern Respiratory Syndrome (MERS). Fur-thermore, there is considerable knowledge on the properties of breastmilk which can inform researchers and clinicians of the most suitable route of action, within the limited knowledge on the COVID-19 disease Since the Coronavirus is a novel virus, there is little re-search to work with hence the research explored the data that is available, as well as built on knowledge and experience of similar past viral outbreaks, including SARS-CoV-1and Middle Eastern Respiratory Syndrome (MERS). Fur-thermore, there is considerable knowledge on the properties of breastmilk which inform research of the most suitable route of action, within the limited knowledge on the COVID-19 disease. Breast milk is found to contain many protective factors like immunoglobulins, lysozyme, lactoperoxidase, complement components, cells and lipids. These host resistance factors act against different organisms and provide definite protection to infants from infection and reduce the mortality and morbidity rate. Colostrum, which is secreted in first few days after birth, is different in its antiinfective properties when compared

to mature milk. It contains a high amount of immunoglobulins and other non-specific factors. The preterm milk also contains higher concentrations of immunoglobulins when compared to the term milk. Therefore these serve as an initial step towards providing immunity to newborns (Shashikala & Prakash, 1984).

3.1 Detection of SARS-CoV-2 in Breastmilk

In most studies existing so far on women with COVID-19, the live virus was not detected in breastmilk. In a small cohort study of 19 SARS-CoV-2 positive lactating mothers, most of their breast milk samples (95%) contained no detectable virus, and there was no evidence of COVID-19 infection in their breast milk-fed neonates (Kunjumon et al.,2021). In a prospective multicentre study in Spain, All breast milk samples analysed showed negative results for presence of SARS-CoV-2 RNA (Bauerl et al., 2021). In a systemic review by Elshafeey et al. (2020), all 26 breastmilk samples from 26 mothers were negative for COVID-19. A rapid systemic review of eight studies showed that breastmilk samples of 24 pregnant women diagnosed with SARS-CoV-2 by PCR test were negative for the virus (Martins-Filho et al., 2020). However much of this information come from smaller studies and case reports. The scientific brief on breastfeeding and COVID-19 published by WHO on June 23, 2020, included a living systemic review which showed that out of 46 COVID-19 positive mothers whose breastmilk samples were tested for SARS-CoV-2, 43 breastmilk samples tested negative, and only three samples tested positive. Out of the three mothers whose breastmilk samples were positive, only one infant tested positive for the virus, but the route of infection (breastmilk or close contact) could not be determined (WHO, 2020).

A few small case series suggest that perinatal transmission to newborns from infected women may occur, likely Infrequently (Chen, et al.,2020; Zeng et al., 2020; Schwartz, 2021) However, it is not clear from these studies whether the infection occurred from contaminated breastmilk or through close contact.

3.2 Detection of Viral Antibodies in Breastmilk

Breast milk contains antibodies that protect an infant whose immune system is still developing. Few studies have examined the presence of antibodies in breast milk of COVID-19 positive mothers. Researchers examined milks samples of 8 mothers who had recovered from COVID-19 and 7 who were suspected of being infected and found that the milk samples contained IgA (Yu et al., 2020; Fox A. et al., 2020). In a recent study of 18 COVID-19 positive mothers, most of the milk samples contained SARS-CoV-2 specific IgA and IgG antibodies, (Pace R, et al., 2021). The presence of antibodies affords breastfed infants protection from infection. However, detailed studies on the protective effects of these antibodies against COVID – 19 are required.

3.3 Recommendations for Breastfeeding for COVID-19 Mothers

WHO currently recommends the initiation and continued breastfeeding of infants and young children of mothers with suspected or confirmed COVID-19 (WHO, 2020). Centre for Disease control and Prevention (CDC) also recommends breastfeeding for the suspected or confirmed cases while following precautions to prevent transmission (CDC, 2021). In Kenya, the Ministry of Health (MOH) also recommends breastfeeding for all mothers suspected or confirmed to have the corona virus as the benefits outweighs the potential risks (MOH, 2020). All the agencies recommend that COVID-positive mothers practice general hygiene, wash hands with soap and water, use hand sanitizer with at least 60% alcohol, and disinfect surfaces and may breastfeed while wearing a mask.

4. Conclusion and Recommendations

Based on the currently available limited evidence, it seems that breastmilk does not transmit the virus. Therefore, recognizing the benefits of breastfeeding, it may be concluded that the benefits of breastmilk outweigh the risk of breastfeeding cessation and of a potential transmission of the coronavirus. Hence, breastfeeding should be encouraged if the health of the mother and her newborn allows. If mothers are too ill to breastfeed, they should still be supported to express their milk, and the infant should be fed by a healthy individual. Mothers and infants should not be separated, and skin-to-skin contact should not be discontinued. However, additional preventive measures should be strictly taken by COVID-19 mothers to prevent droplet transmission of infection to the infants while breastfeeding. There is still limited data on whether the virus can be transmitted through breastmilk. More extensive studies need to be done to quantify and compare the risk of transmission through different feeding practices. There is also need for more research in the developing countries.

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Influence of Stakeholder Participation on Sustainability of Donor-Funded Health Projects in the Health Sector in Kenya

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Abstract

The success of a project is achieved when the set project goals are realized but it is deemed sustainable if its objectives continue to be realized long after the project has ended. This study sought to establish the influence of stakeholder participation on sustainability of donor funded health projects in Kenya. The study was based on descriptive survey design and the population of study being the supply chain system in Kenya's non-commercial health sector which are; the national public and faith-based supply chain institutions as recipients of donor aid and suppliers of Health Products and Technologies (HPT), the Development Partners in Health in Kenya (DPHK) as aid donors, and County Health Departments in Kenya as recipients/consumers of health products supplied through the supply chain system. The study used questionnaires and interview guides to collect primary data. Secondary data was obtained from relevant project management documents. Both quantitative and qualitative data was collected. The study used descriptive statistics to summarize and describe data; inferential statistics to make deductions and predictions about the population; and SPSS statistical package to analyze the data. The study used T-test and if P value ≤ 0.05, then the research hypothesis was accepted. The study found positive significant relationship of stakeholder participation on project sustainability implying that stakeholder participation significantly influences sustainability of donor funded projects in Kenya health sector. The study recommends a thorough stakeholder analysis to understand who they are, how they are organized, their expectations of the project, and their engagement and contribution for sustainable project implementation.

Key words: Stakeholder participation, stakeholder relationship management, social sustainability, Stakeholder involvement, Supply chain, Health sector, Sustainability of Donor funded projects.

1. Introduction

Leadership at both project management and operating environment level (government, hosting institution, beneficiaries) closely links to how sustainable a project will be in terms of maintaining benefits/outcomes after donor funds are depleted. A stakeholder refers to an individual or group with interest in a project intervention, directly or indirectly. It is imperative that project strategic planning is done consultatively with both primary and secondary stakeholders, in a transparent

and accountable manner of prioritizing interventions considering limited resources. To do this it is important to involve participation of major stakeholders including donor community, strategic government ministries, the community, and cultural leaders (UNAIDS, 2007). Project ownership by the hosting institution, alongside a country-led, country-owned, country managed project is a model that facilitates sustainability. The project design and how it is implemented through close-out and transition to beneficiaries contribute to the sustainability of project benefits in the long-term future to benefit other generations.

Leadership in non-commercial sector for donor-funded projects has substantial impact on economic, social, institutional, environmental, and technological dimensions of sustainability to a nation (Wang et al., 2014). The characteristics of sustainable development in relation to social projects are financial viability, environmentally sound, socially responsible, effective governance, and long-term community value These are the desirable sustainability-oriented results of integrating sustainability in project management (World Bank, 2020). Ingle (2005) highlighted need for strategic approaches to achieve sustainability; an approach involving four key elements. These are; future orientation defined as planning to maximize benefits regardless of changing operating environment is emphasized; external emphasis in recognition of diversity of the project environment; the environmental fit defined as planning for a continual fit between project and its environment; and process re-orientation with regard to management priorities and process improvements arising from a lessons learning culture of quality improvement. All these are leadership components indicating a close association between leadership and sustainability.

The International Project Management Association (IPMA) charges the project management profession to take responsibility for sustainability (World Congress, 2008). Program and project managers are considerably expected to contribute to sustainable project management practices. Sustainability would imply that systemic benefits are conferred to both present and future generations through resilient health systems for effective service delivery (Potluka & Svecova, 2019). As countries work towards the global Sustainable Development Goals (SDG's) that aim to improve Aid effectiveness by 2030, external donors and Aid recipients are increasingly concerned about durability of project outcomes beyond donor support. Projects are time-bound in nature indicating the critical need to invest in sustainable project management practices that confer good life to both present and future generations. Kenya Demographic Health Survey - KDHS (2013/14) indicates that progress towards the health-related sustainable development goals has been slow, contributed to by operational health system indicator performance. It highlights need for higher investments in strengthening health systems. Kenya's health sector has been and still is supported by a myriad of external donors to strengthen the health system and improve service delivery statistics (Risso, McKee, Coker, Piot & Legido, 2014). External donor agencies utilize projects as a common mechanism to deliver intended support. While the value of donor support is undisputable, with visible or evident short-term benefits, uncertainty remains on whether donor funding results in sustainable benefits long after the donor has ended support. With debasing of Kenya's economy to a lower middle income however, external aid is beginning to decrease at a fast rate. With the public sector being underfunded from the exchequer, the country continues to rely heavily on donor aid for supply chain systems strengthening with few donor agencies supporting select program health commodities in which they have interest. While more donor agencies have progressively strengthened and utilized the public supply chain system since devolution, contribution from government of Kenya has not grown in commensurate measure.

Governance and policy framework in Kenya provide a basis for sustainable supply chain project management through procurement and supply of Health Products and Technologies (HPT) (Beisheim, Ellersiek, Goltermann & Kiamba, 2018). Kenya Vision 2030 invokes sustainable systems by emphasizing affordable, quality healthcare and productive population. The Universal Health Coverage under the President's Big-Four Agenda equally seeks to have everyone access provision of quality and affordable health services, and the Constitution of Kenya strongly advocates the right to health for all within the devolved system of government. The Kenya Health Policy (2020) aims to attain high health standards by offering the highest attainable standards through delivery of equitable, quality and affordable health services to all Kenyans. It aims to actualize this through specific health impact targets structured around service outcomes and investment orientations including the Health Products and Technologies (HPT) managed through a supply chain system. (KHP, 2020).

Vision 2030 addresses health as one of the key components in the social pillar, of investing in people. This Vision is the long-term development plan for Kenya aimed at creating a competitive edge globally with regard to quality of life through industrialization and economic growth. To enhance quality of life, contribution of quality, affordable sustainable health system is a value addition (GoK, 2008). The Kenya Universal Health Coverage (UHC), one of government of Kenya's Big-Four Agenda goals that sets to attain access to affordable healthcare to all Kenyans by 2022 without causing financial hardship to Kenyans, identifies quality improvement and strengthening of health systems as the key to achieving UHC (Wangia & Kandie, 2019).

The Constitution of Kenya (2010) equally highlights the right to health for everyone through a framework that assigns responsibility for health service delivery to the counties while policy, standards and regulations are the responsibility of national government. In unpacking dynamics of Kenya's devolved system, implementation factors that favour its success such as sustaining effects of donor funded projects will facilitate improvements in the health sector. The constitution allows county governments to independently source donor support for developmental projects within their area of jurisdiction, making their leadership role contributing to sustainability of donor funded projects more prominent.

The Kenya Health Policy Framework provides the basis for the health development agenda and emphasizes quality healthcare that is accessible, affordable and acceptable to all. It envisages combined efforts from various stakeholders such as the community and faith-based organizations, government entities and private sector. Donor agencies and implementing partners are key stakeholders, making durability of donor funded projects a key consideration in shaping government policy. Its implementation consists of strategic plans with broad objectives among them strengthening leadership, governance and healthcare management (KHSA, 2010). Kenya Health Policy (2012-2030) recognizes the need for new management arrangements to enable effective health services reach the people of Kenya, allowing for complementarities of efforts and interventions. Such management arrangements include external donors as key stakeholder in strengthening the health system and collaborating with private sector and local government for sustainability of project benefits after donor exit.

Notably, Kenya records a number of projects whose outcomes have not continued to be experienced after donor funding support has ended. These include a Norwegian Government project fish processing project designed to provide jobs to the people of Turkana that was shut down shortly after

project start-up due to high operational and need for clean water in the ASAL (Mazibuko, 2007). Okun (2009) established that donor projects either perform poorly or get into non-operational status upon termination of external support, and recommended succession planning to ensure that project stakeholders effectively manage the projects after withdrawal of donor support.

The fact of donor aid being time-bound is real, and so is a project's life. This should compel the government to develop and disseminate public policies on stakeholder participation for sustainability in project design and implementation. As the Kenya governments' health system receives funding and technical support through various donor funded projects, emphasizing stakeholder participation in integrating sustainability in the entire project management cycle will enhance durable outcomes in the long-term at various levels of government. This is critical to mitigate financing risks and/or prepare for declining donor investments in the lower middle-income economy that Kenya became a few years ago and still adjusting to.

While leadership at national, sub-national, institutional and community level is critical for project success and sustainability, no research has been done on the influence of stakeholder participation in the sustenance of beneficial outcomes of donors' investments in systems strengthening projects on supply chain in Kenya. To fill the knowledge gap which exists, this study focused on assessing if and how stakeholder participation influences continuity of outcomes from donor health projects in Kenya health system.

1.1 Purpose of the study

The study sought to determine influence of stakeholder participation on sustainability of donor-funded health projects in the health sector in Kenya

1.2 Research Hypotheses

H_1: There is a significant positive influence of stakeholder participation on sustainability of donor-funded health projects in the health sector in Kenya

1.3 Theoretical framework

The study was based on the theory on ladder of participation by Arnstein (1969) which was first explicated in the seminal theoretical work done on the concept of community participation. Arnstein's framework presents limitations of a very broad category, within which there is likelihood of multiple experiences. For example, the level of 'informing' may present significant differences in the quality, type and detail of information conveyed. The ladder signifies more control being better than less control, yet in practice, increased control is not likely desired by the community. Moreover, control should be increased alongside the necessary support so as not to result in failure.

The importance of this theory emanates from the recognition of existence of different participants and levels and their different levels of participation. These range from manipulation, through consultation and genuine participation. This determines the levels of partnership with citizens. Practically however, participation levels more often than not present a complex continuum instead of the desired or expected simple series of steps. This theory supports the independent variable on stakeholder participation as a leadership principle that is hypothesized to have a significant positive influence sustainability of donor funded projects.

Further the study is supported by RBV theory which was originated from the ideas of Penrose (1959) who reviewed insights on an organization's resource perspective. However, according to Awino and Marendi-getuno (2014), the resource-based view of the organization was introduced by Wernerfelt (1984) and later supported by Barney (1991) in his works. Awino and Marendi-Getuno (2014) cites many authors such as (Nelson and Winter, 1982; Dierickx and Cool, 1989; Mahoney and Pandian, 1992, Eisenhardt and Martin, 2000, Zollo & Winter, 2002 and Awino, Z. B. 2011) who have made considerable contribution to the conceptual genesis of the theory

The Resource Based View Theory highlights internal value creation through use of organizational resources and capabilities; and their effect on organization's performance and its competitiveness in the market. The theory asserts that each organization has a set of unique resources which are critical in ensuring the firm not only survives but also grows within the industry in which it operates. These resources range from technical, financial, physical and human, and they all contribute to the success of an organization.

However, according to Awino and Marendi-getuno (2014), critiques have argued that while some resources promote competitive advantage of an organization, others do not. It can also be argued that mere presence of resources does not contribute to success until such resources are coordinated and integrated. The resources listed in the RBVT such as technical, financial, physical and human are all utilized in the implementation of projects within organizations. This theory supports the study variable on how availability and utilization of internal resources at all levels – institutional, country and donor level influence sustainability of health projects.

Haroun and Adam (2015) noted that withdrawal of foreign assistance resulted in lack of progressive implementation of project activities. However, most project benefits were sustained as a result of effective stakeholder participation as a key contributing factor, complemented by a sustainability mechanism of continuous government financial support put in place prior to end of the donor funded project. Effective management of stakeholder relationships is critical for smooth start-up and implementation of projects as well as their sustainability. It encompasses how relationships between the project and government, community, donors, and other stakeholders, is managed (Friedman and Miles 2006).

Aaltonen, 2011 submits that the primary stakeholder in any project is the one that needs to be empowered for sustainability. The relationship between a project organization and its stakeholders should ensure the primary stakeholder is the main beneficiary. Institutional policies often give direction on how different stakeholders relate. It is important to map the individuals or groups that affect or are affected by a project (Hershey, 2011), including power analysis as this enhances understanding of how to engage (Chan *et al*, 2004). Indicators for social development projects are best analyzed from two perspectives, namely the financing and community participation perspectives. Stakeholder involvement needs to begin from the onset. This was noted as the pillar of health care projects designed in Alma Ata as well as the Bamako Initiative (Kahssay, 2004).

Mulwa (2013) opined that lack of community involvement in project design and implementation negatively influences project sustainability. Involving local stakeholders in project implementation produces community willingness to mobilize resources to ensure project continuity for sustainability

as benefits would accrue to all (Panda, 2007). The engagement of community involves participation of project beneficiaries in identification of gaps and subsequent solutions to those identified needs and gaps. Masanyiwa and Kinyashi (2008) conducted a study on community participation in projects managed by NGOs and established that participation is generally limited to giving information, contribution and consultation, without active involvement in planning, monitoring and evaluation or decision-making.

Mwobobia (2011) evaluated the influence of local communities on sustainability of projects and submitted that project managers, sponsors and workers, not the community, members, are the ones involved in developing project objectives and making other key decisions. The community is neither involved in resource mobilization to execute the project nor the project evaluation itself. This led to negative attitude towards the project by the community; despite the short-term benefits to them, lack of the community involvement was an indication that they would not own the project, a key component of sustainability.

Ofuoku (2011) assessed the effect of community participation on sustainability of rural water projects and found that while in most cases the projects were co-funded by the community and other funders, the community was rarely involved in any stage of the projects as they were represented by their community development committees' executives. The jointly funded projects were found to be more sustainable than those that were solely funded by governments. In all cases, functional involvement rather than optimal participation, was the norm.

2. Methodology

This study was guided by the positivist paradigm. The study used cross-sectional survey research design. The target population was 462 employees drawn from non-commercial health institutions comprising of two supply chain institutions (MEDS and KEMSA), County health departments, and Kenya health donors group; with units of observation being the technical employees (one hundred and sixty -160), the six commodity managers for each of the forty seven counties' Commodity Security working groups (two hundred and eighty two – 282) and the twenty (20) supply chain development partners in health in Kenya respectively. Data was collected using semi-structured questionnaires and drop and pick method. Quantitative data was analyzed using Statistical software (SPSS) by running frequencies, cross-tabulations correlation to generate various relationships, frequencies and comparisons. Qualitative data was transcribed and summarized to backup quantitative data. Data was analyzed using descriptive methods. Data was presented in form of figures, tables and charts. All the statistical tests were conducted at 95 percent confidence level. P-value was used to ascertain the significance of each construct in the regression model. The variables were taken to be statistically significant if the p-value ≤ 0.05.

Reliability and validity of the survey instrument was established by carrying out a pilot study on organizations representatives. The research instruments were administered to parent organizations of the supply chain institutions ie respondents from the MOH headquarters' Division of HPT commodity managers as stewards of the public supply chain, and to the CHAK and KCCB commodity managers as Trustees of MEDS.

The study used a cut off Cronbach alpha coefficient of 0.7. Bryman (2016) recommends Cronbach value of 0.7 and above as reliable, Cooper and Schindler (2014) suggest a range of 0.7 to 0.9. Composite results indicated that stakeholder participation had a Cronbach's Alpha coefficient of 0.719 which was within the recommended cut-off point of Cronbach's Alpha coefficient of reliability of ≥ 0.7 as recommended in this study. The instrument was thus considered to be adequately reliable to proceed for main data collection.

Factor analysis was employed to test for convergent validity, discriminate validity and construct validity. It was performed by use of the Kaiser – Meyer – Olkin (KMO) and Bartlett's Test for sampling adequacy to test various types of validity including construct, discriminant, and convergent validity. Further Varimax methods and principal component analysis was applied to extract those factors that clearly measure the independent variable. The results indicated sampling adequacy in the respective samples, with stakeholder participation (KMO=.845, Chi-square (χ)= 1141.806, df=13, sig. level=0.000); and (KMO=.863>0.5 and<0.9, Chi-square (χ)= 1216.176>2, df=13, sig. level=0.000<0.05) for supply chain organizations and county health departments respectively. The varied factor loadings imply that stakeholder participation as an independent variable closely measures the dependent variable.

Table 1: Summary of KMO and Bartlett's Test

	Kaiser–Meyer-Olkin (KMO)	**Bartlett's Test of Sphericity**		
		Chi-square (χ)	**df**	**Sig. Level**
National Supply Chain Institutions	.845	1141.806	13	.000
County Health Department	.863	1216.176	13	.000

3. Results and Discussions

The study was a descriptive cross-sectional survey of data collected from the management staff of non-commercial health sector in Kenya comprising of the health donor agencies, the national non-commercial supply chain institutions (KEMSA and MEDS) and the county governments health department. The questionnaire was used to collect data from non-commercial supply chain institutions (KEMSA and MEDS) and county governments' health department whereas the interview schedule was used to collect data from Development partners of Health in Kenya. Out of a sample of 50 respondents targeted at non-commercial supply chain institutions (KEMSA and MEDS) 38 filled and returned the questionnaires making a response rate of 76%. Out of a sample of 90 respondents targeted at county governments health department 74 filled and returned the questionnaires making a response rate of 82.22%. All the 6 interview schedules were filled and returned making a response rate of 100%. The overall response rate was therefore 80.82%.

Table 2: Response Rate

Category	Questionnaires distributed	Questionnaires filled and returned	Percentage %
Non-commercial supply chain institutions	50	38	76.0%
Count government health department	90	74	82.22%
Development partners of health in Kenya	6	6	100.0%
Total/Overall response rate	146	118	80.82%

3.1 Test of Hypothesis

Hypothesis was based on the research objective was tested using simple regression analysis. The hypothesis was tested at 95 percent confidence level (α=0.05), hence decision points to reject or fail to reject a hypothesis were based on the p-values. Where $p<0.05$, the study failed to reject the hypotheses, and where $p>0.05$, the study rejected the hypotheses.

Interpretations of results and subsequent discussions also considered correlations (R), coefficients of determinations (R^2), F-Statistic values (F) and beta values (β). R^2 indicated the change in dependent variable explained by change in the independent variables combined. Further, the higher the F-Statistic, the more significant the model. The negative or positive effect of the independent variable on the dependent (either negative or positive) was explained by checking the beta (β) sign. The R-value shows the strength of the relationship between the variables, t-values represent the significance of individual variables. The findings are presented along study objectives and corresponding hypotheses.

The study determined how stakeholder participation influences project sustainability through a hypothesis that H_i: μ: = Stakeholder participation has a positive significant influence on sustainability of donor-funded health projects in Kenya. The averages of each construct were determined, and a regression analysis performed.

Table 3: Effect of Stakeholder Participation on Project Sustainability

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	
1	.422[a]	.178	.176	.70945	
a. Predictors: (Constant), Stakeholder participation					
ANOVA[a]					
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	36.022	1	36.022	71.569	.000[b]
	Residual	166.095	116	.503		
	Total	202.117	117			
a. Dependent Variable: Project sustainability						
b. Predictors: (Constant), Stakeholder participation						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.062	.192		5.539	.000
	Stakeholder participation	.511	.060	.422	8.460	.000
a. Dependent Variable: Project sustainability						

The results in the model summary show that R=.422 suggesting that there exists a moderate relationship between stakeholder participation and project sustainability. Coefficient of determination R^2=.178 implies that stakeholder participation influences project sustainability by 17.8%. This is significant since p-value<0.05 at 95% confidence level.

The results shows that the overall model is significant (F=71.569, p<0.05) and the coefficient also shows that stakeholder participation contributes significantly on project sustainability (β=0.511, t=8.460, p>0.05). This implies that stakeholder participation significantly influences project sustainability and therefore the hypothesis that Stakeholder participation has a positive significant influence on sustainability of donor-funded health projects in Kenya is supported.

4. Conclusion and Recommendations

Stakeholder participation is critical for smooth start-up and implementation of projects as well as their sustainability. It encompasses how relationships between the project and government, community, donors, and other stakeholders, is managed. The study depicted stakeholder participation as stakeholder relationship management, social sustainability, and stakeholder involvement. Findings indicated that the primary stakeholder in any project should be the focus of empowerment for sustainability. The relationship between a project organization and its stakeholders should ensure that the primary stakeholder is the main beneficiary, with institutional policies providing clarity on stakeholder participation, more specifically mapping the individuals or groups that affect or are affected by a project and how they relate. The findings further indicated that involvement of stakeholders in projects not only ensures buy-in but also increases chances of project sustainability through improved demonstration of transparency and accountability. The findings concluded that the engagement of local stakeholders in project implementation produces community willingness to mobilize resources to ensure project continuity for sustainability, with the engagement involving participation of project beneficiaries in the identification of gaps and subsequent solutions.

The study determined how stakeholder participation influences project sustainability through a hypothesis that stakeholder participation has a positive significant influence on sustainability of donor-funded health projects in Kenya. The results in the model summary suggest that there exists a moderate relationship between stakeholder participation and project sustainability with coefficient of determination implying that stakeholder participation influence project sustainability. The results show that the overall model is significant, and the coefficient also shows that stakeholder participation contributes significantly on project sustainability. This implies that stakeholder participation significantly influences project sustainability and therefore the hypothesis that stakeholder participation has a positive significant influence on sustainability of donor-funded health projects in Kenya is

supported. The study recommends that a thorough stakeholder analysis is required to understand who they are, the organization that they come from, their expectations of the project and what contributions you need from them to accomplish the project successfully. The study recommends that a thorough stakeholder analysis in donor funded health projects is required with a goal to understand who the stakeholders are, how they are organized, their expectations of the project, what their contribution to accomplish the project sustainably would be, and how engagement would be structured to enable the design and implementation of a co-creation, co-implementation and co-monitoring framework.

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Review of Hematological Parameters among Patients with Covid-19 Infection

By John Kimathi – Gretsa University

Abstract

The novel severe acute respiratory syndrome coronavirus 2 (sars-cov-2), which causes the coronavirus disease 2019 (covid-19), has affected over 257 million people globally with over 5 million fatalities to date thus becoming a global pandemic of unprecedented size. The symptoms normally vary from person to person thus clinical manifestation of disease ranging from asymptomatic, mild infections, serious, and life-threatening cases requiring admission to the intensive care unit. The severity of covid-19 infection depends on a number of factors including such as biological, physiological as well as presence of existing comorbidities. A literature search was performed using the google scholar and PubMed databases to identify studies on hematological findings of COVID-19 up to November 1, 2021. The keywords used in the search were as follows: SARS-CoV-2, COVID-19, clinical findings, laboratory findings, hematology, and coagulation as were used earlier studies, (Asma et al, 2021). Papers with data on plasma levels of white blood cells (WBCs), platelets, C-reactive protein (CRP), aspartate aminotransferase (AST), alanine aminotransferase (ALT), gamma glutamyl transpeptidase (GGT), alkaline phosphatase and lactate dehydrogenase (LDH) were included in the study. The reference lists in the full-text articles were scanned to obtain additional references. The initial selection was based on the article title and abstract, following which the full-text article relevant to the topic were included, after removing duplicates. The most common hematological findings include lymphocytopenia, neutrophilia, eosinopenia, thrombocytopenia and, less frequently, thrombocytosis. Literature analysis reveals that among all the hematological abnormalities, lymphocytopenia has been the most frequent since admission to death. Significant reduction in lymphocytes count include could be due to the following reasons: (a) Lysis of cells due to direct infection in these cells by SARS-CoV-2, since due to the presence of ACE2 receptors on the cell surface; (b) Lymphocyte apoptosis due to the systemic inflammatory process among others. The platelet changes in COVID-19 infection could be due to a possible mechanism for abnormal thrombopoiesis related to SARS-CoV-2 infection which interferes with bone marrow hematopoietic and stromal cells, inducing cell growth inhibition and apoptosis. These findings explain thrombocytopenia which could possibly be due to consumption, and may cause immune damage to blood cells. Thrombopoiesis can occur in the lungs, where platelets are released from mature megakaryocytes.

Key Words: Hematological, covid 19, sars, laboratory, diagnosis

1. Introduction

The novel severe acute respiratory syndrome coronavirus 2 (sars-cov-2), which causes the coronavirus disease 2019 (covid-19), has affected over 257 million people globally with over 5 million fatalities to date thus becoming a global pandemic of unprecedented size (who, 2021). The first case of

covid-19 was reported by the People's Republic of China to the world health organization (who) on 31 December 2019, (Zhu n et al., 2020). Later on Singapore confirmed its first imported case on 23 January 2020 and local transmission was detected on 4 February 2020, (who, 2020) thereafter, cases spread in Africa with first confirmed happening 14 February 2020, in Egypt [who, 2020] in the in the sub-Saharan Africa, first confirmed case was announced in Nigeria at the end of February 2020, (MacLean, 2020). Locally, first case was confirmed in Kenya 12th march 2020 in Nairobi (MOH, 2020).

The symptoms normally varies from person to person thus clinical manifestation of disease ranging from asymptomatic, mild infections, serious, and life-threatening cases requiring admission to the intensive care unit (ICU) (Mackenzie and Smith, 2020). The severity of covid-19 infection depends on a number of factors including such as biological, physiological as well as presence of existing comorbidities (Hu, 2020).

Among the symptomatic cases, covid-19 clinical presentation is similar to Sars-Cov infection. The most reported symptoms are fever dry cough, dyspnoea and fatigue, (She, 2019).

Laboratory parameters	**Abnormality**	**References**
Lymphocytes	Reduction	Huang et al., 2020; Chan et al., 2020; Zhou et al., 2020;Guan et al., 2020; Liu et al., 2020; Wang et al. 2020;
Platelets	Reduction	Chan et al., 2020; Guan et al., 2020; Chen et al., 2020;
	Increase	Lippi et al., 2020; Ruan et al., 2020
Neutrophils	Increase	Wang et al. 2020; Chen et al., 2020;
Eosinophils	Reduction	Liu et al., 2020; Zhang et al, 2020; Sun et al, 2020
Leukocytes	Reduction	Huang et al., 2020; Guan et al., 2020.
	Increase	Zhou et al., 2020; Wang et al., 2020; Chen et al., 2020.
C-reactive protein(CRP)	Increase	Guan et al., 2020; Chen et al., 2020; Chan et al., 2020; Liu et al., 2020; Ruan et al., 2020; Young et al., 2020
Ferritin	Increase	Zhou et al., 2020, Chen et al., 2020.
Procalcitonin	Increase	Wang et al. 2020; ; Chen et al., 2020; Zhou et al., 2020
Lactate dehydrogenase (LDH)	Increase	Chen et al., 2020; Chan et al., 2020; Zhou et al., 2020; Liu et al., 2020; Wang et al. 2020.
Cytokines	Increase	Zhou et al., 2020; Ruan et al., 2020; Fu et al., 2020; Huang et al., 2020.
Prothrombin time	Increase	Zhou et al., 2020; Huang et al., 2020; Tang et al., 2020.
Aspartate aminotransferase (AST)	Increase	Chen et al., 2020; Wang et al. 2020; Huang et al., 2020.
Alanine aminotransferase (ALT)	Increase	Wang et al. 2020; Chen et al., 2020; Zhou et al., 2020

COVID-19 diagnosis is crucial for the identification, isolation, and treatment of contagious cases as well as to reduce mortality and morbidity. the gold standard method for confirmation of infection of covid -19 cases is through amplification of viral RNA by rRT-PCR. The technique has long turnaround time of about 3-4 h to generate results. In addition to these, the technique also requires certified laboratories, expensive equipment and trained personnel, thus there is need for alternative, less expensive and more accessible tests for fast diagnosis which may initiate timely patient management.

2. Methodology

A literature search was performed using the google scholar and PubMed databases to identify studies on hematological findings of COVID-19 up to November 1, 2021. The keywords used in the search were as follows: SARS-CoV-2, COVID-19, clinical findings, laboratory findings, hematology, and coagulation as were used earlier studies, (Asma et al., 2021). Papers with data on plasma levels of white blood cells (WBCs), platelets, C-reactive protein (CRP), aspartate aminotransferase (AST), alanine aminotransferase (ALT), gamma glutamyl transpeptidase (GGT), alkaline phosphatase and lactate dehydrogenase (LDH) were included in the study. The reference lists in the full-text articles were scanned to obtain additional references. The initial selection was based on the article title and abstract, following which the full-text article relevant to the topic were included, after removing duplicates. The findings from primary research articles, case reports, and case series were summarized and discussed. From the initial data collection, 1227 articles were identified from PubMed and google scholar, of which 28 studies were selected for review. Searches were limited to articles published from 2020 to 2021. Studies which were eligible described the method of diagnosis of COVID-19, conventional laboratory indices, the number of patients and the cut-off value of each laboratory index.

3. Results and Discussions

SARS-CoV-2 virus infections, like in other infectious diseases such as influenza, varicella, dengue among others may cause hematological changes which can potentially optimize the monitoring of infectious process or to indicate the suspicion of their severity (Shahid et al., 2018). Laboratory abnormalities based on hematological changes check the status of covid-19 infection due to the fact that hematopoietic system and hemostasis su□er impacts during the evolution of COVID-19 B. (Debuc & Smadja, 2020). The most common hematological findings include lymphocytopenia, neutrophilia, eosinopenia, thrombocytopenia and, less frequently, thrombocytosis.

As already reviewed by Henry et al. (2020), such abnormalities have been reported by several authors and are associated, in different parts of the world, there is a likelihood of complicated/severe covid -19 infection s which a predictable on hematological measures.

Literature analysis reveals that among all the hematological abnormalities, lymphocytopenia has been the most frequent since admission to death (Sílvia, 2021). According Terpos et al. (2020), significant reduction in lymphocytes count include could be due to the following reasons: (a) lysiss of cells due to direct infection in these cells by SARS-CoV-2, since due to the presence of ACE2 receptors on the cell surface; (b) lymphocyte apoptosis due to the systemic inflammatory process (c) lymphoid atrophy especially in the spleen; (d) inhibition of lymphocyte proliferation caused by lactic acidosis.

According to Sílvia et al. (2020), the platelet changes in COVID-19 infection could be due to a possible mechanism for abnormal thrombopoiesis related to SARS-CoV-2 infection which interferes with bone marrow hematopoietic and stromal cells, inducing cell growth inhibition and apoptosis. These findings explain thrombocytopenia which could possibly be due to consumption and may cause immune damage to blood cells. Thrombopoiesis can occur in the lungs, where platelets are released from mature megakaryocytes. According to Duarte (2020) in the damaged lung tissue there is an increase in the consumption of platelets and thrombopoiesis reduction.

Since the outbreak of Covid -19 in December 2019, there has been rapid spread of infections among humans throughout the world. To date, there has been no scientific knowledge regarding the origin, virulence, spread and specific pathogenesis thus so several gaps existing. The diagnosis of Covid-19 disease is a major challenge in clinical practice, as it presents clinical manifestations that related to other diseases such as cold or flu. Moreover, there is a challenge of performing Real Time-PCR which is the gold standard diagnostic method as well as serological tests which have not been universally accepted. Thus, many suspected individual samples are awaiting diagnosis, which is fundamental for adoption of adequate measures of isolation, treatment, and others. Therefore, the search for hematological, biochemical or other suggestive laboratory parameters is extremely welcome in this scenario in which SARS-CoV-2 infection is spreading with enormous speed around the world and the availability of specific tests is still quite limited.

4. Conclusion and Recommendations

Available data suggest that several hematological parameters may change in the course of SARS-CoV-2 infection and that some of them can be considered significant predictors of unfavorable clinical out- comes, such as admission to ICU or even death. Given the above, the present literature review may be relevant, not only to disseminate what is already known, but it may also serve as a valuable base for future investigations. The search for routine hematological and biochemical variables and others that may assist in the clinical diagnosis of patients suspected of being infected with SARS-CoV-2, or that can predict the severity of the disease or even serve for its monitoring is highly desirable at a time of great challenge imposed by the pandemic.

In conclusion, its important for the health care providers to consider the hematological test for covid 19 suspects or confirmed cases for management of this disease.

Further research can be done locally to determine the variations on the hematological parameters among covid-19 patients for easier management

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Review of Public Health Resilience to the SARS-COV-2 Pandemic in Kenya

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Abstract

The study sought to assess Public Health Resilience and adaptations to the SARS-COV-2 Pandemic in Kenya. Review of existing literature on building resilience and adaptation among public health department. The study adopted review of published studies and grey literature related to public health resilience studies was done independently. The search strategy utilized electronic databases comprising of Medline, Google Scholar, Pub-Med and MOH-Kenya COVID-19 Reports and facts sheet. Screening and extraction of eligible 69 studies. Duplicate studies (39) were excluded based on their titles while 17 were excluded based on title and or abstract review. A total of 13 eligible papers underwent full-text review, out of which 8 studies were excluded as they did not meet the exclusion criteria and 6 studies met the inclusion criteria. Result, reveals from all the eligible documents emphasize on the importance of Coordinated and collaborative evidence-based responses for the successful control of a public health emergency. Case investigation and contact tracing were fundamental public health strategies for controlling and preventing the spread of infectious diseases. Another finding that came out clearly was on the expansion of public health capacity through the massive recruitment of community and public health officers in the universal health coverage program which happened in the midst of the pandemic

Keywords: Public Health Resilience, COVID-19 Pandemic, Kenya

1. Introduction

Numerous prevention efforts and strategies implemented for COVID-19 aimed at reducing the burden on strained health systems and human resources world-wide with much divide in developing countries. More research efforts have been on the vaccine development and its acceptance as compared to little research conducted to understand how severe acute respiratory syndrome coronavirus (SARS-CoV-2) has affected health care systems and professionals in terms of their work. The effects are worse among developing countries already coupled with other humanitarian relief needs due to prolonged droughts, locust invasion, high cost of living, job loss (1.72 million) KBS 2021, terrorism among many others as the Kenyan case. On 12th March 2020, MOH-Kenya confirmed the first COVID-19 case in Kenya which was followed by WHO declaration of the COVID-19 outbreak as a pandemic in the same March 2020 (WHO, 2020). Finding effective ways to share the knowledge and insight between counties, including lessons learned, was paramount to the containment and management of the COVID-19 pandemic. The current approach to controlling COVID-19 pandemic has largely been a strategy aimed to flatten the epidemic curve and lower peak morbidity and mortality. Reducing the intensity of COVID-19 transmission remains crucial to avoid overloading health systems. At different points during the pandemic, health systems have been unable to meet the laboratory testing, contact tracing, ICUs bed capacity and other supply chain demands such as personal protective equipment.

Contact tracing has overwhelmed public health departments, often with less than an optimal time delay. Kenya has experienced several waves and surge of COVID-19 despite protocols established and enforced including: movement restrictions, curfew, use of mask, social distance among others Globally, there have been bed shortages in intensive care units (ICUs). In resource limited settings, such as in Kenya and Africa generally, the low performance and resilience of health systems and public health has been alarming (Van Damme W et al., 2020) The existence of divide in county capacities and resource has been found to have far reaching effects in slowing and stopping the COVID-19 spread and transmission. How different public health institutions from different counties respond during this pandemic in their preparation and implementation was essential to study and understand. Preventive measures including awareness creation, mapping of vulnerable groups and hotspot areas, capacity development among community health workers and contact tracing all under public health department forms key thematic areas under focus to determine the adaptability and resilience between the counties of interest in this study which have recorded relatively high confirmed COVID -19 cases . This has informed the necessity for this study for comparison in order to identify strengths and weaknesses in the response, including challenges for public health professionals

1.1 Review Objective

I. The objective of the review was to determine Public Health pandemic response to COVID-19 in Nairobi and Kiambu counties in Kenya with a focus on strategies adopted and the contribution to building resilience in public health These two counties have reported majority of COVID-19 cases in Kenya (Nairobi-101,818 and Kiambu- 16,393 out of the total 252,066 cumulative confirmed cases) and have relative high population increasing the transmission risks

II. To determine collective and practical lessons learned from the COVID-19 crisis can be developed for better preparation and response in the future

2. Methodology

The study adopted review of published studies and grey literature related to public health resilience studies was done independently. The search strategy utilized electronic databases comprising of Medline, Google Scholar, Pub-Med and MOH-Kenya COVID-19 Reports and facts sheet. Screening and extraction of eligible 69 studies. Duplicate studies (39) were excluded based on their titles while 17 were excluded based on title and or abstract review. A total of 13 eligible papers underwent full-text review, out of which 8 studies were excluded as they did not meet the exclusion criteria and 6 studies met the inclusion criteria.

Year	Frequency [n=6]	Percentages of included studies
Year		
2021	3	44%
2020	2	34%
2019	1	22%
Publication type		
Journal article (peer reviewed)	6	100%

3. Results and Discussions

From the Review it is worth noting the importance of Coordinated and collaborative evidence-based responses critical for the successful control of a public health emergency. The many unknowns of COVID-19 have made the response efforts difficult and variable, while improving equitable access to COVID-19 interventions would be a vital step in reducing disease propagation (Chabrol.F et al., 2020).

Several studies have shown that during the COVID-19 pandemic, social adversities such as poor living and working conditions have accumulated for certain social categories with special attention to resource limited context which influenced public health measures and practices to adopt to social living environments. Regarding public health measures, it is of vital essence to understand social factors likely to inform key planning of COVID-19 interventions. Further reviews noted that Case investigation and contact tracing were fundamental public health strategies for controlling and preventing the spread of infectious diseases. Although the principles behind these strategies are not new, the capacity and operational requirements needed to support disease investigation during the SARS-CoV-2 (COVID-19) pandemic were unprecedented.

Governmental public health agencies were mobilized to expand case investigation and contact tracing programs in the early months of the pandemic. In doing so, they encountered a range of challenges that included rapidly scaling up the workforce; developing and subsequently revising guidance and protocols specific to COVID-19 as more was learned about the virus over time; COVID-19 case investigation and contact tracing programs presented an array of opportunities for health departments to innovate, especially around technology to support public health efforts, as well as opportunities to address health equity and advance community resilience. It was also revealed that the introduction of vaccine attracted mixed reactions among Kenyans and the uptake remained relatively low for the first few months due to conspiracy theories around the COVID-19 vaccine like any other earlier vaccines. From the two counties of interest it was revealed that similar public health interventions implemented included hand washing campaigns, keeping social distance, use of face masks, body temperature checks, case investigation and mass testing, contact tracing, counselling and psychosocial support among enforcement of the other government directives and guidelines

Another finding that came out clearly was on the expansion of public health capacity through the massive recruitment of community and public health officers in the universal health coverage program which happened in the midst of the pandemic.

3.1. Lessons learned

Lessons learned from COVID-19 intervention specialists, guidance and resources from governmental agencies and national partners, and peer-to-peer exchange of promising practices can support jurisdictions encountering early implementation challenges. Further research is needed to assess COVID-19 case investigation and contact tracing program models and innovations, as well as strategies for implementing these activities during containment and mitigation phases. There were divide in human capacity and resource availability across the counties and this presented inequalities in COVID-19 interventions and service provision.

4. Conclusion and Recommendations

In conclusion, it is evident from this study that COVID 19 presented unique opportunities and challenges not only to health sector but also economic sphere with diverse multiple effects. Public health resilience is a process that is anchored on synergy collaboration with other sectors. Public health resilience and preparedness appear to be limited. From the studies it has been revealed that proper training and education on disasters like the current COVID-19, which is of significant importance for healthcare workers, is limited. It also emerges that the staff members whenever required could mark and perform in the triage area, but the Isolation room haven't got the request facilities. Research on disasters or health emergencies is in its primitive stage. To achieve efficacy in disaster planning, one must have in-depth knowledge and skills as to 'what emergency preparedness and professional competencies are required and also that 'what knowledge, skills, and abilities are needed'. Therefore, each country has to raise its level of awareness to recognise and deal with health emergencies'. The outburst of COVID-19 has created a global health crisis, which is having a profound impact on the way we perceive our world and on our everyday life. This research establishes that the level of emergency preparedness in terms of knowledge and skill competencies ranges from little to moderate in healthcare providers. Therefore, it is highly important to focus on proper training and education. Clinical care, on the other hand, varies, as a triage area was marked but the isolation room was not fully equipped to stabilise a critical patient. However, there was the availability of an emergency stock of medicines to deal with a health emergency. Nevertheless, testing facilities were limited to 17 per cent only. It is also an established fact that self-efficacy of healthcare providers is predominantly significant for effective handling of all types of health emergencies, and for that, mental well-being is very important to provide holistic care to the patients.

Several changes are proposed in relation to building resilience within the public health and hospitals. Among these changes may be more robust supply chains, cultures of excellence and collaboration, and systems for coordinating operations within and across hospitals. At the same time, the health services research enterprise should conduct rigorous studies investigating which organizational elements are most important for fostering hospital resilience. The factors that create resilient hospitals remain poorly understood, and a more nuanced understanding of what it means to be a resilient hospital will provide novel strategies to create resiliency ahead of the next pandemic. COVID-19 will not be the last large-scale public health threat of the 21st century. In addition to infectious diseases, hospitals and health systems will confront climate-mediated extreme weather events, cyberterrorism disruptions, and other threats in the decades to come. Hospitals can never be truly prepared for these events. But if hospitals understand and build sustainable resilience, they will be ready.

Further research is needed to assess COVID-19 case investigation and contact tracing program models and innovations, as well as strategies for implementing these activities during future containment and mitigation measures. A more robust communication and information sharing mechanisms is key in exchange of health experiences and interactions across counties for optimal performances.

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Technical Factors Influencing Electronic Health Records System Use by Nurses at Kirinyaga County Teaching and Referral Hospital, Kenya

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Abstract

Technical factors affecting the adoption and use of electronic medical records adoption by nurses at kirinyanga county teaching and referral hospitals are explored in this study. The study utilized a cross sectional survey study design where data was collected using questioner. Census was used as a sampling technique as the study population was relatively small. The completed questionnaire was coded into SPSS statistical software. Descriptive statistics was utilized to determine how the Information and communication infrastructure, internet access and physical security influenced the adoption of electronic medical records in the hospital. All the tests had a significant level of $p<0.05$. the study findings were presented in tables. The study hypotheses was accepted as the findings indicated there seems to exist a significant rellation between the technical factors and EHR use by nurses in kirinyaga county teaching and referral hospital. According to the report, health facilities should improve infrastructure and resources to enable EHR use, workers should be provided with more EHR training, and suppliers should periodically support and train health staff on how to properly use EHR. The findings of the study may be valuable to hospitals as they strive to integrate all of their processes through the use of ICT.

Key words: electronic health records, technical factors, nurses, Technology Acceptance Model

1. Introduction

Significant advancements have been made over the years in improving people's health, increasing their lifespan, eradicating communicable diseases as well as minimizing infant and maternal mortality. The millennium development goals, have three agendas related to health (WHO, 2000). Over the 15 years period of millennium development goals, progress towards reducing child mortality and improvement of maternal health. In 2015 the sustainable development goals were developed to take from the millennium development goals. The SDG have 17 targets aimed at transforming the world. SDG goal number three is enhancement of health and welfare with targets which encompasses guaranteeing universal access to sexual and reproductive health programme; realization of universal wellbeing; access to high quality basic health care amenities; member sates ability strengthening, with special focus to the developing and underdeveloped countries to get prompt alert, minimize risk and control o the countries and the world health challenges among others (Rosa, 2017).

Health care givers and hospitals are faced with numerous challenges arising from the increasing chronic illness coupled by the problems of the aging population. These challenges have mounted pressure on the already overwhelmed hospitals. This calls for the strengthening the hospitals capacity as well as proper utilization of the resources. (Ingebrigtsen et al.,2014). These changes have led to increased medical needs as the aging population has a myriad of medical conditions, decline in ability to work and age-related diseases have contributed to the rise in health expenditure such as health insurance and pension fund to support the aging population. The health dynamics of the older age are linked to raised needs for healthcare services. Barriers to accessing health services and health care systems that are designed to handle different problems are also part of the problem facing health care systems in the world (WHO, 2015). Tracking and addressing these issues is important for the sustainability of the health care providers that are tasked to provide effective and equitable healthcare services. Experts holds the view that health information technology use is crucial in the provision of high quality healthcare resulting to satisfactory outcomes (Wheatley, 2013).

Electronic Health records with automated practitioner order entry, dosage and prescription management, relaying of information and an imaging systems are popularly utilized in the current times. The use of electronic medical record have grown considerably in hospitals worldwide, with the largest growth witnessed in America where by the year 2018 it was reported that more than 4000 hospitals and close to 600,000 outpatient health care providers made use of the electronic health records in offering care to their clients and patients (Adelman et al., 2018). These tools have significant benefits as they can assist clinical decision making, share record on clinical outcome, and information for population-oriented assessments of the uptake rate (Vedel et al., 2013). Electronic health records have the potential to harmonize health care procedure and resources allotment through incorporation management and clinical data structures. Despite the many benefits incorporations of health information technology have proved to be a complex affair. The implementation can turn out to be a risky affair with numerous undesirable outcomes, both to the patient and the health facility (Sheikh et al., 2011). According to Spurgeon et al.(2017), the adoption and use of electronic medical records requires involvement of the health care partitioners as an important path to the attainment of improved healthcare outcomes at a lower cost.

Despite the many advantages of electronic health records, their adoption and use in public hospital remains relatively low up to date. Although much studies have been done on the factors that influence a healthcare professional's decision to use a new technology or system, previous studies have primarily been theoretical and have not examined the factors that directly influence information use. Kenya, being a developing country, is attempting to stay up with technological advancements in order to improve the health and quality of care provided to its population. The goal of this research was to look into the influence of technical aspects on EHR system usage by the nurses.

1.1 Purpose of the Study and Conceptual Framework

The purpose of this research was to assess the technical factors influencing electronic health records system use by nurses at kirinyaga county teaching and referral hospital, Kenya. The interrelationships between study variables are conceptualized as shown below. As indicated in the conceptual model, there are three technical factors that influence adoption of EHR in kirinyaga teaching and referral hospital which include;ICT infrastructure, system design and ICT skills. A gaps exist on the factors that influences use of electronic health record technology in public health institutions in Kenya and the extent of the relationship of these variables is not clear and need to be examine.

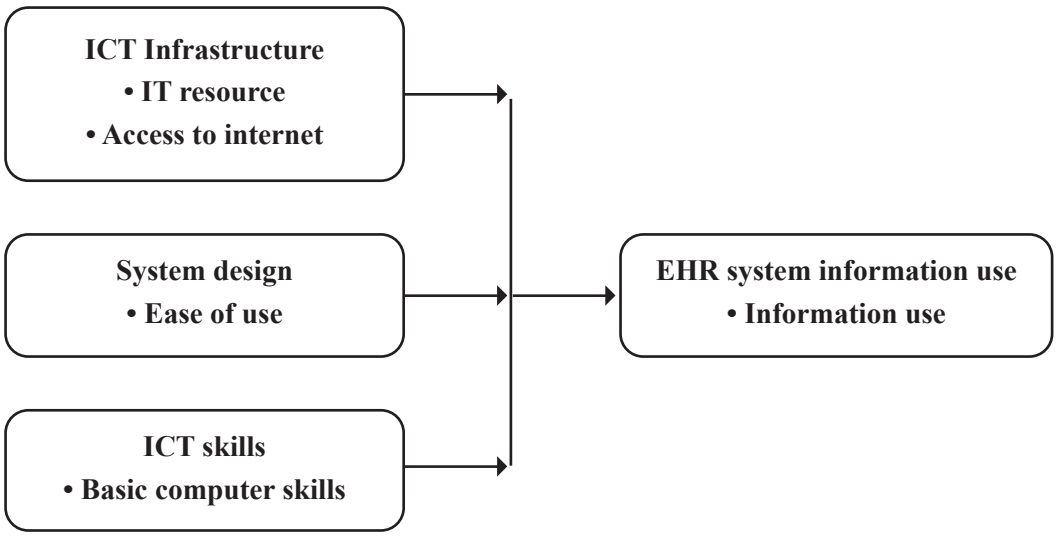

Figure2: conceptual framework.
Source: researcher 2020

1.2 Theoretical framework

The Technology Acceptance Model served as the foundation for this study (TAM). Davis proposed the model in 1989, presenting an analytical methodology for predicting computer technology acceptance. The technological elements influencing healthcare professionals' attitudes on the implementation and use of EHR data are investigated in this study. According to TAM, adopting information system technology is connected to the intention of utilizing a specific system, which is decided by perceived usefulness and perceived ease-of-use from the user's perspective. As a result, Davis tested and validated two separate variables: perceived ease of use and perceived usefulness of the technology. Perceived usefulness is the user's level of confidence that using the system will help them perform better in their work, as well as whether they will utilize the technology or not. The extent to which the user perceives or believes that the information system is easy to use is referred to as perceived ease of use. TAM has proven to be the most effective model for forecasting the factors that influence technology acceptance in a variety of contexts, including health care (Vathanopas & Pacharapha, 2010)

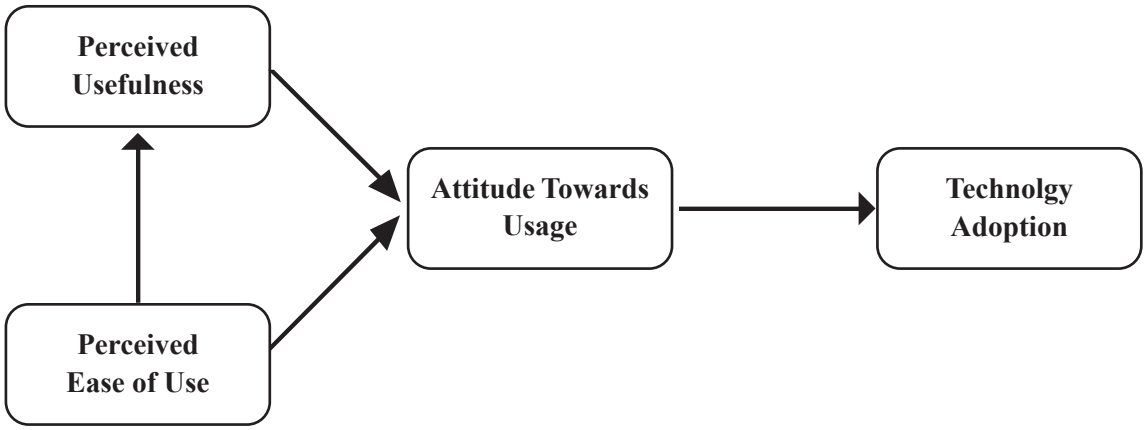

Figure 2: Technology acceptance model**.**
Source: Davis 1989

2. Methodology

A cross sectional survey was adopted for the study. The study was undertaken in Kirinyaga County Refferal Hospital. The facility is a county teaching and referral hospital in the central region of kenya. The hospital provides surgical and acute healthcare to the patients. The hospital is also tasked with offering community and primary heath care to the catchment population. The complexity and scale of the hospital renders it to be the best site for the study stting. The suitability of this hospital is also potrayed by the fact that the finding obtained from this study can be widely used in examining the implementation and use of the EHR in other hospitals. The target population for this tudy were the nurses working in the KCTRH. The study will use a census, where by all the 60 nurses in the facility will be included in the study. A questionnaire was used in the study as a data collection tools. The questionnaire was structured to collect demographic data, design of EHR, level of ICT skills perormace and availability of the ICT infrastructure in the hospital. A five scale likert scale was used and interpreted as follows: 1; Strongly Agree (SA), 2; Agree (A), 3; Uncertain (U), 4; Disagree (DA) and 5; Strongly Disagree (SD). The items in the questionnaire were influenced by items used in the AAP survey (Lehrman et al. 2015).The questionnaire was pretested at Kirinyaga west sub-county hospital to make appropriate modification before embarking on the main study. Data analysis was done following the four phases normally used in research, these include: data clean up, reduction, differentiation and explanation. Both descriptive and inferential analysis was used to analyze the data. Descriptive analysis was done using mean, frequencies, and percentages. Association between the study variables was assessed by probability value of $P<0.05$ for significance.

3. Results and Discussions

Out of the 60 questionnare distributed, 57 were adquetelly filled which accounts for 92.5%. according to Mugenda Mugenda (2003), a response rate of 50% is adequate and a response rate of 70% is very good. As a result 92.5% respose rate that was reprted in the study was adequate for making conclusion. The questionnaire used in the study was highly reliable with a Cronbach coefficiency of 0.82. A reliability coeffiecient above 0.65 is acceptable(Glien 2003).

Study participants demographics were analysed descriptively as shown in table 1. 64.9% of the study participants were female while 35.1 were males. Majority of the respondent (60.8%) were yung people aged between 20 and 30 years. The results on the level of education reveled that 5.4% of the respondents had attained a post graduate degree, 28.4% were bachelor's degree graduates, 54.1% had completed diploma,and 12.2% had attained certificate. The nurses work experience ranged less than five years to above 20 years.

Table 1: Demographic characteristics

	N	%
Gender (N=57)		
Male	20	35.1
Female	37	64.9
Age group (N=57)		
20-30 years	35	60.8
31-40 years	12	21.6
41-50 years	7	12.2
Over 50 years	3	5.4
Level of education (N=57)		
Certificate	7	12.2
Diploma	31	54.1
Graduate	16	28.4
Post Graduate	3	5.4
Years of experience (N=57)		
Less than 5 years	45	78.4
6-10 years	9	16.2
11-15 years	1	1.4
16-20 years	2	2.7
Over 20 years	1	1.4

Table 2: Distribution of the respondents on level of ICT skills

Items	SD	D	U	A	SA
I have been trained in use on basic computer skills	4(6.8%)	5(9.5%)	2(4.1%)	26(44.6%)	20(35.1%)
The management often provides short training on ICT skills	13(23%)	15(27%)	6(10.8%)	17(31.1%)	5(8.1%)
I have sufficient computer skills on use of the EMR	5(9.5%)	8(14.9%)	7(12.2%)	26(44.6%)	11(18.9)
I would appreciate the opportunity for additional training on the EMR	3(5.4%)	2(4.1%)	4(6.8%)	15(25.7%)	33(58.1%)

26 out of the 57 nurses agreed having participated in basic computer skills trainig while 5 respondents disagreed to have undertaken the basic computer skills. 10.8 percent of the nurses were unsure, 31.1 percent agreed, and 6% strongly agreed that management frequently gives short training on ICT skills, 44.6 percent agreed, and 18.9 percent strongly agreed that they had adquate computer abilities to utilize the EHR, and 12.2 percent were unsure. Furthermore, 25.7 percent and 58.1 percent of the 57 respondents said they would welcome the opportunity to receive extra EMR training. The majority of health care practitioners have high ICT skills, according to the datta analysis.

Table 3: Distribution of the respondents by responses on system design

Item	SD	D	U	A	SA
The management always seek your opinion in design the current EHR system	15(25.7%)	15(24.3%)	6(10.8%)	12(23%)	9(16.2%)
The EHR system adequately respond to the needs of your hospital	7(12.2%)	12(20.3%)	8(13.5%)	25(43.2%)	6(10.8%)
The EHR is easy to use	3(5.4%)	11(18.9%)	5(9.5%)	26(45.9%)	12(20.3%)
The EHR system is unnecessarily complex	11(18.9%)	24(41.9%)	7(12.2%)	11(18.9%)	5(8.1%)
I always need technical help to use the system	5(9.5%)	28(48.6%)	8(13.5%)	13(23.4%)	2(4.1%)
The various functions of the system are integrated	5(9.5%)	8(14.9%)	5(8.1%)	29(51.4%)	9(16.2%)

According to the findings, 23% agreed and 16.2% strongly agreed of the 54 respondents said management usually seeks their input when designing the existing EHR system, whereas 24.3 percent disagreed and 10.8% were unsure. 43.2 percent (agreed) and 10.8 percent strongly disagreed of the 54 study participants said the EMR system sufficiently did respond to the facility's needs, while 12.2 percent strongly disagreed and 20.3 percent disagreed. 45.9% (agreed) and 20.3 percent strongly agreed of the 54 study participants said the EHR system is simple to use, while 18.9 percent disagreed and 9.5 percent were unsure. When inquired if they always require technical assistance to use the EHR system, 18.9% strongly disagreed and 41.9 percent disagreed while 18.9% agreed. When asked if they always require technical support to use the system, 9.5 percent strongly agreed and 48.6 percent agreed whilst 13.5 percent were uncertain. When asked if the system's multiple functions are integrated, 51.4 percent of respondents said yes.

Table 4: Nurses' perception on Infrastructure

Items	SA	D	U	A	SA
The hospital has access to high speed internet connectivity	14(24.3%)	15(25.7%)	10(17.6%)	12(20.3%)	7(12.2%)
The hospital hardware supporting the EMR is reliable both in terms of and accessibility	8(14.9%)	13(23%)	9(16.2%)	20(35.1%)	6(10.8%)
The hospital network supporting the EMR is reliable both in terms of and accessibility(Uptime) and speed	8(14.9%)	14(24.3%)	9(16.2%)	19(33.8%)	6(10.8%)
I feel the device used to access the EMR at the facility enables an efficient workflow	6(10.8%)	11(18.9%)	8(13.5%)	26(47.3%)	5(9.5%)
The hospital has the right number and types of IT resources to support my use of the HER	5(9.5%)	17(29.7%)	15(25.7%)	13(23%)	7(12.2%)

About thirty five percent agreed while 10.8 percent strongly disagreed that the hospital hardware supporting the EHR system is consistent in terms of acess and availability, while 14.9 percent strongly disagreed and 23.0 percent disagreed. 33.8 percent agreed and 10.8 percent strongly disagreed on the hospital network enabling the EMR is reliable in terms of ease of access (Minimal downtime) and speed, while 14.9 percent (strongly When asked if the device used to access the EMR at the institution supports an efficient workflow, 10.8% (strongly disagreed) and 18.9percent of respondents disagreed, respectively, while 47.3 percent agreed. Nevertheless, when asked if the hospital.

Table 5: EMR Information use by healthcare providers

Items	SA	D	U	A	SA
I use EMR to seek specific information on patient care	7(12.2%)	8(14.9%)	8(14.9%)	26(45.9%)	7(12.2%)
The EMR allows me to always follow patients' management plan	5(8.1%)	12(21.6%)	8(13.5%)	25(44.6%)	7(12.2%)
Using EMR I can always order relevant tests/give relevant support to the patient.	3(5.4%)	8(13.5%)	10(17.6%)	28(48.6%)	8(13.5%)
I am able to generate reports from electronic medical reports system	5(9.5%)	9(16.2%)	9(16.2%)	25(43.2%)	8(14.9%)
EMR data is able to guide in establishing costs of health care	5(8.1%)	6(10.8%)	8(14.9%)	29(51.4%)	8(14.9%)
EMR is used as a reference to order supplies, medicines and health products	3(5.4%)	4(6.8%)	9(16.2%)	26(45.9%)	14(24.3%)
EMR data generated is used to establish health trends of clients and ensure continuity of care	3(5.4%)	6(10.8%)	11(18.9%)	27(47.3%)	10(17.6%)
EMR data captured is used in making decisions about staffing and infrastructure	4(6.8%)	9(16.2%)	13(23%)	23(40.5%)	8(13.5%)
It is easy to access or retrieve information in the EMR system to guide clinical decision making in real time	4(6.8%)	8(14.9%)	9(16.2%)	25(44.6%)	10(17.6%)

Participants were questioned on their capacity to enter data into the system, report generation, data retrieval, and interoperability in this area. The study found that 58.1 percent of the 57 respondents agreed that they use EHR to seek precise regarding patient care, while 27.1 percent disagreed, 56.8% agreed that the EHR permits them to always adhere to the laid down patient follow up plan, while 29.7% disagreed, 63 percent percent agreed that they can always order appropriate tests relevant support to the patient using EHR, while 19.2 percent disagreed, and 58.1 percent agreed that they are able to generate reports from electronic medical reports system while 25.7% disagreed,60.8% of the respondents

Table 6: Regression Table of influence of technical factors on information use

				t	Sig.	95.0% Confidence Interval for Coefficients	
	Regression Coefficients	Std. Error	Pearson correlation Coefficient			Lower Bound	Upper Bound
	8.353	3.885		2.150	.035	.605	16.102
Technical Factors	.480	.080	**.583**	6.009	.000	.321	.640

The relationship between professionals' perceptions of technical aspects (infrastructure, system design, and level of ICT abilities) and EMR information utilization was investigated using Pearson's correlation analysis. To determine the technological aspects that influence how professionals use information. Infrastructure, system design, and ICT skill level were computed as independent variables in the analysis, with information use as the dependent variable. Technical characteristics and information consumption had a strong positive significant connection (r = 0.583, p0.05). The goal of this study is to see how technological factors affect the use of EMR in the Kirinyaga teaching and County Referral Hospital. The study findings revealed a strikingly positive relationship between nurses' perceptions of technical characteristics and their utilization of information. These findings contradicted earlier findings from other researchers who claimed that one reason for limited eHealth adoption in developing nations is a lack of computer skills among practitioners, as reported by (Omary et al., 2010). All healthcare experts and personnel participating in the process must have computer capabilities in order for e-healthcare to be implemented successfully around the world.

This study also clearly demonstrates that interconnection and a lack of essential facilities or hardware, as indicated by the authors, is a major impediment to the widespread adoption and use of EMR systems (Menachemi, Langley & Brooks, 2007). healthcare workers, according to Ludwick et al. (2009), strain to acquire suitable technical training and support from the vendor. Other studies suggest that a sufficient amount of hardware, such as phone lines, computers, and internet connections, is necessary to employ EHR systems. The study indicates that there is a lack of infrastructure to support EMR, which is similar to a study that found out that a lack of these fundamental facilities hardware prevents mass adoption and use of EHR systems (Vishwanath & Scamurra, 2007). According to a survey conducted by Chebole (2015), while the majority of healthcare practitioners have access to a computer and printer, which is one of the minimal requirements for using an EHR system, other core infrastructure are still lacking (Chebole, 2015). Muchangi and Nzioka (2014) discovered that health information is transmitted between health institutions, health institutions, and patients in a secure manner.

It has been established that low telecommunication and internet penetration has a negative impact on the transmission of health information between health institutions, health institutions and patients, health institutions and third parties such as insurance companies, patients, and health institutions. The findings are consistent with those of the OECD (2013), which found that high internet penetration and bandwidth remain a concern in poor nations, limiting the use of telemedicine and other internet-based applications. According to Kemper et al., this restricted infrastructure could have an impact on the perspective of other healthcare providers where the system has not yet been adopted. Other

researchers have stated that those who are unwilling to adopt the EMR system are suspicious of assertions that the system will successfully increase the quality of medical practices (Jha et al., 2009). Physicians' perspectives are crucial in their response to EMR, according to (Walter & Lopez, 2008). In terms of training, the majority of health providers stated that they had limited training in EMR. This contradicts other studies that show that the majority of healthcare workers have a basic understanding of computer applications and frequently use the internet, allowing them to understand and embrace new technology (Chebole, 2015).

In another study, Meade et al. (2009) points out that the majority of the current generation of physicians in Ireland obtained their training prior to the introduction of IT programs. EMR suppliers appear to underestimate the amount of computer skills required of physicians, despite the fact that the system is not only perceived as, but also is in practice, quite difficult to use by these doctors. A proposal made by Singh and Muthuswamy (2013) that training programs for nurses be developed in order for them to use electronic health records easily is in line with this study. The successful implementation of an electronic health record is dependent on proper training. (Singh & Muthuswamy, 2013). EHR use, according to Shachak et al. (2009), produces a new sort of medical error: typos. Furthermore, not only physicians, but also other members of the medical team, lack adequate computer skills. Randeree (2007) stated that people will adopt EMR in hospitals once they have become accustomed to new systems. Randeree recommended that suppliers continue to give EHR training to health care providers. The majority of healthcare providers in our study were confident in the information relayed by the EHR system; however, other studies, such as one conducted by Wamae (2015), found that over 65 percent of healthcare providers confirmed the EHR's ability to compile statistics and support for general enquires.

4. Conclusion and Recommendations

This study discovered and confirmed that health providers had a favourable attitude about the usage of EMR information. The usage of electronic medical records (EMRs) in healthcare facilities helps to ensure clinical care efficiency and patient safety. A large proportion of health-care providers have basic computer abilities, allowing them to use EMR. In the outpatient section, health care workers lacked formal EMR training. The study found that the EMR design chosen was user-friendly, despite the fact that health care personnel who used the EMR said they had little participation in its setup. The study also identified the difficulty of insufficient EMR infrastructure, including as internet connectivity, as well as a small number of people to manage and promote EMR use. Technical issues must be solved for good efficiency. There is little question that using an electronic health record will improve healthcare efficiency, but several reasons such as cost, time, training, fear, security and privacy, and a lack of standards are preventing healthcare practitioners from using electronic records. The results of this study may provide guidance to hospital administration, system designers, installers, users, and non-users on technological issues that should be addressed in order to improve the usage of medical devices.

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Waste Disposal Practices of Used Face Masks among Students and Staff of Gretsa University in Kiambu County, Kenya

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Abstract

Facemask usage is one of the preventive measures encouraged worldwide to limit the transmission of the SARS-Cov-2 pandemic. Hence, the production and mass use of facemasks are rising due to the pandemic and government rules that mandate citizens to wear facemasks. However, the improper disposal of facemasks has been polluting the environment with enormous hazardous waste. As health professionals and the government encourage people to use facemasks, it is also critical to provide information on how to dispose of them, as improperly disposed of facemasks properly can spread the infection. Violations of health standards when it comes to disposing of used masks underline the importance of this. The scope of the threat is expanding as potentially COVID-19-infected masks can be sighted in public and open settings. This research aimed to assess the waste disposal practices of used masks among students and staff of GRETSA University in Kiambu County, Kenya.

The objectives were to determine the individual daily facemask usage, establish the knowledge and determine waste disposal practices for used masks within GRETSA University. A cross-sectional analytical survey design was adopted involving mixed methods of data collection. The study adopted stratified random sampling techniques to select 165 from the 1652 students and staff of GRETSA University. Observation and questionnaires were used to collect data. Quantitative data were analysed using SPSS software, while qualitative data was analysed via synthesizing the facts from numerous sources into a coherent description of what was found or otherwise observed. From the findings, the knowledge scores on used mask disposal practices indicated that most participants had medium knowledge (60.46%). However, this knowledge did not translate into practice because most respondents (74.42%) disposed of their used masks in non-designated bins. The research concluded that problems of improper used masks disposal need to be tackled at the individual level. This will require individuals to develop positive attitudes, which will increase their environmental consciousness and further guide them to adopt proper disposal practices. Based on the findings of this study, it does not require being an environmental health expert or possessing special knowledge to keep our surroundings clean and appealing. All we need is to be responsible individuals in our routine daily activities.

Keywords: Human Coronavirus (SARS-CoV-2), Coronavirus Disease of 2019 (COVID-19), Face masks, Personal Protective Equipment (PPE), Pandemic.

1. Introduction

On March 13, 2020, Kenya encountered its first official case of COVID-19 (coronavirus disease 2019). This novel coronavirus, referred to as SARS-COV 2, originated in Wuhan, China, in December 2019. Within a short time, thousands of cases were diagnosed worldwide and in Kenya, causing the World Health Organization to declare it a pandemic on January 30, 2020. The Disease is far more than a worldwide health emergency but has resulted in a significant impact on our society and economies, as well as our daily lives. The number of casualties is fast increasing worldwide (WHO, 2020). Several health professional research institutions have recommended personal protective equipment, such as surgical or medical masks, non-medical facemasks, face shields, aprons, and gloves. Governments all over the world are grappling with a scenario unlike any other in human history. There has been an increase in uncertainty and concern for public health worldwide as countries implement specific measures to control the spread of the Disease. Health authority regulations have become essential instructions by imposing numerous restrictions on our daily activities. In many countries around the world, personal protective equipment (PPE), particularly face-covering masks and gloves, has been made mandatory while in public (Aragaw TA, 2020)

As of June 10, 2020, more than 3,000 COVID-19 cases had been reported in Kenya. Several steps to contain the virus has been put in place, including imposing a nationwide curfew, isolating the Nairobi Metropolitan Area and three coastal counties, enacting various hygiene measures, such as requiring public mask wear and establishing government quarantine sites. Since March 2020, the 'new normal' has been in effect and facemasks are required to be worn in public places; thus, it should be our obligation to dispose of them safely and appropriately. Unless we do so, we shall continue to be in danger of losing our lives. In Nairobi, the order to "wear a face mask in public areas" seemed to be working. This is for various reasons; the police and other law enforcement agencies have been monitoring its implementation. The fear of being detained or penalized may have been the primary motivator. Another reason is the masks' ease of use and low cost. A disposable surgical facemask costs only Ksh 10 in pharmacies. Another cause could be the significant effort made by healthcare experts and public awareness initiatives to raise awareness about the need to wear facemasks. Because it is difficult to follow the rule of physical distance in busy places like Nairobi, widespread use of this basic preventive strategy is even more crucial. This is particularly true in public locations such as markets, bus and taxi stops, and places of worship. Hand hygiene is particularly challenging in the city due to the frequent water outages. At every level of society and throughout economic sectors, the pandemic is providing significant obstacles.

Despite occasional claims to the contrary, there is never a simple trade-off between health care and economic concerns. Instead, there are varieties of worthwhile activities available across the healthcare and economic spectrums. Unlike earthquakes or tropical storms, the COVID-19 pandemic will not pass in a matter of hours or days. It will be with us for at least another year and possibly several more. Other localized natural disasters are almost certain to occur during the pandemic, further complicating waste management concerns. As a result, in addition to resolving immediate problems, there is the potential to improve waste management systems and build a better future in the long run based on today's lessons. COVID-19 waste adds to the already restricted waste management capacity in developing countries, necessitating careful consideration and operation. As a result, developing countries and cities are fighting COVID-19 while also preventing environmental and

human health threats, including those posed by COVID-19-related garbage, including those posed to waste employees. This is a major environmental concern because of the surge in demand for plastic products, protective gear, personal protective equipment (PPE), disposable life support equipment, and general plastic supplies like syringes; all used to prevent and treat the virus. The urgency of this comes in people's violations of rules when disposing of masks they use. It has now become common to see used facemasks scattered on sidewalks and in parking lots. Surgical masks are mainly polypropylene, thus turning them into a source of fossil plastic and microplastic pollution. However, the current generation of facemask wastes and the implications of solid waste management to prevent marine pollution remain unknown (Battegazzore D., Cravero F., Frache A., 2020)

2. Literature Review

Since the contagious COVID-19 pandemic outbreak, the usage of facemasks has been an essential safety measure to protect the public and health workers from viral infection. Face mask absorbs droplets released from the wearer and at the same time protects the wearer from inhaling pathogens in the air (Adanur and Jayswal, 2020; Chellamani et al., 2013; Colomer et al., 2021; Li et al., 2006; Metwaly et al., 2013).

Due to the COVID-19 pandemic, many countries have enforced laws that mandate citizens to wear facemasks in public places. As a result, the use and production of disposable facemasks have skyrocketed since the disease outbreak. For instance, before the pandemic, the global market value of face masks was $737 million in 2019 and it is projected to reach $22,143 million at the close of 2021 (Markets and Markets, 2020).

For instance, Ammendolia et al. (2021) surveyed to quantify the types of COVID-19 related PPE debris in Toronto, Canada. The finding showed that 1306 PPE debris were found in the surveyed areas were face masks and constituted 31%. Similarly, a study on Chile's leading tourist beaches determined an average of 0.006 facemasks per square meter (Thiel et al., 2021). Moreover, the density of facemask litter was significantly affected by the activities of the beach in Lima, Peru, where recreational beaches were found to be the most polluted (De-la-Torre et al., 2021). However, banning single-use products significantly reduced the amount of litter on beaches (Okuku et al., 2021).

Apart from the visual aesthetic damage to the streets, facemasks could carry traces of pathogens that could pose a potential risk to human health. For instance, SARS-Cov-22 can remain infectious for a week in the outer layer of a facemask, thereby constituting a potential threat to the occupational safety of solid waste workers (Chin et al., 2020). Another concern is that littered face masks can be transported farther by drainage systems and wind up in the marine environment (Fadare and Okoffo, 2020).

COVID-19 is a respiratory disease caused by the SARS-CoV-2 virus. According to the WHO, as of March 5, 2021, 116,614,624 cases of COVID-19 had been confirmed worldwide (3,971,496 confirmed in Africa). Information suggests that the two main routes of transmission of the COVID-19 virus are respiratory droplets and contact. COVID-19 has an incubation period of 2 to 14 days during which all infected patients, asymptomatic or with mild symptoms, transmit the disease to a non-infected person and this poses a challenge for early isolation and containment of community transmission. (WHO, 2020)

The pandemic has sparked a great demand for single-use plastic products (Alfonso et al., 2021). Among these, the use of personal protective equipment, such as facemasks, face shields, and gloves has increased as an efficient way to prevent the transmission of the virus (De-la-Torre et al., 2021b). Silva et al. (2020) argue that the pandemic has compromised the legislative progress against single-use plastics while recycling programs have stopped due to the risk of transmission (Zambrano-Monserrate et al., 2020).

The working mechanism of facemasks can be summarized into an electrostatic attraction or physical sieving. In electrostatic attraction, filters are made of charged materials that attract and retain oppositely charged particles. At the same time, physical sieving is divided into an interception, inertial impaction, and diffusion mechanisms, where the blocked particles are >600 nm, 300–600 nm, and <300 nm in diameter depending on their pore size, respectively (Tebyetekerwa et al., 2020).

3. Study Objectives

3.1 Main Objective

To determine disposal practices of used facemasks among students and staff of GRETSA University, Thika

3.2 Specific Objectives

1. To ascertain the knowledge on used Face Masks Disposal among students and staff of GRETSA University, Thika
2. To determine the approximate individual daily face mask usage among students and staff of GRETSA University, Thika
3. To determine the different types of face masks in use among students and staff of Gretsa University, Thika
4. To determine disposal practices of used face masks among students and staff of GRETSA University, Thika

4. Research Methodology

4.1 Research Design

The study adopted a cross-sectional analytical survey and utilized qualitative and quantitative research methodologies. The descriptive survey is significant because it describes the status quo while using the qualitative data to provide an explanatory dimension without manipulation of variables or influencing events to happen in any way (Bryman, 2015).

4.2 Target Population and Location of study

The study was conducted within GRETSA University, located in the outskirts of Thika town within Makongeni Location in Thika West Sub County. The study population constituted students and staff of GRETSA University. The total population is approximately 1,652 students (University Billing Department).

4.3 Sample Size and Sampling Techniques

To get a proportionate representation of the targeted respondents, this study adopted stratified random sampling techniques to select 165 respondents from the 1,652 students and staff population of GRETSA University. The study population was stratified into two strata composed of students and staff, and then a proportionate random sample was picked, consisting of 12 staff and 153 students. A sample size of 165 respondents was used, which is 10% of the total population. This is in line with Mugenda and Mugenda, 2003 who argue that a sample size of 10%-50% is acceptable for descriptive research.

4.4 Data Collection and processing

The study approach was twofold: one was visual observation and the second was a questionnaire to collect both quantitative and qualitative data. The visual observation was carried out from mid-January to February 2021 for a total of 42 days. The duration of the observation was between 9:00–12:00 a.m. and 7:00–9:00 p.m. GMT + 7. The time range was selected because it represents a day's worth of litter post morning and pre-evening, starting at 10:00 p.m. During the observation, the area characteristics and geotagged photos were recorded for each littered facemask.

This study used questionnaires to gather information on the used facemask disposal—additionally, the researcher conducted in situ qualitative observations of discarded facemasks within GRETSA University.

4.5 Data Analysis

The research findings were cleaned, edited and interpreted quantitatively and qualitatively per the nature of the data collected. In the qualitative method, data was organized, summarized, and explained thematically to compare and analyze attributes (Corbin, 2014).

5. Results and Discussions

5.1 Knowledge on used masks disposal

Knowledge on used masks disposal practices was measured using the following indicators: the importance of using mask disposal, which should bear greater responsibility for used mask disposal and where used mask should be disposed of. From the findings, 88.37% of the respondents believed that using mask disposal is important, 2.33% felt it is unimportant, and 4% were unsure. The majority of the respondents (51.16%) felt that the greatest responsibility in used mask disposal should be on the university; 18.61% felt it should be on the local authority. In comparison, 30.23% felt it should be individual responsibility.

Table 1 Knowledge on Household Solid Waste Management Practices

Knowledge on Household Solid Waste Management Practices(N=165)		
Knowledge Indicators	Frequency	Percentage
Whether used mask disposal is important		
Yes	146	88.37
No	4	2.33
Not sure	15	9.30

Who should bear greater responsibility for used mask disposal		
University	84	51.16
Local Government	31	18.61
Individuals	50	30.23
Where used mask should be disposed		
Separate Labeled Container	73	44.19
Same Container as Other Waste	50	30.23
Not Sure	42	25.58
Notes: N= Number of participants		

5.2 Knowledge Scores

A numeric scoring pattern was used to assess participants' knowledge, and outcome variables were computed. These outcome variables were further categorized as high, medium and low. The knowledge scores on used mask disposal practices indicated that most participants (60.46%) had medium knowledge, 23.26% had high knowledge, and 16.28% had insufficient knowledge. This is in line with a study carried out in Nigeria, which showed that respondents in the major urban markets of Owerri in Nigeria were aware of the health risks associated with poor waste management (ezedike et al., 2020). Even though respondents were knowledgeable about waste management, this knowledge did not translate into practice because most respondents (74.42%) disposed of their used masks in non-designated bins. There was evidence from direct observation that used masks were disposed of anywhere and exposed to health dangers. The cases were rampant in the cafeteria, toilets, library, playing grounds, and resting gazebos. People are continually adopting and modifying attitudes to fit the ever-changing needs and interests. Attitude may not be changed by simple education, but improved behaviours and practices depend on many social and psychological factors. Despite millions of people being told to use facemasks, little guidance has been given on disposing of or recycling them safely. In addition, as countries begin to lift lockdown restrictions, billions of masks will be needed each month globally. Without better disposal practices, an environmental disaster is looming (wegedie, 2018)

Table 2 Knowledge Score (N=165)

Correct Response	Knowledge Score	Frequency	Percentage
0-1	Low	27	16.28
2	Medium	100	60.46
3	High	38	23.26

Notes: N= Number of participants

5.3 Types of Face Masks in Use

The finding indicated that 77.58% of the respondents used single-use masks while 22.42% used reusable masks. The high number of single-use facemasks increases the waste available for disposal. However, it was also noted that even those who used the single-use masks reused them or used them for long hours than recommended and sometimes did not wear them appropriately. Wearing facemasks for a prolonged time causes physical adverse effects such as headaches, difficulty breathing, acne, skin breakdown, rashes, and impaired cognition. It also interferes with vision, communication, thermal equilibrium and level of concentration. Face coverings worn by infected people have been shown to become highly contaminated with SARS-CoV-2 even over short periods (Williams et al.

2020), with the contamination likely increasing with the duration of timeworn. This would not pose a risk to the wearer, as they are already infected. When users adjust or handle their contaminated face covering and then touch other surfaces, there is a risk of contamination of frequently touched surfaces, potentially leading to transmission to others who then touch these surfaces. In some countries, it is advised to change your surgical mask every 4 hours. This maximum duration of 4 hours comes from a WHO report and a study on the tolerance time of the mask. In reality, the surgical mask can be worn longer. When the mask is no longer tolerated, there will be a tendency to touch it often with one's hands, which increases the risk of contact contamination and repositioning it on one's face, which increases the risk of inhaling viral particles. In addition, when the mask is wet, its electrostatic properties decrease; therefore, it retains fewer particles and its air permeability reduces; consequently, it is less "breathable." This is why it is then preferable to change the mask. It has been confirmed that patients with mild or no symptoms at the pre-symptomatic and early stages of infection can contribute to the spread of COVID-19. A facemask may help to reduce the spread of infection in the community by minimising the excretion of respiratory droplets from infected individuals. However, studies are still controversial on the type of mask used in this current COVID-19 pandemic (Moore K. Oregon, 2020)

Table 3 Types of Face Masks in Use (N=165)

Type of Mask	Frequency	Percentage
Single-use	128	77.58
Reusable	37	22.42

Notes: N= number of participants

5.4 Used Masks Disposal Practices

The finding indicated that the used mask disposal practices within GRETSA University were varied among respondents, with 16.28% disposing of the mask in any available waste bin, 53.49% using the general waste bins mixed with other waste, 25.58% using designated colour coded containers and the remaining 4.65% threw them anywhere. This indicated that the majority (74.42%) disposed of their used masks in non-designated bins. Many respondents were unsure how and where they should dispose of their used masks despite knowing they were potentially hazardous. This can be attributed to the information flow where much of the available information is emphasized on health effects and prevention of transmission of the pandemic disposing of used masks in general bins mixed with other waste exposed waste handlers to risk if these items are infected with COVID-19. These people work in unsafe conditions and lack adequate Personal protective equipment to handle such waste. The procedure of collecting, transporting and sorting this waste remains a significant challenge; thus, changing public behaviour towards the use and the management of used mask waste and installing efficient and functional waste management facilities will help to reduce the trash during the pandemic and afterward (De-la-Torre G.E., Aragaw T.A.,2020.

Table 4 Used Masks Disposal Practices (N=165)

Disposal Point	Frequency	Percentage
General Waste Bin	88	53.49
Colour Coded Bin	42	25.58
Any Available Waste Bin	27	16.28
Anywhere	8	4.65

Notes: N= number of participants

5.5 Daily Individual Face Mask Usage

The findings indicated that 90.01% of the respondents used one mask in a day, 7.05% used two, while 2.94% used more than two masks in a day. According to an observation made for ten days at the main university gate, this study estimated the number of facemasks in a day to be around 1,702. The distribution was 1,552 for students, 100 for staff, and 50 for visitors. It was found that the quantity of daily facemask usage depends on the number of people within the institution at a particular time. Considering that an ordinary surgical mask weighs 5g on average, this number of facemasks translates into roughly 8.51kg daily waste. Using masks at this pace with the absence of adequate management approaches, strategies and public policies of such waste would drastically increase the quantity of discarded masks that could litter the gutters and cause blockages of waterways, as well as the transmission of infections (Mitze T, Kosfeld R, Rode J, Wälde K, 2020).

Individual Daily Mask Usage	Frequency	Percentage (%)
One	148	90.01
Two	12	7.05
More than Two	5	2.94
Notes: N= Number of participants		

Quantity of used masks waste produced in a day (N=1702)

Producer	Frequency	Percentage (%)
Students	1,532	90.01
Staff	120	7.05
Visitors	50	2.94
Notes: N= Number of participants		

6. Conclusions and Recommendations

The problems of improper used masks disposal need to be tackled at the individual level. This will require individuals to develop positive attitudes, which will increase their environmental consciousness and further guide them to adopt proper disposal practices. Although this research relied on GRETSA University in Thika data, its conclusions tend to be broader application. This is because, despite the specifics of the undeniable context of learning institutions, they broadly exhibit similar characteristics, which can form the basis for adaptation of the findings of this research.

As depicted by the results, it can be concluded that even though respondents knew health risks associated with improper used masks disposal, this knowledge did not translate into practice because there was evidence from direct field observation that their disposal practices were wanting and exposed them to health dangers.

Waste disposal Practices varied among respondents, with 16.28% disposing of the used mask in any available waste bin, 34.88% using the general waste bins mixed with other waste, 44.19% using designated color-coded bins and the remaining 4.65% threw them anywhere

Recommendations

Based on the findings of this study, it does not require being an environmental health expert or possessing special knowledge to keep our surroundings clean and appealing. All we need is to be responsible individuals in our routine daily activities and adhere to the following;

i. Facemasks are treated as a potentially contaminated material; thus, specific disposal recommendations are given by the government or health organizations, such as sealing used facemasks in plastic bags. These rules are no exception for learning institutions and should be supplemented with enforcement and close monitoring of individuals' practices.
ii. The need for more colour-coded rubbish bins to enhance waste segregation at the source and makes it easier for staff and students to put waste items into the correct container and maintain sorting of the wastes during transport, storage and disposal. Awareness campaigns and laws will go unheeded if the necessary infrastructure are not available.
iii. Advocating for the adoption of the use of reusable facemasks to reduce the number of contaminated facemasks.
iv. There is a need for an awareness campaign to raise students and staff 's knowledge on safe practice and disposal of facemasks.
v. The university can design and encourage cloth masks used with matching official university.

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