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3RD

INTERNATIONAL
MULTIDISCIPLINARY
RESEARCH
CONFERENCE

*Theme: “Transforming Society and Organizations
Through Research and Innovation”*

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A group photo of participants at the Gretsá University
3rd International Multidisciplinary Research Conference

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December, 2019

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KEYNOTE SPEAKERS

Mr. Bernard Njoroge: Managing Director, Sky Foods Ltd

Prof. Kennedy Mutundu: Dean, School of Social Sciences, Mount Kenya University

MODERATORS

CLUSTER 1

Sub-Theme 1: Computing and Informatics

Sub-Theme 2: Library and Information Science

Dr. Margaret Gikenye: University of Nairobi

Dr. Stephen Njenga: Murang'a University of Technology

CLUSTER 2

Sub-Theme 3: Hospitality and Tourism Management

Sub-Theme 4: Business

Prof. Francis N. Kibera: University of Nairobi

Dr. Jonathan Mulwa: Rongo University

Dr. Ray Mutinda: Mount Kenya University

Prof. J. Kuria Thuo: Gretsia University

CLUSTER 3

Sub-Theme 5: Education

Sub-Theme 6: Community Development

Sub-Theme 7: Communication

Sub-Theme 8: Health Sciences

Dr. Peter Mugo: Kenyatta University

Dr. Justus Osero: Kenyatta University

Prof. Peter L. Shalo: Masinde Muliro University of Science & Technology

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WELCOME REMARKS

Prof. J. Kuria Thuo

Vice Chancellor, Gretsä University

Prof. Thuo opened the conference by welcoming the University Council Members, Guest Speakers, Moderators and participants. He thanked them for honoring the invitation to attend and participate in the conference. He noted that the presentations lined up for the two days demonstrated the diversity of participants and noted that the conference provided an opportune moment for researchers, industry practitioners and academicians to share experiences and knowledge.

Prof. Francis N. Kibera

Chairman, Governing Council, Gretsä University

Prof. Kibera observed that it was not a mean achievement for the university to organize and host a successful international multidisciplinary research conference each year since hosting the first conference in 2017. Quoting Bernard Shaw “Progress is impossible without change and those who cannot change their minds cannot change anything”, Prof. Kibera noted that a university brings change through: teaching and training; research and consultancy as well as entrepreneurship.

Dr. Kibathi Mbugua

Chancellor, Gretsä University

Dr. Kibathi urged participants to use the knowledge and ideas gained at the conference to transform the society. Picking from Prof. Kibera’s remarks on change, Dr. Kibathi gave the analogy of Nokia phones: The Nokia phone had 50% global market share and was the most sought for phone worldwide by 1998. However, failure by Nokia to embrace change and move with technology had the firm completely relegated to a small time player in the global phone market in subsequent years. Dr. Kibathi urged participants to become change agents in the society.

KEYNOTE SPEECH 1

By Bernard Njoroge

Managing Director Sky Foods Ltd.

Speech Title: My Journey as an Entrepreneur and Contributions to Societal Development

Bernard Njoroge opened his speech by giving his life story of a simple village boy who rose to become a top manager and then owner of his own company. He has a Bachelor of Commerce degree from the University of Nairobi. He narrated how he left a one million salary job as a marketing manager in Delmonte overseeing operations in east Africa before walking away from the comfort of a regular income and dived into entrepreneurship armed only with faith and optimism. The risk paid off and he bought Treetop Juice trademark from Unilever in 2011 and launched the brand back into the Kenyan Market in 2015 noting Treetop juice was last sold in Kenya in 1995. However the journey to treetop wasn't easy as he had started and failed in several businesses before the Treetop breakthrough came. He had a stated a company called African Garden Limited which was processing cucumbers in 2004 and another company selling sun dried tomatoes which ended up draining his savings.

How did he raise capital to start Skyfood Limited which owns the famous treetop juice? He sourced startup capital from the Industrial and Commercial Development Cooperation (ICDC) and other partners. Today, Skyfood Limited has employed over 120 staff and has 48 product distributors with operations in Kenya, Tanzania, Uganda and Rwanda.

His advice to the conference participants was to remain optimistic, be disciplined, have faith and invest in their areas of specialization. He observed that there is no substitute to hard work and it is good to have a background and experience of the sector you wish to invest in to avoid pitfalls that are experienced by new entrepreneurs with no experience.

Questions from the participants

1. What keeps Mr. Njoroge humble despite of all his success?

***Answer:** My upbringing. I was raised up by an elderly father who gave me a lot of attention and invaluable advice.*

2. What are your plans in helping the less privileged in the society?

***Answer:** I have invested in educating the less fortunate in my society and my siblings. I also offer internships to new graduates to equip them with practical skills. My dream is employing 10,000 young people in my company.*

3. How do you balance between academics and business/ entrepreneurship
Answer: *First students should learn. Work for other people to learn. Build relationships and networks. Cultivate discipline*
4. What is the market share of Treetop in Kenya?
Answer: *6% share of the ready to drink juice in the Kenyan market*
5. What distinguishes your products from those of competitors?
Answer: *Taste and packaging.*
6. Why focus on juices only?
Answer: *I focused on what I knew best having worked for Delmonte for more than 10 years I knew the product as well as the market.*
7. How did you manage to save money as a young person?
Answer: *By being disciplined- I avoided alcohol, smoking and immorality and instead was intentional in what I wanted to achieve.*

KEYNOTE SPEECH 2

By Prof. Kennedy Mutundu

Dean School of Social Sciences, Mount Kenya University

Speech Title: Kenya Vision 2030 and Societal Development- The Role of Research

Development is the transformation of society through increase in various aspects across social, economic and environmental factors. Research on the other hand is a systematic process aimed at providing solutions to societal needs. Research leads to basic discovery and invention, and in turn to the creation of technology; technology leads to growth in the places that it is developed, and other places where it is transferred. Growth will be stimulated by new innovation. There is clear evidence that investment in research is correlated with economic growth. The Link between Research outputs and socio-economic development can be attributed to: Sale of patents and licensing of new products/services, the development of 'spin-off' industries and improvement of efficiency of existing firms. Investing in research may achieve returns of between 1% and 5% of total research investment.

The Kenya Vision 2030 aims to transform Kenya into a newly industrializing, middle-income country providing a high quality of life to all its citizens by 2030 in a clean and secure environment. For this enviable dream to be realised, crafters of Vision 2030 put a lot of emphasis on research, technology and innovation to drive economic growth and development. To achieve the vision with ease, we have limited options as a country as far as investing in research and development is concerned. The government needs to enhance investment in the sector by providing a framework to increase funding for research to 2 per cent of GDP.

With initiatives such as the one from Chuka University which is putting up Sh3 billion ultra-modern science and Technology Park to boost research and innovation, time is nigh for creative partnerships between universities, the government, and industry so as to increase investment in research for better economic returns. Vision 2030 was founded on the tenets that seek to address the challenges faced by Kenya and many other African countries. One of these challenges is inadequate investment in research, yet research is an excellent weapon for ground-breaking scientific and technological innovation. However innovation will only contribute to economic growth if the private sector has the 'absorptive capacity' to take up new systems, products and technologies. Ability to take up and use knowledge and technology is a better predictor of growth than the ability to generate new knowledge and technologies within a country.

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CLUSTER 1

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

Moderators:

1. **Dr. Margaret Gikenye:** University of Nairobi
2. **Dr. Stephen Njenga:** Murang'a University of Technology

Rapporteurs:

1. **Faith Too,** Gretsia University
2. **Vincent Mbandu,** Gretsia University
3. **Pascaline Ndila,** Gretsia University

Building for Purpose: A Critical Review of the Literature on Reconstructing Academic Library Space for the 21st Century Users

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Abstract

The primary purpose of an academic library is to support teaching, learning, research and innovation of the mother institution. Libraries serve diverse needs of diverse users, but they should ensure customer satisfaction by meeting users' inherent needs. Users should be provided with access to authoritative and trustworthy information with efficiency and convenience. What is of great concern is whether library "space" matters in the execution of such, and if yes, in what perspective. In Kenya, new trends are emerging in the physical designing of the libraries. Many academic institutions have developed skyscrapers to serve as libraries. These structures concentrate on the traditional set up of mass rows of shelves and desks which creates a warehouse environment that supports crowding of resources with no value being gained by the users. The 21st century users are digital and their main medium for information access is the screen. To serve the interest of these users, libraries need to deviate from concentrating on developing physical structures and make place for digital libraries, virtual libraries, hybrid libraries and library 2.0. This should be backed by technologies such as library apps and institutional repositories. Additionally, users should be supported with information and network literacy skills to enable them efficiently navigate the digital space and get value out of it. This paper is based on literature review, a content analysis of primary and secondary data, whose aim is to convince academic institutions to redirect their resources into developing digital spaces that will efficiently support research and innovation for the 21st century.

Key words: Library Space, 21st Century library users, Academic Libraries

1. Introduction

1.1 Overview

The most crucial component of a library is the user. Every effort put into place to develop the library is a waste if it is not meant for use (Majal, 2016). The 21st century has practically turned everything virtual, and library and the users have as well gone virtual. Access to information for the 21st century users is no longer restricted to visiting the library physically. In the traditional library set up, users are easily identifiable because they appear in the library physically. For the 21st century, users are being identified by ICT skills irrespective of age or physical challenges. According to Anyira (2011), the 21st Century users will need information for: Personal-self-development, Health, Government, How-to-do-it, and Work/ occupation/ career reasons.

Anyira (2011) further argues that, academic libraries need to move away from the concepts of understanding “where their users are” to “being useful to the users where they are”, so as to maintain their relevance with the 21st century generation. Libraries need to make their contents more visible in cyberspace and maintain simplicity to enhance ease of information access. The 21st century generation of library users are techno-savvy and not afraid of touching the button. Glass and screen are the main medium for content dissemination. Contents consumed by this generation are kinesthetic, visual, interactive and portable. The users are technologically infused and no longer need the print, as they are a click away from the information (Gardner& Eng, 2005). Users must therefore possess skill for the 21st century technologies for them to access the library resources.

Further, the 21st century users take more responsibility in locating and retrieving information resources more than it was done in traditional libraries (Majal, 2016). However, this generation is known to be the most info-illiterate generation. It lacks critical skills of analyzing and evaluating the sources of information. Whatever pops up on the screen first is taken to be the gospel truth.

1.2 Problem statement

In Kenya, many academic libraries have advanced their physical spaces. A considerable number of these libraries have developed skyscrapers and pride themselves on voluminous collections and high subscription to e-resources. However, despite the advancements, academic libraries are still grappling with low usage of both print and electronic resources. Students take the library as a place to avoid or at least pick what is needed for research and leave. This is an indication that there is something about user needs that is not being met. Libraries need to shift their gears and concentrate on what can capture the attention of 21st century users and efficiently provide them with valuable and accessible information. This review suggests how these spaces can be redesigned to attract and serve the information needs of the 21st century generation of users.

1.3 Focus of the study

The objective of the study was to highlight how academic libraries can sustainably reinvent their spaces to meet the needs of the 21st century generation of users. The paper focused on:

- a) Identifying information seeking and utilization behaviors for the 21st century generation of users;
- b) Establishing how libraries can leverage on technology to meet the needs of 21st century users.

2. Methodology

This research paper uses content analysis of primary and secondary data. The paper provides a critical review of literature on library space. Sources used include peer reviewed literature sources and grey literature sources. Proper evaluation of sources was done based on authority, and objectivity of information before being used for literature review.

3. Literature Review

This section reviews existing primary and secondary literature guided by the research objectives on information seeking behaviors of the 21st century generation of users and the library spaces.

3.1 Library Space

According to Seal, (2015), library space in the 20th century used to be designed by and for librarians. User needs, while recognized, often came second. Librarians thought that they knew what students and faculty needed and planned new libraries accordingly. User comfort was mentioned as an important design consideration, but it focused almost exclusively on the environment.

However, in the 21st century, libraries witnessed a major shift worldwide in terms of the relevance of space, how it is designed and utilized. Library buildings needed to accommodate change more readily than other types of academic buildings. Technology assisted in altering the library which later greatly influenced library space planning. The most striking change in the character of the library space has been as a result of computer systems, the internet, the World Wide Web, the personal computer, the laptop computer, email, social media, mobile devices, and cloud computing (Seal, 2005).

A small number of librarians dared to oppose the traditional conservative thinking about library space and use. They had the vision that access to computers and the internet was at the center of the library of the future. They began to systematically ask users what would bring them back to the library in order to avoid having a campus library as a place to stay away from. A new model was accepted and it was known as the information commons (IC). IC has four basic features which are: technology in its many forms, spaces for group work, digital media & online collections, and, access to both librarians and technology experts (Seal, 2005). The author however, failed to show how new space models would be integrated into the traditional library set up and ensure change in library space is gradual and systematic.

Watson, (2017), argues that, Libraries have to ensure that the spaces are fit for purpose on the first day they open doors to the users. The space that academic libraries currently have was created for the needs of the older generations. For the modern users, libraries have to ensure that the space is linked to the activities of the learners. These users are not only information consumers but also information producers. Libraries should therefore, enable the modern users to produce and share information beyond the confinements of the buildings.

According to Watson, (2017), the space organization, the quality and the services provided within the space determines the experience of users in the library. An excellent experience results from well-designed space that fits and changes with expectation. However, the greatest challenge for libraries lies in shifting the focus of library space to the activities of the library users as producers and consumers of information. The creation of space is not merely balancing variety of spaces, but the interrelation and ability to flow from one space to another. Libraries should refrain from concentrating on comfort only, but consider being creative to avoid repeating what is already known by the users.

The strength of the research lies in the fact that, the researcher, (Watson, 2017), explored the new trends in the society, the learning, technology and experiences of 21st century users, aspects that would help in understanding and supporting development of university library space.

3.1.1 Information Commons as a Library Space

Forrest & Halbert (2009), describe Information Commons (IC) as an emerging library space that is designed to support social construction of knowledge. The space is often equipped with up-to-date technology and embodies new information resources, collaborative service programs, and redesigned staff and user spaces. In simple terms, it is a one-stop shopping experience for all types of information needs in the library.

According to Forrest & Halbert (2009), Students desire to be linked to the world around them via the internet, so as to have easy access to information, knowledge, friends and family, the university and its professors, and more. The IC facilitates this connectivity with computers and peripherals, campus networks and e-mail, high-speed internet access, and ever-present Wi-Fi.

The information commons have renewed the library, offering many benefits which attract the users. These advantages include, seamless and convenient access to information resources; hardware and software needed to do research, write papers, and undertake projects; a variety of spaces to accommodate differing learning styles and study habits; and the opportunity to interact with classmates, librarians, technology specialists and professors, all of whom contribute to the success of one's academic work. Information commons is a productive space for students (Forrest & Halbert, 2009).

The authors have further explored the development of information commons as a library space. According to Forrest & Halbert, 2009, the information commons model, first theorized, proposed, and implemented in the 1990s, has not remained constant. Like other aspects of the library profession, the academic library commons has been evolving. Old ideas have been updated and improved and new aspects of the model introduced. Much of the transformation has come from advances in technology. Technologies seen in today's information commons include, mobile docking stations/modules for individual and group work, video walls, touch screen computers and signage, 3-D printers, circulating iPads and other tablets of all sizes, copier/scanner combinations, wireless printing, poster printers, charging stations or lockers, splitters for group listening, and green screens.

Happily today, after adopting IC, most academic libraries are warm, hospitable, and attractive places where students not only do serious work but go to be with their friends, write research papers, make a video presentation for class, do research in databases and electronic journals, prepare for a class group project or presentation, browse the Web and use social media, and attend an impromptu talk by a prominent faculty member. It is a space which attracts users because it has embraced technology (Seal, 2015).

3.2 Information Seeking Behaviors for the 21st Century Generation of Users

Tella (2016) defines information seeking behavior as the process in which individuals acquire, evaluate and use information. It involves an array of actions in which individuals indulge in the process of identifying, selecting and using information to solve information needs. For instance, some users will prefer either reading print resources, searching online, listening to audio recordings, watching videos etc.

Nicholas, et al (2009) conducted a study that aimed at establishing facts regarding the actual information seeking behaviors for the students found in digital scholarly environment. The results of these findings gave indications that both undergraduate and post graduate students relied on library links to access information sources, specifically information stored in online databases. The findings of the study supported the fact that use of library links which is facilitated by virtual libraries can be useful in supporting academic work for the students. However, this study primarily focused on students within a digital scholarly environment, and their behavior cannot be used to generalize on that of students in a traditional library set up.

Combes, B. A. (2012) carried out an investigation to establish the information seeking behaviors of the internet generation. The target population for this study was young people aged between 18-22 years old. The findings of the researcher supported the notion that the young people have the habit of seeking information through the use of technology. The use of internet and technology for information search and problem solving is determined by how they first interacted with the internet.

A study by Rowlands, et al (2008), investigated on the impacts of digital transition on the information seeking behavior for the Google generation. The report was meant to help libraries and information service providers to anticipate and react to the new behaviors effectively. According to the findings, the young people rely heavily on search engines, they view rather than reading information and do not possess critical and analytical skills of assessing the information that they consume. Although the young people demonstrate apparent ease with computers, the impact of it on information search and use has been overestimated. The research findings refuted the common suppositions that Google users are web-literate. These findings were eye openers for the librarians to venture into virtual space bearing in mind that these users need orientation on how to navigate the space.

3.3 Space Models That Libraries Can Adopt To Meet Information Needs of the 21st Century Generation of Users

Libraries can adopt several space models to serve the information needs of the 21st century generation of users. Four of such models are discussed in this section.

3.3.1 Library 2.0

Library 2.0 takes the tools of web 2.0 and moves them into a library setting with libraries that are user oriented to create a vital and evolving organization designed to meet the needs of the current

information culture. Library 2.0 has proved relevant to institutions offering off campus services to students. However, the technology can be leveraged to ensure maximum information provision to regular students. Library 2.0 provides students with customizable, personalized and collaborative library assistance that contributes to their success as students (Sodt & Summey, 2009).

Library 2.0 leverages on modern technology, to facilitate participatory and a user-focused services. It rides on the developments of web 2.0 technologies to offer library services. It is a socially rich, often egalitarian electronic space. This means users can create, consume and share information contents, an aspect that favors information use for 21st century generation of users (Maness, 2006).

The most essential part of library 2.0 is offering user-centered library services. It focuses on constant and purposeful change in the library services. The technology allows users to participate in creation of physical and virtual services that they desire. The aim is to reach to all users, whether physical or virtual and makes use of their input to improve library services. Library 2.0 is not achieved by only bringing in new digital services; old/traditional services can still be library 2.0 if they make use of web technologies to deliver services to the users (Casey & Savastinuk, 2006).

Library 2.0 depends heavily on technology. However, libraries that are affected by digital divide can still work towards library 2.0. The affected libraries need to identify physical activities that can serve clients better and bring on board new but fulfilling services, for instance, a discussion room. This can be achieved by surveying new and potential customers, getting feedback from the staff or borrowing from other libraries (Casey & Savastinuk, 2006).

Casey & Savastinuk (2006) further expresses that, Library 2.0 model seeks to harness customer's knowledge to supplement and improve library services. User comments, tags, and ratings, feed user-created content back into these web sites. Ultimately, this creates a more informative product for subsequent users. Library customers have favorite titles, authors, and genres. Allowing them to comment, write reviews, create their own tags and ratings, and share them with others through a more versatile OPAC interface will enhance the catalog. Library 2.0 relies heavily on technology and, the author has vividly explored various ways in which libraries affected by technology can tailor-make their services to make them library 2.0.

According to Maness, (2006), the librarian is not primary responsible for the creation of content in library 2.0 environment. The librarian acts as a facilitator or a provider of support. Users interact and create resources with one another and with the librarian. Librarians can leverage on 2.0 technologies, to send new notices to users, send instant communication of new items, services or new content in subscription.

Maness, (2006) further argues that, in library 2.0, the role of users and librarians are not clear as there is dynamism in content creation and consumption. The librarians must allow users to change the library. The changes include finding new ways of communicating, finding new ways of information seeking,

retrieval and utilization, and continually updating the services for the library community. The author highlighted numerous advantages associated with adoption of library 2.0 technologies. However, the author failed to highlight challenges experienced in the process. Challenges would help librarians wishing to adopt the library 2.0 model navigate through the entire process will limited hiccups.

Baro & Godfrey (2015) undertook a study on Web 2.0, Library 2.0, Librarian 2.0, and the challenges for African librarian. The aim of this study was to find out the extent to which African libraries are using web 2.0 tools to render library services and the challenges faced. According to Baro & Godfrey (2015), Library 2.0 in Africa is still at the embryonic stage. The author highlighted challenges experienced by university libraries in their pursuit to become library 2.0. They included; lack of skills, lack of supporting policies, power failures, lack of facilities and conservative attitude by librarians.

This was a systematic review which was well articulated. The author prior to pointing out the challenges of web 2.0 adoption highlighted the services in library that can be rendered through the use of web 2.0 tools. Such exploration would assist librarians in identifying how the aforementioned challenges affect the adoption of web 2.0 services in the library systems.

Baro et al (2013) did a comparative study on the usage of web 2.0 tools in South Africa and Nigeria. The purpose of the study was to compare extent to which university libraries in the two countries use web 2.0 tools. The findings showed that librarians in both countries use web 2.0 in libraries but the difference lies in the frequency of use. South African libraries used 2.0 technologies more compared to Nigeria. Challenges that were associated with low usage included; power failure, lack of facilities, lack of internet connectivity, and lack of skills.

In summary, Library 2.0 is a space that leverages on modern technology and thus improves the experience of the user. It supports information creation, use, and sharing by users for users. The greatest challenge associated with Library 2.0 is that it depends heavily on technology, and thus, its application is limited in libraries that have poor or no internet connectivity.

3.3.2 Mobile Library Apps

An app is mobile application or software that operates on mobile devices. There is basically an app to everything nowadays and the number of downloads app continues to grow on daily basis. Library apps have been developed to enable access to e-resources, podcasts, social networking sites, OPACS, information bulleting among many services in the library. (Mishra, et al 2017).

Other than the normal services in the library, advanced app have webcams that can allow users to check on congestions in the library, provide an interactive library map, Ask the librarian plug in and links to mobile enabled databases (Mishra, et al 2017). The apps have improved the experience of users in the library as they basically support search and retrieval of information for academic and personal use. They are becoming quite popular in library settings, and their support to information access cannot be ignored.

There are basically three categories of apps that libraries can adapt and use for their services which are: native apps, web apps and hybrid apps. Native apps are applications that have been developed for a specific operating system. Web apps are developed through HTML which makes them take the form of a website. Students can access the app content via the normal browsers. Contents on these apps can be accessed just as one would access the web pages. Hybrid apps are a cocktail of web and native apps. Libraries use these apps to express web contents in app forms. User can access existing library web contents in their mobile apps.

Apps are useful in libraries as users are able to access electronic resources, connect users with librarians and other users, reach out to more users, increase resource utilization, among other benefits which leads to better and stronger online communities for the students (Mishra, et al2017). This was a comprehensive study as it indicated the basic features of library app, the available apps for the library, and their advantages to both the libraries and users.

In his study about Library mobile applications in university libraries, Chang (2013) mentions that, the potential for mobile app in an academic library is great. At the palm of their hands, users can get information about their borrowing status, library news, and other location based services. University libraries would benefit if they understand and make use of the available technologies that enable users interact with library resources via mobile devices.

According to Chang, (2013), when university libraries are developing mobile app for their institutions, they should concentrate on services that can benefit offsite users such as OPACS, research guides, directional aids, etc. the applications should enable users access information and other materials published by the university on their mobile devices anywhere anytime. The author has acknowledged that, because of the nature of research methodology, the data might have introduced some inaccuracies.

Some libraries are loaning tablets for use within library premises for students without smartphones. Libraries now acquire tablets and smartphones for use in libraries. They are installed with mobile apps that support researching, reading, notes taking, creating multimedia, contents performing experiments, writing, presenting, and teaching. For users without smartphone devices, libraries loan tablets and smartphones to them to ensure that they are able to help engage students of all ages and abilities Hennig, (2014). There is therefore the need for librarians to become app literate so that they can provide continuous skills and training both in person and online.

Wong, (2012) carried out an investigation on the likelihood of users accessing library video via mobile app while the web counterpart was still available. The study was undertaken to inform the librarians before implementing the mobile library app. According to Wong (2012), Mobile apps are more responsive compared to websites as they provide a one click access to online contents, thus being highly preferred by the users. The app developers only need to ensure that the app stays longer in app store so that it can attract more users.

Wong, (2012) insisted that the use of mobile app for accessing networked information is the way to go. This is because researches have predicted that mobile access to networked information is likely to surpass desktop access. The researcher advises academic libraries to observe these trends and make wise decisions that will lead to efficient information access by library users. The strength of the research paper is that, the researcher has given practical information that can aid libraries in justifying, developing, and implementing mobile apps.

3.3.3 Hybrid Library

According to Verma, & Verma, (2014), Hybrid libraries develops both traditional and digital collections. In these forms of libraries users can easily navigate from print sources and access electronic sources. These libraries concentrate on converting traditional print sources into electronic formats to widen the access base. Hybrid libraries are the new trends in academic institutions because, with their existing services/ nature, they can easily provide both electronic and print forms of information sources. Digitizing print collection ensures that the 21st century generation can easily access their information via personal electronic devices. The major input requirements for digital libraries include; trained staff who can operate electronic machine and have the ability of serving vast digital information.

Rusbridge, (1998) denotes that hybrid libraries are meant to reflect the intermediary state of a library which is half digital and half print. Hybrid library uses the available technology to bring the best of a library from both print and e-resources.

Libraries believe that digitizing their library service is the right direction to steer. However, many libraries face budgetary constraints and low investments in library services. This impedes efficient implementation of highbrid libraries. The cost of running hybrid library is not uniform. Some libraries are affected by infrastructure while others by its human resource. To develop and implement a hybrid library; IT, personnel, infrastructure, and data costs must be catered for (Kollöffel, & Kaandorp, 2003).

3.3.4 Virtual Libraries

According to Verma, & Verma, (2014), the concept of virtual libraries has led to the replacement of traditional libraries and stands to be the most reachable source of information to modern library users. Virtual libraries operate by building a collection of links that are maintained, updated and managed as part of the normal services of virtual libraries. The links are not necessarily owned by virtual libraries, but they can be accessed via the same.

Operating virtual libraries means that users will access information that resides in electronic format without being constrained by physical boundaries. What is good with virtual libraries is that there is no restriction on the extent, contents, costs, or format of data. All this information will be accessible via internet (Verma, & Verma, 2014).

Verma, & Verma, (2014), conclude by noting that; this is the time for libraries to go virtual and develop their presence in the cyberspace so as to enhance and facilitate education. The virtual libraries are providing efficient alternatives of serving the new generation of users in an academic set up.

Koganuramath, (2007) in his study on the overview of virtual libraries implied that, the Virtual Libraries have provoked libraries, scholars, publishers and document delivery vendors to develop new partnerships that are working for the good of scholarly communication in both developed and developing countries.

For the virtual libraries to deliver successfully, maintaining human presence is critical. The librarians have to interact with their clients via telephone and email to ensure that the users maintain the utilization behaviors. Virtual libraries should in addition maintain steady round-the-clock presence for effectiveness. Activities have to be continuous such as evaluation of resources and inviting users to give feedback of services offered. Most importantly, virtual libraries need to put into considerations policies of content use and sharing. Users of virtual libraries need to be informed about policies and agreements to avoid violation of the same (Koganuramath, 2007).

Virtual libraries have the ability to provide users with information sources that are not available in physical libraries. They offer extraordinary access to sources provided by anybody and located everywhere in the world. Information found in virtual libraries is up to date and at the same time available information can be upgraded often and anytime compared to physical sources. They complement virtual learning environment as students on online and distance learning can utilize resources conveniently. Virtual libraries should remain a vision for all libraries of future. Koganuramath, M. (2007).

This was a theme paper and the author has exhaustively identified purpose and nature of virtual libraries. The author has also highlighted the inhibitors of successful implementation of virtual libraries. Mbambo, (1997) studied Virtual libraries in Africa. According to this author, virtual libraries offer a positive platform to which information resource centers can be developed. The needs for developing virtual libraries in Africa differ from one country to the other. Some countries are networked but have poor and high costs of internet. For virtual libraries to become a reality in Africa, solutions on technical, administrative and political problems must be found.

4. Conclusion

Redesigning the library space to suit the information needs of the 21st century generation of users should be a priority objective of every academic library. This ensures that the information consumed by this generation is authentic for research purposes. The 21st generation of users is fascinated by the kinesthetic, portable, and interactive. The traditional library space model does not accommodate this kind of information, and thus the need to adopt new models to accommodate the information needs of the 21st century generation of user. Suitable space models include, and are not limited to: virtual libraries, hybrid libraries, library 2.0, and mobile app libraries. Academic libraries can adopt any of such models that offer the least constraints for them. This will ensure the 21st century generation of users merit from the high-rate information acquired by the libraries.

5. Recommendations

- i) University Libraries should devote themselves to offering technological and Information literacy skills as that will enhance maximum utilization of information available in the virtual space.
- ii) University Libraries should invest heavily in current awareness to enable users become knowledgeable about the availability of information sources found in cyberspace and how to access that information.
- iii) University Libraries should Invest in technologies such as library apps, and virtual conferences, where users can access information resources without being constrained by physical space.

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Using SQL Joins to Enhance Matching of Records from Two or More Tables

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Abstract

An SQL join clause corresponding to a join operation in relational algebra tries to join one or more fields in a table. Joining fields between two or more tables by using matching fields to each other is known as JOIN. This article did performance comparison of where clauses join and join... on clause. JOIN ...ON; is used when column names are different. Every type of these join types has its own conditions, but the question is: If there is a query that meets and complies with the conditions of all of these types, which of them have better performance, or which of them is the fastest?. To answer the question the researcher prepared a simple query in MySQL to join Customers and Orders tables, the query written in two different means in order to be in line with the two kinds of SQL inner join, the main is by using JOIN ... ON, and the second by using WHERE Clause, each query executed 5 times and the execution time is recorded for each one, and the average time for each query is calculated. The researcher found that the average of JOIN ...ON is 0.0271s and the average of WHERE join is 0.0012s. The researcher concluded that these types of join can be arranged from fastest to slowest speed as follows: WHERE join, JOIN...ON.

Keywords— SQL, MySQL, Xamp, query, SQL join, inner join, join on, where clause join

1. Introduction

EQUIJOIN is mainly and widely used in combining tables in SQL as part of join known as INNER JOIN. This type of join combines two or more entities, displaying only the records that meet the condition set by the join. As specified by the SQL expression the inner join a result set for all the records in an entity that have matching records in the other entities. An intersection between table A and table B may be interpreted as a two-table equijoin as displayed in the Venn diagram as shown in figure 1 below.

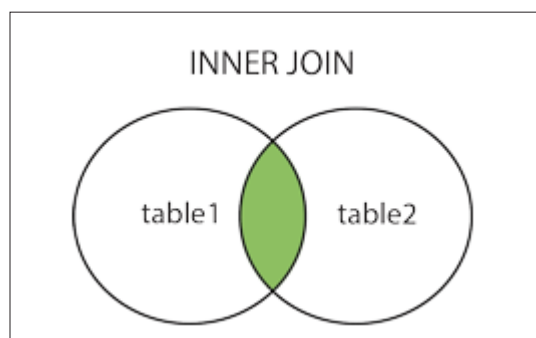


Figure 1: Intersection of two tables.

The different types of SQL joins is as shown in figure 2.

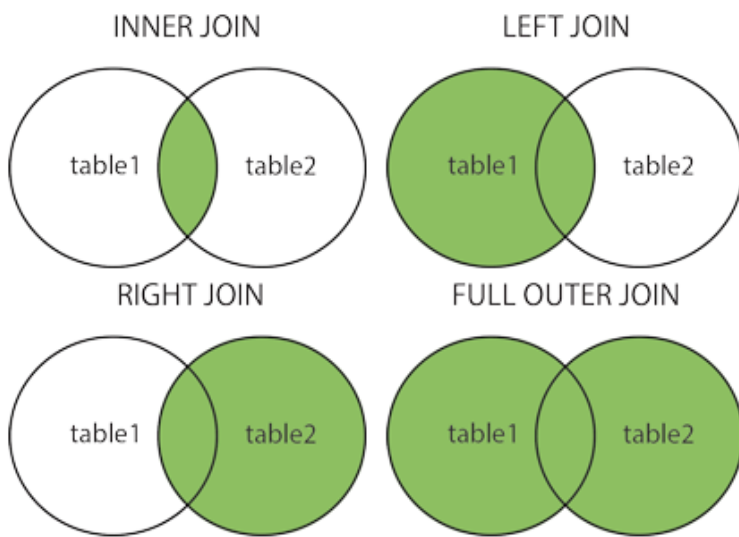


Figure 2.Types of SQL Joins

NATURAL JOIN, JOIN ... USING, JOIN ... ON, and WHERE clause join are the four types of inner join. The term inner can be used interchangeably with the word join; SQL/99 refers to the first three inner join types which are ANSI standard. Explicit or implicit join condition clause can be specified using inner join as follows:

i). Join By ON Clause

INNER JOIN ... ON; when the join columns have different names inner join is used with explicit join condition, its basic syntax as follows:

```
SELECT table1.column1, table2.column2...  
FROM table1  
INNER JOIN table2  
ON table1.field1 = table2.field2;
```

Example:

```
SELECT ID, NAME, AMOUNT FROM CUSTOMERS INNERJOIN ORDERS ON  
CUSTOMERS.ID=ORDERS.CUSTOMER_ID;
```

ii). WHERE Clause

You can use the explicit join condition to perform matching between two tables such as

```
"WHERE table1.column1 =table2.column2"
```

The syntax:

```
SELECT table1.column1, table2.column2...  
FROM table1, table2  
WHERE table1.field1 = table2.field2;
```

Example:

```
SELECT ID, NAME, AMOUNT FROM CUSTOMERS, ORDERS WHERE  
CUSTOMERS.ID=ORDERS.CUSTOMER_ID;
```

When executing an SQL query in MySQL, MySQL creates a query execution plan in order to retrieve records from entities. The set of steps on how the database will retrieve records from entities is known as the query execution plan. The requests processed may depend on how the query is organized which may have an impact on the cost and the time used to process those SQL requests. The most efficient way to retrieve data and get better output which is a better response on how to retrieve records usually depends on the query optimizer chosen.

In database SQL requests in terms of capability usually leads to a problem sooner or later. SQL requests that are huge and takes time to be executed usually use a lot of computer resources hence making the database server and application takes time to load, this may also lead to entities within the database locked and records being interrupted in the database. Due to these issues, optimizing SQL requests therefore becomes now an urgent task.

Most of the SQL requests are used in combining two tables; the matching process in database is used for data retrieval from multiple database entities which makes the records accessed to be consistent, complete, and integrated. The fact that there are many join types and the most commonly used in relational database is inner join, is significant for developers of database systems to put in mind different types of joins and understand which among these join can be used in order to produce good results and thus can be used to retrieve records from database using less resources and within minimal time.

2. A Review of Related Literature

A number of papers have been written concerning the concept of query performance including join tables and the types of join, and below are the papers the researchers have the privilege to look at:

- There are ten rules that every database developer and database administrator should adhere to while creating database and using SQL queries which was published in a research paper

written by Synametrics Technologies Inc. 2014. It also talks about some common mistakes developers typically make and how to avoid them. The publication also entails the mistakes commonly made by database developers and also the papers provides clear way of handling the mistakes.

- Hristo Kyurkchiev, Kalinka Kaloyanova 2014; developed a benchmark, which is subsequently used to measure some of DBMS's performance. Evaluating the results then decide about each DBMS's suitability and main advantages over the other.
- Ossama K. Muslih, Imad Hasan Saleh (2010); Tried to enhance the performance of the database by sending a well done, error-free and a professional SQL commands, They proposed a system that will try to find any SQL statement with join predicate and examine if the statement has non join predicate, the system will rewrite the statement and send a hint to database optimizer to start with non-join predicate.
- Dalia C. Kahane (2008); published a paper which demonstrates the need of being aware of one's records and the characteristics that highly exhibited in the entire datasets or distinctive in every dataset; and the steps of carefully executing the all commonly SQL join types.
- According to Ben Nadel (2006), putting 'criteria' in the ON clauses of a SQL statement creates a faster query when compared to the same SELECT statement if the same criteria were placed in the WHERE clause.
- Roger Schrag (2005) discussed the semi-join and the anti-join, two powerful SQL constructs Oracle offers for use in the quest for faster queries. In particular, he defined these two terms, discussed when and why you might want to use the [NOT] EXISTS or [NOT] IN constructs, and demonstrated how one can use optimizer hints and make minor query changes in order to enable Oracle to use some very powerful and efficient access paths.

3. Methodology

Performance Improvement means doing things faster. Performance is always and only about time. The query performance method is rooted in finding performance problems that can be seen by using statistics, so we have to collect some statistics about an important factor that affect the query performance that is the time response or the execution time of the query. To do that, a simple query prepared in MySQL to join Customers and Orders tables, the query is written in two ways to meet the two types of the inner join conditions in SQL, the first by using Join By ON Clause, the second by using WHERE Clause, each query executed 30 times and the response time of each query is recorded and the average time is calculated for each query.

These queries are as follows:

The first query:

```
SELECT ID, NAME, AMOUNT FROM CUSTOMERS INNERJOIN ORDERS ON  
CUSTOMERS.ID=ORDERS.CUSTOMER_ID;
```

The second query:

```
SELECT ID, NAME, AMOUNT FROM CUSTOMERS, ORDERS WHERE  
CUSTOMERS.ID=ORDERS.CUSTOMER_ID;
```

Every SQL request was processed 5 times and the processing time was recorded for every query and the processing time for every query was determined as in table 1 below:

Table 1: Time average of query execution in each type of join

Join Type	Join by on clause	Join by where clause
Time Average (Seconds)	0.0271	0.0012

3.1 Experimental Results

As table 1 and the histogram in figure 3 show that the average speed of JOIN by on clause, and WHERE clause Join is respectively: 0.0271 sec and 0.0012 sec., hence these types of inner join can be arranged from fastest to slowest speed as follows: WHERE clause Join and JOIN by on clause.

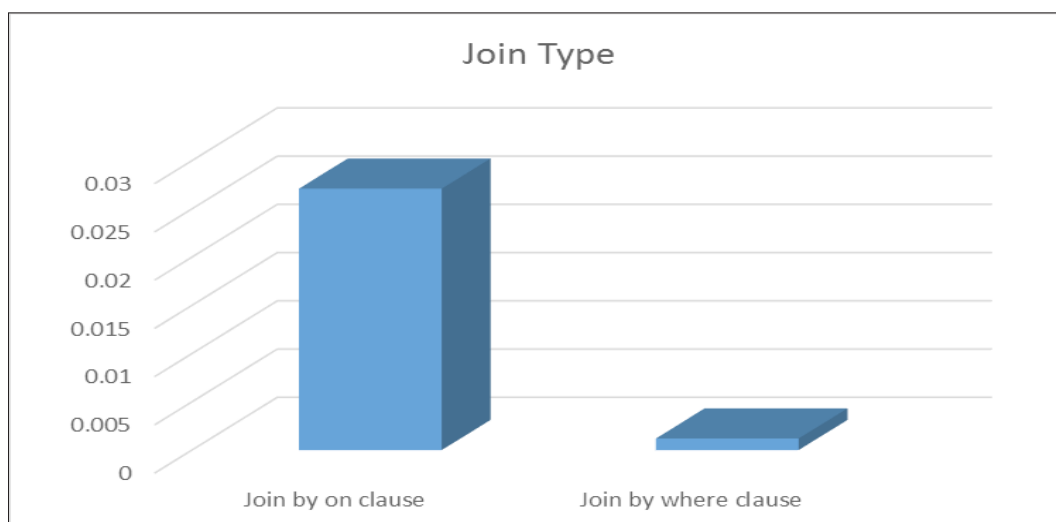


Figure 3: Join type and time average of execution

According to the result achieved we recommend SQL developers to adopt inner join types with explicit join conditions in their queries like using WHERE clause because this type of join compared to the other type has less execution time. The paper raised another issue for further work that is worthy of study, i.e. the issue is the exact reason that led to the differences in execution time (response time) between the inner join types.

4. Conclusion

This paper explained the concept of inner join and its types, explore the performance of each type of inner join, compared these types in term of speed. We conclude that these types of join can be arranged from fastest to lowest in relation to execution speed as follows WHERE clause Join then Join by on clause.

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Role of Information Literacy in Competency Based Curriculum in Kenya

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Abstract

The purpose of this study was to investigate the role of information literacy in Competency Based Curriculum in Kenya. Information literacy is a set of skills needed to find, retrieve, analyze, and use information. The CBC in Kenya identifies communication and collaboration, critical thinking and problem solving, imagination and creativity, citizenship, learning to learn, self-efficacy and digital literacy as the core competencies that learners will be required to attain at different points of their education. Learners cannot achieve the core competencies outlined in CBC without practicing information literacy skills. These skills help students to apply their knowledge from the familiar environment to the unfamiliar. However it remains unclear how learners will acquire these skills in CBC in Kenya since there is no framework for acquisition of information literacy skills and the Librarian/Information specialist factor seems to have been ignored. Traditionally, educators assumed that the students will gain information literacy skills automatically by themselves. But this is not so. Information literacy skills need to be inculcated among the students, by the teachers and librarians. The study recommends that: information literacy skills should be integrated into the fabric of Competency Based Curriculum for quality and effective implementation of the curriculum and academic librarians should be brought on-board in the implementation of Competency Based Curriculum. This can be done through establishment of a working relationship between teachers and librarians.

Key Words: Competency Based Curriculum in Kenya, Information Literacy Skills, Education in Kenya.

1. Introduction

Partner states in East African Community (EAC) in 2013, as part of EAC integration, agreed to carry out reforms in the education curriculum, and put in place a harmonized curriculum framework which is competency based in order to build a society that is knowledgeable in response to the noted challenge of providing quality education that meets the job market demands of 21st century (Ondimu 2013). Rwanda adopted CBC in 2015 due to her desire to build a knowledgeable society in order for her citizens to remain competitive in local and global market; while Tanzania adopted CBC back in 2005. The rest of EAC partners are in the process of developing CBC.

Curriculum is usually considered as the vehicle through which a country equips its citizens with the necessary knowledge, skills, attitudes, and values that empower them to be socially and economically independent, for personal and national development. Curriculum is therefore designed to meet the needs

of the individual citizens and the nation. All citizens in a country are stakeholders in education in different ways, either by being parents, learners, employers, teachers and siblings or relatives of learners. Curriculum change is, therefore, a high-stakes, technical, political, and sensitive issue (UNESCO 2019). This can explain why the announcements of curriculum change in Kenya from objectives-based curriculum to competency-based curriculum (CBC) by the cabinet secretary of education in late 2017 generated a lot of discussion among education scholars and the general public.

Competency-based curriculum refers to systems of instruction, assessment, grading, and academic reporting that are based on students demonstrating that they have learned the knowledge and skills they are expected to learn as they progress through their education. CBC emphasizes the importance of developing knowledge, skills and attitudes (competencies) and also applying those competencies to real life situations (Tilya & Mafumiko 2018). Muraraneza, Mtshali & Mukamana, (2017) defines competency as proven ability to apply skills, knowledge and personal abilities in different situations. Competencies are a collection of trainable skills, knowledge, abilities, behaviour, attitude, aptitude, confidence, experience, talent and proficiency (Tilya & Mafumiko 2018).

Developing a competency-based curriculum entails clearly identifying the competencies that learners will be required to attain at different points of their education. The CBC has come with new developments, for instance the teacher will now be more of a facilitator, focus is on developing competencies and how to apply them in real life, rather than acquisition of book knowledge for the sake of it. In addition, content delivery is now learner-centred as opposed to being teacher-centred.

The CBC aims at equipping learners with quality education. However to achieve the desired objectives of CBC it is critical for teachers to be conversant with the new teaching methodologies as well as equip learners with information literacy skills which will enable them become independent learners, since CBC is learner-centred as opposed to being teacher-centred. Teachers are the implementers of curriculum and therefore play a critical role in its success. A study by Kaviti (2018) on the implementation of CBC in Kenya found that although there remained a number of challenges on preparedness of teachers in readiness for implementation of CBC, the government of Kenya had made progress through piloting the new curriculum and conducting in-service training for teachers.

2. Problem statement

To achieve the objectives of CBC, which are Lifelong learning, Independent learning, Student centered, inquiry based, problem solving, and critical thinking, learners need to be equipped with information literacy skills. However it remains unclear how learners will acquire these skills in CBC in Kenya since there is no framework for acquisition of information literacy skills and the Librarian/Information specialist factor seems to have been ignored. Information literacy is at the core of competency based learning (CBL). It empowers learners to seek, evaluate, use and create information effectively to achieve their personal, social, occupational and educational goals.

One of the most important goals of CBC is to raise individuals who are able to enact lifelong learning independently in today's information society. To reach this goal, the indispensable mean is information literacy. Breivik (2014), notes that the skills of information literacy lay the foundations of lifelong learning while Smeaton, et al. (2016) notes that information literacy is the catalyst required to transform the learners of today into the learning society of tomorrow.

From the foregoing, it is clear that for learners to fully acquire the competencies outlined by CBC they need information literacy skills. This study therefore sought to establish the role of information literacy skills in CBC in Kenya.

3. Role of Information Literacy in Student-Centered Learning

Literacy basically means the ability to read and write. Technically there are different types of literacy such as computer literacy, fictional literacy, digital literacy, civic literacy and information literacy among others. Information literacy is a combination of all these concepts. According to the American Library Association (2000) "Information literacy is a set of abilities requiring individuals to 'recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information.'" We can therefore conclude that information literacy is the set of skills needed to find, retrieve, analyze, and use information.

In Student-Centered Learning, learners cannot achieve the core competencies without practicing information literacy skills (Ranaweera, 2019). In other words, information literacy skills empower the learners with the critical skills which will help them to become independent lifelong learners. These skills help students to apply their knowledge from the familiar environment to the unfamiliar. Due to information explosion it has become increasingly clear that students cannot learn everything they need to know within a few years, at school or the university. Information literacy equips them with the critical skills necessary to become independent lifelong learners.

Information literacy is critical in the contemporary society owing to the amount of information that is available. Simply being exposed to large amount of information does not make students informed citizens; they need to learn how to use this information effectively, ALA (2000). In fact, too much information can create a barrier towards learning (Solmaz, 2017). Students require information literacy to cope with the information explosion, by equipping them with the necessary skills to recognize when they need information, where to locate it, and how to use it effectively and efficiently. Consequently it will help decision making and productivity which is beneficial to the society.

Due to the information explosion, students and the society in general face many difficulties to locate, evaluate, use, and communicate information (Breivik 2014). Due to the expansion of internet services the society has access to a lot of information that is not evaluated, hence the authenticity, validity, and reliability of this information is in doubt. A student-centered, inquiry based and critical thinking proactive learning environment with the help of information literacy skills, will develop deep learners

in the society (Solmaz, 2017). Furthermore, information skills are vital to the success of students in education, occupation, and day to day communication of all citizens. In the 21st century, lifelong learning has become one of the main themes in education sector. Therefore the students need to be educated with regard to the abilities and skills of how to learn, or learning to learn, by developing the aspects of reasoning and critical thinking.

Information literacy skills will help students to achieve this goal in a broader sense, in student centered learning. Traditionally, educators assumed that the students will gain information literacy skills automatically by themselves. But this is not so. In fact, information literacy skills need to be inculcated among the students, by the teachers and librarians (Johnston, 2018).

4. Role of the Librarian

Librarians and teachers are key stakeholders in the successful implementation of student-centered learning. Librarians in collaboration with teachers can design an information literacy syllabus that will impact learners with information literacy skills. The experiences of librarians with information searching tools and evaluation criteria give them a context for equipping learners with information literacy skills (Johnston, 2018). Librarians also understand how to sequence information literacy learning activities to facilitate learning. Librarians in partnership with teachers can also help students to acquire other competencies listed under CBC such as critical and creative thinking as students learn to select information, evaluate ideas, process, experiences and objects in meaningful contexts they also develop the critical and creative thinking skills.

The CBC aims at graduating learners who are able to think rationally and logically. With the explosion of information in both print and electronic forms, and the increasing difficulty of getting meaning from this information, the role of the librarian becomes central. Librarians are skilled in accessing and evaluating information regardless of the format and in providing leadership in the appropriate use of information. There is a significant body of research (Tan et al 2017; Harada and Hughes-Hassell, 2008 and Johnston, 2018) that demonstrates that a qualified Librarian has a positive impact on school culture and student achievement. Several studies indicate teachers have collaborated more in schools when there is a Librarian. Previous research suggests that when teachers and librarians work together, students achieve higher levels of literacy, reading, learning, problem-solving skills and information and technology skills (Harada and Hughes-Hassell, 2008).

Teachers have to incorporate curriculum integration, resource-based learning, new evaluation practices and technology into their daily teaching. McLeod, (2015) notes that teachers cannot implement such changes without support. The most effective support comes through collaborative processes with other staff members who have knowledge, skills, and commitment to the development of independent, information-literate, lifelong learners. Librarians can contribute to this process by drawing on knowledge and skills gained in implementing library programs. They are in a good position to promote collaborative working relationships among staff, across the different grades and the curriculum (Johnston, & Green 2016).

Many teachers and administrators have yet to be convinced about the place of technology in today's classroom and the society in general. Librarians are ideally suited in helping them understand the role of technology in today's economy (Johnston, 2018). They have the training and the experience to introduce new materials and make teachers comfortable using them. Librarians recognize that information sources are rapidly changing from print resources to electronic resources and the library must assume a leadership role with the teaching of these new technologies. They recognize the important roles their positions and resource centres have in preparing students for information and technology.

5. The Information Literacy Role of the Librarian

Information literacy has a central role in the successful implementation of CBC and librarians recognize it as a natural progression in the understanding of student centered learning, research and information skills (Shahibi & Hakim, (2017). The modern day Librarian must not only be proficient with the wide range of information technologies available today, but they must still be able to work with teachers to instill information literacy skills in their students. Information literacy is the key to lifelong learning, (Baule, 1999 p.42). Information literacy is the ability to access and evaluate information that promotes both independent learning and social responsibility. Today's students must possess information skills or research and study skills that will lead to critical thinking, effective problem solving and decision making. Information literacy skills, when taught in isolation are of little value to learners. They must be integrated with specific subject being learned in which the teacher and the librarian are working partners. It is the role of the librarian to show students how to analyze information critically and use it wisely. Learners need to know how to plan, locate, and retrieve information (Kirkland & Koechlin, 2015).

Many students are familiar with electronic resources. The children are technologically literate from the manipulative point of view and technologically illiterate from the process point of view. They can print it, highlight it, clip it, and manipulate it. But have a challenge in the process of searching for it, evaluating it and making use of it to solve the problem at hand. (Farmer, 2015). Students therefore need to be taught to use both the physical resources and the electronic resources to find answers. They must also be taught when a book, a person or the Internet is the most appropriate source to seek information from. Teachers need also need to be sensitized about other possible assignments to give students to ensure that they are not merely copying and pasting assignments from the internet (McLeod, 2015).

6. Conclusion

The development of competency-based curriculum in Kenya is a key step towards addressing challenges the society is facing in the 21st century and build a knowledgeable society where citizens are able to remain competitive in local and global market. To reach this goal, the indispensable mean is information literacy. Information literacy skills need to be inculcated among the students, by the librarians in cooperation with teachers. Information literacy skills empower the learners with the critical skills which will help them to become independent lifelong learners.

7. Recommendations

- a) Information Literacy Skills should be integrated into the fabric of Competency Based Curriculum for quality and effective implementation of the curriculum.
- b) Academic Librarians should be brought on-board in the implementation of Competency Based Curriculum through establishment of a working relationship between teachers and Librarians.

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Challenges and Opportunities in Electronic Waste Management in Kenya

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Abstract

The rapid growth in ICT has led to an improvement in the capacity of computers but simultaneously to a decrease in the products' lifetime. As a result increasingly large quantities of waste electrical and electronic equipment (e-waste) are generated annually. This equipment contains toxic elements that once released to the environment are harmful to both human and wildlife. The objective of this paper is to study the challenges and opportunities in managing the electronic waste in Kenya. It is a review of selected publications in Kenya on electronic waste management in the last five years. The study has established the need for a revamped public awareness to the dangers of poor disposal of e-waste and the need for a legal framework that will help in the management of waste electronic products.

Keywords: End-of-Life (EoL), Waste Electrical and Electronic Equipment (WEEE), E-waste

1. Introduction

According to European Directive 2002/96/EC, electronic waste is defined as “Waste electrical and electronic equipment, including all components, subassemblies and consumables which are part of the product at the time of discarding”.

E-waste is used as a generic term embracing all types of waste containing electrically powered components. E-Waste - or Waste Electrical and Electronic Equipment (WEEE) - is the term used to describe old, end-of-life (EoL) or discarded appliances using electricity. It includes computers, consumer electronics, fridges, Mobile phones, etc, which have been disposed of. E- Waste contains both valuable materials as well as hazardous materials which require special handling and recycling methods.

The growth in WEEE has brought a number of challenges including demanding effective management practices that are environmentally sound to reduce its negative impact on human health and environmental pollution.

According to a United Nations global report on e-waste, 44.7 million metric tonnes of discarded electronic components with battery and plug were generated in 2016, compared to 3.3 million metric tonnes in 2014, constituting an increase in 8% in two years. Only 20% of the 2016 e-waste was documented to have been recycled.

According to the report, experts expect e-waste to grow by 17% to around 52.2 metric tonnes by 2021. It is also noted that around 4% of 2016 e-waste ended up in landfills.

2. Category of Items Contributing the Most to E-Waste (IEEE)

SNO.	CATEGORY	DESCRIPTION
1.	Small equipment	Vacuum cleaners, microwaves, ventilation equipment, toasters, electric kettles, electric shavers, scales, calculators, radio sets, video cameras, electrical and electronic toys, small electrical and electronic tools, small medical devices, small monitoring and control instruments
2.	Large equipment	Washing machines, clothes dryers, dish-washing machines, electric stoves, large printing machines, copying equipment, photovoltaic panels
3.	Temperature exchange equipment	Refrigerators, freezers, air conditioners, heat pumps
4.	Small IT and telecommunication equipment	Mobile phones, global positioning systems (GPS), pocket calculators, routers, personal computers, printers, telephones
5.	Lamps	Fluorescent lamps, high intensity discharge lamps, LED lamps
6.	Screens	Televisions, monitors, laptops, notebooks, tablets

Source: UN report published in Science daily, 14/12/2017

3. E-Waste Type, Weight and Expected Lifespan

The following table shows the e-waste type, weight and expected Life span of some common electronic products.

Item	Mass of Item (kg)	Estimated life (years)
Personal Computer (PC) ^a	25	3
Fax machine ^b	3	5
High-fidelity system ^c	10	10
Cell phone ^c	0.1	2
Electronic games ^c	3	5
Photocopier ^b	60	8
Radio ^c	2	10
Television (TV) ^d	30	5
Video recorder/DVD Player ^c	5	5
Air-conditioner ^b	55	12
Dish washer ^c	50	10
Electric cooker ^c	60	10
Food mixer ^c	1	5
Freezer ^c	35	10
Hair-dryer ^c	1	10
Iron ^c	1	10
Kettle ^c	1	3
Microwave ^c	15	7
Refrigerator ^c	35	10
Telephone ^c	1	5
Toaster ^c	1	5
Tumble Dryer ^c	35	10
Vacuum cleaner ^c	10	10
Washing machine ^c	65	8

4. Dangerous Elements in E-Waste and their Use in Computers

SNO.	ELEMENT	USE IN A COMPUTER
1.	Lead	Manufacture of the electrical Circuits boards
2.	Cadmium	Chip resistors, semi-conductors, Cables etc.
3.	Chromium	Used to make the metal plates and the Computer casing
4.	Beryllium	Used in the Manufacture of Motherboards and Connectors
5.	Bromine	Used in the manufacture of Circuit boards and plastics
6.	Mercury	Used in the Manufacture of Screens
7.	Copper	Manufacture of the micro Chips
8.	Silver	Used in manufacture of Keyboards, batteries, calculators, Cameras, Soldering wire, DVDs and CDs etc.

5. The Challenge of Electronic Waste

Normally, people find it easy to get copper wires by burning the PVC coating off the wires. The burning releases dioxins. If dumped in a waste site, the following materials find themselves in food chains through soil, water or evaporating into the air: Lead, Cadmium, Mercury and Copper, According to Greenpeace, traces of flame retardants have been found in human breast milk, whales and polar bears.

6. Synthetic Musks

These are chemical fragrance substances that strongly disrupt the sex hormones. They get ingested through the skin, which absorbs them either when one uses perfume or aftershave.

Examples of these musk's include:

- Galaxolide (HHCB)
- Tonalide (AHTN)
- Musk Ambrette (MA)
- Musk Ketone (MK)
- Musk Tibetene (MT)
- Musk xylene (MX)
- Traseolide (ATII)
- Celestolide (ADBI)
- Phantolide (AHMI) and Cashmeran (DPMI).

7. Endocrine system

It is the collections of glands which produce hormones responsible for regulating metabolism, growth and development, tissue function, sexual function, mood reproduction, sleep among others things. When alkyl phenols accumulate in the environment, they have deleterious effects on endocrine functions, including feminization in some fish.

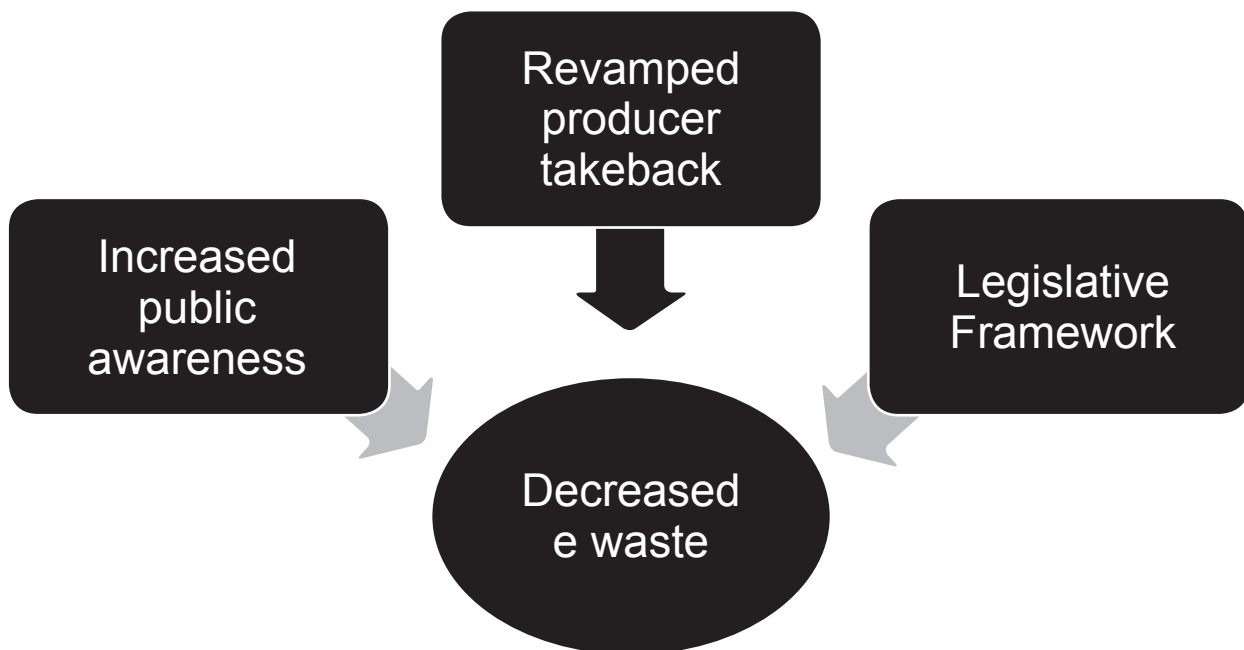
8. Effect of Metals on Humans and Wild Life

Metals in Computers	Effect to humans or wildlife
Copper	Long-term exposure to copper can cause irritation to the nose, mouth and eyes and provokes headaches, abdominal pain, dizziness, vomiting and diarrhoea. Intentionally high intakes of copper can cause damage to the liver and kidneys, and can even result in death. It is not yet clear whether copper is carcinogenic
Aluminum	Long term exposure may cause disorders in nervous system, temporary and permanent memory loss, shakiness, or lethargy.
Lead	Although lead limits chlorophyll synthesis in plants, they can tolerate a relatively high lead content in the soil of up to 500 ppm. At higher concentrations, plant growth is affected. Lead can end up in the food chain in this way, which is why it is prohibited in pesticides, among other products.
Phosphorus	Elevated phosphorus concentrations in surface water stimulate the growth of phosphate-dependent organisms such as algae and duckweed. These organisms use large amounts of oxygen and prevent sunlight reaching the water below. This means that other organisms cannot survive in the water, a process known as eutrophication
Silver	Soluble compound of Silver can lead Damage to kidneys, eyes, lungs, liver and brains, Heart rhythm disorders etc.
Cadmium	Toxic to the kidney, excessive exposures to airborne Cd may impair lung function and increase the risk of lung cancer. Neathery & Miller (1975)
Bromine	It has got adverse health effects in humans and wildlife. It irritates eyes and throat.
Beryllium	may cause breathing problems, fatigue, fever etc.
Tin	Eye and skin irritations, Headache ,Stomach ache Nausea and dizziness, Heavy sweating, Breathlessness Urination problems Long-term effects are: Depression, Liver damage, Damage to the immune system Chromosomal damage, Deficiency of red blood cells Brain damage
Mercury	Blurred vision, Fatigue, Deafness, Paralysis, Coma, Death

11. Some-waste recycling centers in Kenya

- Tranbiz waste solutions since 2005
- E-waste initiative kenya (ewik) since 2010
- WEEE center 2010

12. Conclusion



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A Systematic Review of Data Security and Patient Privacy Issues in Electronic Medical Records

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Abstract

Adoption of electronic medical records offers numerous benefits to health care services users as well as the health care providers. However, despite the many benefits, adoption of EMR has been relatively low due to the many unresolved security and privacy issues. Privacy and security of a large amount of sensitive and confidential health data that is stored in different forms at different locations has proven difficult to guarantee. This has also contributed to the low adoption of EMR, especially in the developing countries. This paper presents a systematic literature review to: (1) identify the privacy and security concerns in the adoption of EMR and (2) analyze the available measures to deal with the identified concerns. A total of two hundred and thirty papers were acquired for this purpose. After critical screening and studying of the papers, only 14 satisfied the criteria for review in this Paper. This review evaluates security and privacy issues and the available solutions. The review concludes that security and privacy concerns are not fully addressed. The study also revealed that there is adequate financial and technical support to address the issues of Electronic Medical Records. It is also apparent that the developing countries faced more challenges in adopting EMR due to lack of privacy and security policies, coupled with lack of background infrastructure.

Keywords: Electronic health record, privacy, security policy, confidentiality, systematic review.

1. Introduction

In the previous decades, information and communication technology has played a pivotal role in health care sector. The development and adoption of ICT has given rise to a concept referred to as e-health. E-health is the sharing and exchange of health related data electronically, or the improvement of the efficiency and effectiveness of the health care services delivery (Cashen, et al. 2004). E-health equips the users with tools and utilities to execute their duties electronically as opposed to the use of the conventional paper-based utilities.

Among the most crucial concepts of e-health are the electronic health records. This is a computerized medical information system that collects stores and display patient information and allows family doctors and other health care providers to chart patient health information using a computer. EHR contains individual patient medical data such as the patient medical history, treatment accorded, laboratory tests and ward booking among others (Terry, 2009). All this information is kept electronically in the hospital database. Electronic medical records have numerous benefits to the patient, the health care provider and the hospital. However, despite the numerous benefits the EHR has been faced by many issues, including

patient privacy and information security. The electronically managed data is prone to data malpractices such as hacking, abuse and misuse that greatly compromise the integrity, quality and availability of the data (Andriole, 2014). In fact, EHR provides a critical and sensitive environment for the health care services due to the large volume of sensitive patient health information housed in storage devices.

Adoption of technology in health care has the potential to ensure better coordination of health care, patient engagement and healthcare. Despite these benefits, it must be recognized that challenges that comes with this technology, particularly the security and privacy issues that comes with the technology which has led to fairly low adoption of by the health care services (Kelly and Rima, 2012).

This analyses security and privacy issues surrounding adoption of EHR by health care facilities and as well as the existing solution to the identified concerns. The paper employs a systematic literature review (SLR) technique.

2. Methods and Materials

The paper adopted the systematic literature review in order to reduce biases and uncertainty (Kitchenham and Charters, 2007). A search of peer reviewed and non-peer reviewed sources of relevant information was conducted. The peer reviewed literature search was conducted in PubMed, MEDLINE, Web of Science, Directory of Open Access Journals, and Google Scholar. The information obtained from the peer reviewed search was not sufficient. Therefore to ensure that all relevant information was acquired, a search was extended to non-peer reviewed sources including web-based portals for eHealth, profit and non-profit organizational websites, and blogs. The search was also extended to government documents and organizations reports such as those of WHO, among others. All the papers which were reviewed were source of relevant information relating to security and privacy concerns in Electronic Health Records which were published between the year 2008 and 2018.

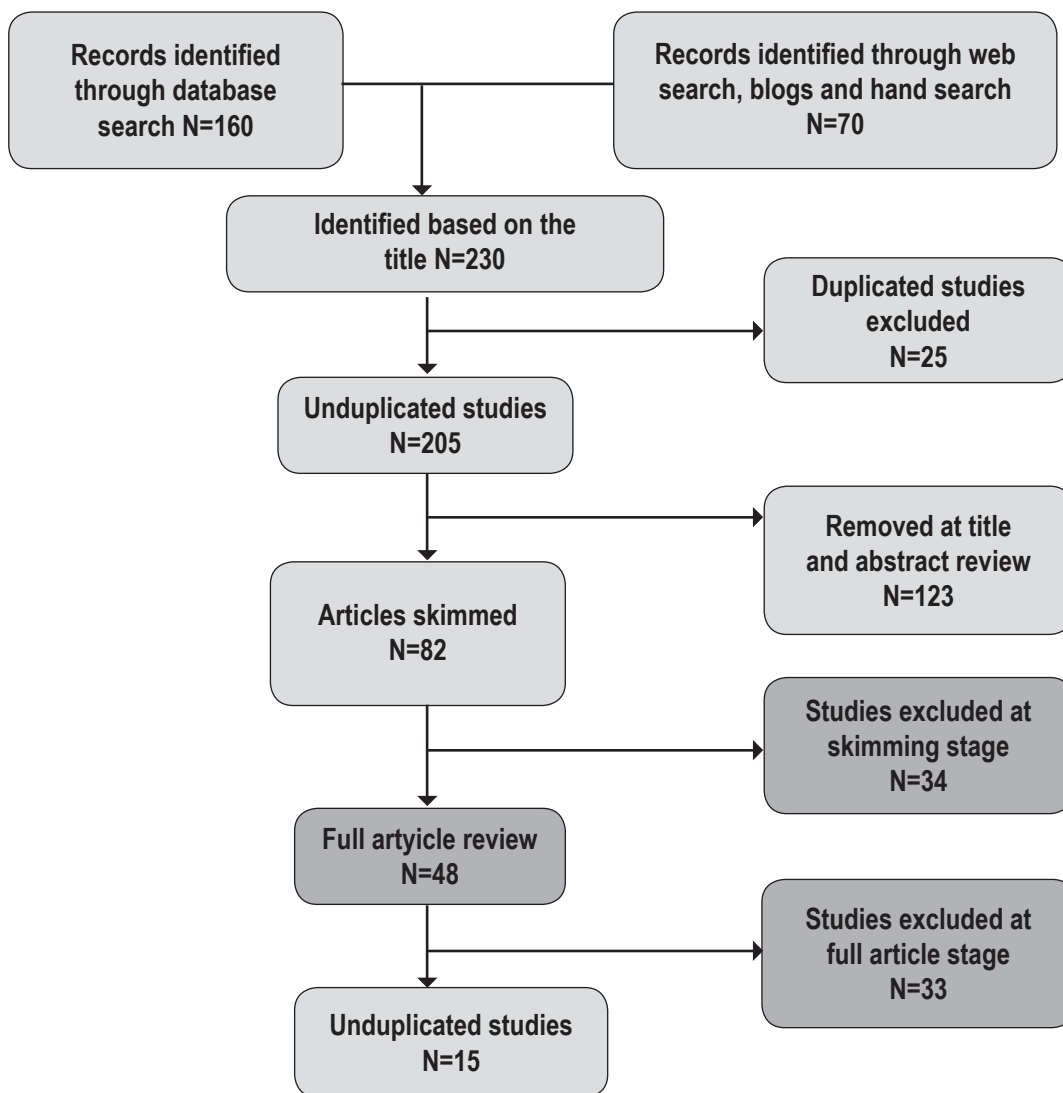
The inclusion criteria for the search included: (1) any proposed EHR security framework or security policy of EMR or the information systems security theories which are related to the EHR, (2) any available study that looks at privacy and security and challenges associated with the adoption of Electronic Medical Records, (3) any publication that presents experimental adoption of Electronic Health Records in developing countries, (4) any article that analyzes and present the success factors of the security policy to protect EHR, and (5) any article that focuses on the problem gap that regarding the security policy and privacy issues of Electronic Health Records. The exclusion criteria were: (1) studies focusing on e-health in general, (2) studies that were not published in English language, and (3) papers not specifically focusing on privacy and security policies of HER.

The first strategy was applied to all documents related to data security and privacy issues including electronic health records in peer reviewed sources. The search used key terminologies including: electronic health records, electronic health records security policy, privacy, systematic review, electronic

health records. Due low adoption of information and communication technology in health sector in the developing countries, the search was extended to the grey paper.

All this yielded a total of 230 papers on security and privacy in different databases. From these, 25 papers were found to be duplicates and were accordingly removed. Of the remaining 205 papers, 123 were excluded because they did not meet the selection criteria, based on the content of their titles and abstracts. Thorough examining the remaining 82 papers resulted in only 34 papers. Papers, that were not discussing effective security framework model and/or information security theory or/and factors which influence the security model of EMR and review papers were also eliminated. This left 15 papers which met the inclusion criteria.

The selection process is diagrammatically presented in the figure below:



3. Results

The review included the fifteen papers which were considered to be in line with the title of this study and crucial information that was extracted. Out of the 15 studies, 4 studies provided the security framework model to secure EHR, 5 studies focused on barriers and challenges to accept EHR in healthcare services and 3 focused on the success factors which enhance the success of EHR.

The first objective of the study was to identify privacy and security concerns in the adoption of EHR by health care institutions and health care services. From the finding health care facilities all over the world are in the implementation and adoption process of EHR in their hospitals and services. Among the pertinent challenge to the adoption of EHR is maintenance of patients' records and information security. This is a result of the huge amount of information related to the adoption of HER. Health care providers make medical decisions to render treatment to the patient based on the individual patient's health record. The patients have problem arising from the disclosure of their medical information, since EHR can be readily accessed by unauthorized people. Therefore privacy and policy issues of electronic medical records are important in ensuring acceptability of EHR in health care services.

The second objective was to analyze the measures available to deal with the numerous issues that were identified and presented under objective one. The studies provide privacy and security policies or techniques and security framework as a solution to protect electronic health records from hacking, misuse, and abuse. The solutions found were dependent on the existing infrastructure and technical issues of the healthcare organization in specific countries, but it is necessary to find some suitable solutions compatible with the requirements in developing countries.

From the findings it was clear that most of the developing countries venturing in electronic health records adoption do not seriously consider the security and privacy policy to ensure protection EHR. These countries also lack security awareness, security culture, lack of technical and infrastructure backgrounds, as well laws on ethics and rules to protect EMR and enhance privacy.

4. Discussion

The existing security and privacy solutions are not adequate to maintain the patient privacy in EHR and secure the information from unauthorized access. The available solutions boost the security but are not adequate to keep the privacy and security of EHR together. A majority of the suggested solutions show physical technical and security factors to protect EHR, and point out the barriers met in the adoption and implementation process. Some of the studies assert financial and technical support is not sufficient to overcome the challenges of addressing the security issues raised in implementation of EHR electronic medical records. To effectively offer security and privacy for EHR it is proposed to implement a security framework which encourages EHR security policies as an approach to protect patient information, and lay out strategies to secure the privacy of patients. The suggested solution is to amalgamate privacy concerns, security policies, and the factors that have effects on them.

The constant use of EHR has a remarkable influence on health facilities and electronic health worldwide. It was noted that there are antithetical allegations from health care providers on the adoption and use of electronic medical records. Some claim that EHR will promote efficiency in health care services; while others claim adoption of EHR will lead to exposure of the patient privacy, leading to breach of data security. Despite the claims, it is clear that most health care providers are agreeable to the adoption of EHR as a way of maintaining accessible health record. of The merits of leveraging EHR exceed the demerits. Therefore it is important to review the existing privacy and security policies in protecting EHR in health facilities. Health care workers should be willing to learn and adapt, (Ferreira, et al. 2007).

The security policy has some eminent and effective merits with regard to the availability and integrity of electronic medical records to the authorized users. Provision of security to a great extent will promote the quality of the services, ensure availability of data, keep data integrity and protect the data from abuse, misuse, and unauthorized modification.

Based on the review of the available studies and literature relating EHR, it is argued that in developing countries these are crucial for the successful implementation of electronic health records (Aldajan. 2012). Most of the studies concur that security and privacy of electronic medical records is the most striking barrier to the adoption of the EHR. It was also evident that most of the developing countries embark on adoption of electronic medical records without contemplation of how to deal with security and privacy issues which may arise. Therefore this review exposes the paucity of relevant studies to support the required guidelines for implementation and adoption of HER.

5. Conclusion and Recommendations

As much as the advantages and adoption of electronic medical records in health facilities outweigh the disadvantages, the rate of EHR adoption is reasonably low, which is associated with inadequate protection of patient privacy and information security.

This findings of study are crucial to the stakeholders in healthcare, since it underlines the challenges to adoption EHR. The review demonstrates that the much needed fiscal and technical support is by itself insufficient to ensure the privacy and security concerns of EHR. To overcome the challenges, it is proposed that some practical security framework solutions be considered in order to promote the security policy and privacy issue in EHR.

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CLUSTER
2

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

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2. **Dr. Jonathan Mulwa**, Rongo University
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The Effects of Kiambu County Government Policy Framework and Business Training on the Growth of Micro-enterprises in Thika Sub-County, Kenya

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Abstract

Micro Enterprises are the major agents of economic growth and employment that lead to increased participation of the local people in the economy. Micro enterprises have encountered many difficulties believed to have an impact on their growth. The main objective of this study was to investigate the effects of Kiambu County Government support initiatives on the growth of micro enterprises in Thika Sub-County. The specific objective was to assess how business skills affect micro enterprises growth. The study adopted a descriptive research design. The study targeted the 100 respondents working or owning the micro enterprises in 5 wards (Township ward, Hospital ward, Kamenu ward, Gatuanayaga ward and Ngoliba ward) in Thika Sub-County. Primary data was obtained using self-administered questionnaires. Data was analysed using Statistical Package for Social Sciences (SPSS Version 25.0) which is the most recent version. Descriptive statistics such as frequencies, percentages, mean score and standard deviation was estimated for all the quantitative variables and information presented in form of tables. Inferential data analysis was undertaken using regression and correlation analysis. The study established that Kiambu County Government business skills training programmes do not influence micro enterprises growth since it is not clear to the respondents how training in accounting, financial and marketing skills and training in computer and internet skills improves the business growth. The study concluded that there micro enterprises firm factors are not related to support initiatives of Kiambu County Government, however they tend to affect the growth of micro enterprises in Thika Sub-County significantly. Kiambu county government needs to come up with a supportive policy for the establishment of documentation centres and information networks to provide information to micro enterprises entrepreneurs since most of the stakeholders of the micro enterprises seemed not to be aware on the importance of various county government initiatives.

1. Introduction

Micro enterprises are a catalyst and key factor in the economies of many developing countries. The micro enterprise sector is one of the primary driving forces for job creation and poverty alleviation (Mutiria, 2017). Micro enterprises are increasingly recognized as important drivers of productivity and are widely accepted as a major aspect of economic dynamism (Hisrich, 2014). Visser (2013) argued that micro enterprises form the backbone of developing countries and are a main source of income for most

people in urban and rural communities. In Sub-Saharan Africa, micro enterprises account for about 90% of all businesses and over 80% of new jobs that are created (Rambo, 2013). Thus, governments should provide increased resources to support micro enterprises due to their increasing importance.

Micro enterprises tend to thrive in an environment that supports business growth, where the regulatory regime is transparent and decisions are made consistently that favors growth. One of the major challenges facing developing countries is the transformation of informal micro enterprises to the formal sector, to enable them enhance access to government support services (Mutiria, 2017). Some governments in developing countries in the past decades have placed emphasis on boosting their economic growth through the formulation of policies that support micro enterprises (Thuranira, 2017). The role of government is crucial in promoting and enhancing micro enterprises access to credit and education (Ackah & Vuvor, 2011). Berg et al. (2015) argues that governments perform a critical role in enlightening micro enterprises on types of funding options available and awareness trainings on financial risk management.

Previous studies on micro enterprises in Kenya have focused on social, economic and administrative expertise that hinders the growth of micro enterprises. However, the proposed study will focus on factors that support the growth of micro enterprises at County Government level. The research will be conducted in Kiambu County, Thika Sub-County which is one of the country's most prolific business towns in Kenya. Micro enterprises have been selected as they form a huge sector of Kenya's economy and present great potential in wealth creation and employment. Since micro enterprises dominate the business environment in Thika, a better understanding of this sector may help in facilitating its growth.

Micro Enterprises are the major agents of economic growth and employment that lead to increased participation of the local people in the economy. The Government of Kenya has recognized the significance of micro enterprises development as a means of encouraging self-employment, poverty reduction and accelerating economic growth. As a result, the government has created a conducive business environment that ensures the expansion of the micro enterprise sector. By realizing the importance and potential of micro enterprises, governments in both developed and developing countries have initiated policies aimed at fostering their development by reducing problems facing the sector in financing, marketing, infrastructure and regulation.

Micro enterprises have encountered many difficulties believed to have an impact on their growth. Problems associated with the growth of micro enterprises are diverse and they have faced numerous obstacles such as financial credit, viable market or inadequate support which highlight the challenges of the sector. Most micro enterprises have insufficient capacity in terms of skilled employees to manage their activities. Micro enterprises which lack government support policies have restricted access to improving their growth.

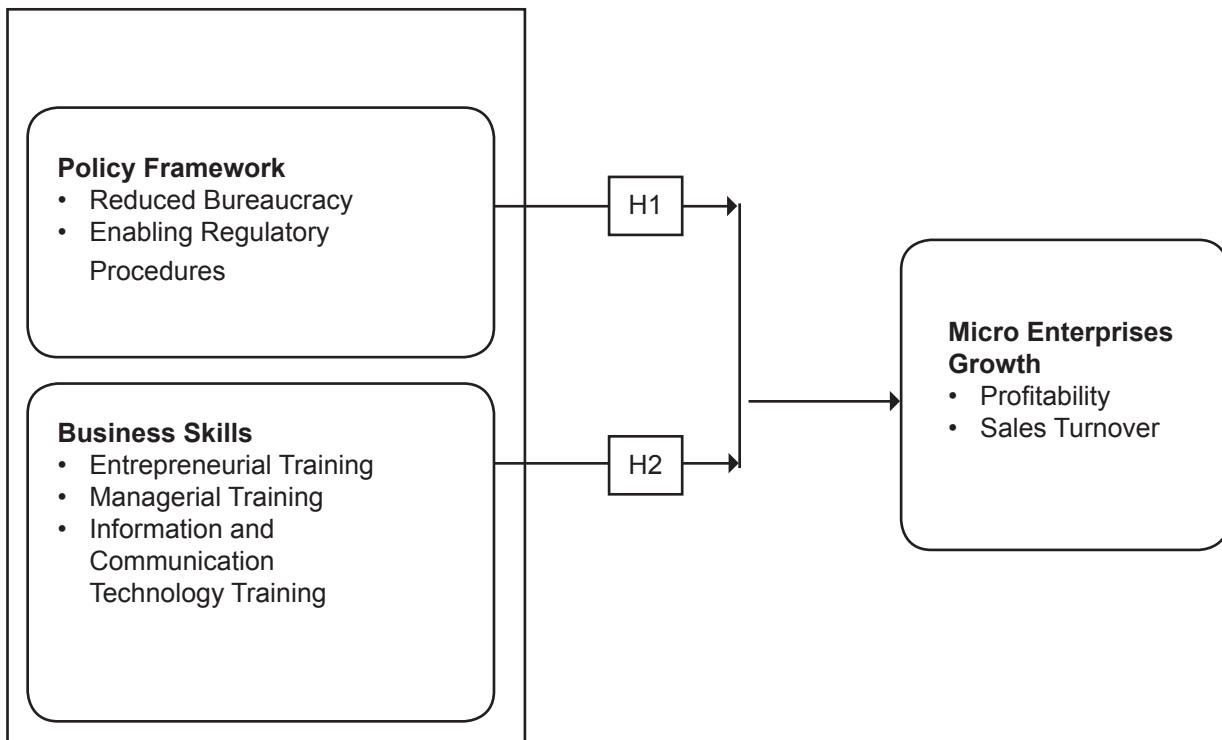
Despite their significances, a sizable number of micro enterprises fail within first few years of their business operations. Gichuki et al. (2014) indicate that three out of five micro enterprises fail within the first few months of operation and those that continue 80 per cent fail before the fifth year. Given this high failure rate, it becomes critical to research factors that can enable micro enterprises to survive. Many studies have been conducted on the factors influencing the growth of micro enterprises. However, these studies are done in different contexts and may not apply to the Kenyan micro enterprises context. This study therefore sought to investigate how Kiambu County Government supports the growth of micro enterprises in Thika Sub County. The study aimed to determine the influence of policy initiatives on the growth of micro enterprises and to assess how business skills affect micro enterprises growth. This was done through the following hypotheses:

H₀1: There is no relationship between Kiambu County Government policy frameworks and micro enterprises growth in Thika Sub-County.

H₀2: Kiambu County Government business skills programmes do not influence micro enterprises Growth.

2. Conceptual Framework

Micro Enterprises Support Initiatives



3. Theoretical Framework

The theoretical framework seeks to explain the relationship of variables and factors that affect growth of micro enterprises. The variables used to explain micro enterprises include the number of employees, annual sales turnover, assets, profitability and these vary from industry to industry (Kushnir, 2010). According to the Resource Based Theory, availability of resources leads to sustained competitive advantage which in turn leads to growth of micro enterprises (Bunyasi, 2015). Resource Based Theory relates the role of a company's resources as the foundation for their strategy. The theory proposes that the resources and capabilities are a source of direction and are the starting point of strategy formulation as they give a statement of the company's identity and purpose (Majama & Magang, 2017). Barney (1991) contends that resources include all assets, capabilities, business processes, firm attributes, information, knowledge, etc. controlled by a company that enables micro enterprises to conceive of and implement strategies that improve their efficiency and effectiveness.

The ability of micro enterprises to survive and grow depends on conditions of the external environment (Covin, 2014). In spite of their many contributions, micro enterprises are plagued by high failure rates and poor performance levels (Jocumsen, 2004). Resource availability is one of the areas where micro enterprises lack strength (Rahman, 2015). According to Mughan et al. (2004), one major reason for the failure of micro enterprises seems to be insufficient management capacity, lack of expertise, low levels of skills and managerial competences. One of the most important aspects of starting a micro enterprise or expanding an existing one is access to necessary resources (Watson, 2007).

The resource-based view predicts that certain types of resources owned and controlled by companies have the potential to generate superior performance (Ainuddin et al., 2007). It rests on the assumption that a company's resources are influential in its achievement of growth (Davidsson & Wiklund, 1999). Therefore, resource based theory will be used to demonstrate that adequate resource support and policies to create capability are critical for micro enterprises growth as they are small in size and need assistance. Resource based theory will provide a framework to explain how business can identify suitable measures to overcome growth obstacles, have better access to manpower resources, financial resources, infrastructure and access to the market (Nguyen et al., 2008).

4. Review of Existing Literature

The research field on micro enterprise growth has drawn considerable attention from both government and scholars alike (Gao, 2015). Sanjo & Ibrahim (2017) state that micro enterprises are generally privately owned organizations set-up for the purposes of producing goods or services for profit. The criteria for classifying business enterprises under micro enterprises differ from country to country (Aremu & Adeyemi, 2011; Nyagah, 2013). This has made it difficult to come out with a single universally accepted definition for micro enterprises. Based on the number of employees, a micro-enterprise is defined as having no more than 10 employees (Lois & Annette, 2005).

Governments all over the world have designed a number of support services for micro enterprises which include the policy initiatives for the purpose of creating and developing the micro enterprise sector (Mutiria, 2017). Chaston & Mangles (2002) argue that governments have paid increasing attention of the need to support micro enterprises development as a means of achieving their policy aims. Grimm & Paffhausen (2014) state that policy intervention focusing on improving the framework conditions for micro enterprises may entail labour market regulations and credit information systems. Ramsden (2010) asserts that micro enterprises thrive in environments that support business growth, where the regulatory regime is transparent and where physical infrastructure such as road and rail networks, power and telecommunications are adequate to facilitate trade.

Various studies have indicated that bureaucracy in the government in terms of business registration, issuing licenses and permits, tax payment etc. may create a strong regulatory barrier to micro enterprises growth (Bouazza et al., 2015; Mashenene & Rumanyika, 2014). Fiestas & Sinha (2011) stated that the paper work involved is mountainous and when correctly filled out and properly submitted with the requisite fees, getting the paper signed, stamped and approved becomes a monumental task. The World Bank (2016), noted that bottlenecks in the public administrative systems reduce the entry and growth rate of micro enterprises. Hayford (2012) contends that bureaucracy affects the ability of micro enterprises to secure credit which slows the rate of micro enterprises growth.

According to King & McGrath (2010), there is a strong positive relationship between the level of education and growth of micro enterprises. Al-Madhoun & Analoui (2003) observed that owner managers resist advancing their management skills through training programs. Some were reluctant to hire qualified and skilled enterprise managers, which prevents the ability of micro enterprises to grow or even survive. Iota & Wehinger (2015) identified various challenges faced by micro enterprises including lack of innovative capacity, managerial training and experience. Berg et al. (2015) argues that governments performs a critical role in enlightening micro enterprises within local communities on types of funding options available and trainings on financial risk management.

Various studies have been conducted in Kenya based on the growth of micro enterprises. Wanjau et al. (2013) studied the role of quality on the growth of micro enterprises and explained that adoption of quality influences the growth of micro enterprises. Namusonge (2011) examined the elements of growth oriented micro enterprises and concluded that the availability and the type of finance are crucial elements that contribute to the growth of micro enterprises. Previous studies on micro enterprises development in Kenya largely focused on social, economic and administrative expertise that hinders the growth of the micro enterprises (Obura & Matuvo, 2011; Mira & Ogollah, 2013; Kiraithe, 2015). Few studies have focused on the role of Kiambu County Government in supporting the growth of micro enterprises in Thika Sub-County, Kenya and this study seeks to fill this gap.

5. Methodology

Descriptive research design was used in order to describe the County Government factors influencing the growth of micro enterprises and examine the relationship between the dependent and independent variables. This study adopted a cross-sectional research design as it allowed the comparison of the extent to which at least two sectors of micro enterprises differed on the dependent variables (Bryman & Bell, 2007).

The study targeted the owners and managers of micro enterprises that have been in operation for more than one year at the time of the study. The target population for this study comprised of all licensed micro enterprises in Jua Kali sector, retail shops, general trade, Boda Boda/Tuk Tuk, textile works and hospitality sector. The study targeted the 4805 persons working or owning the micro enterprises in 5 wards (Township ward, Hospital ward, Kamenu ward and Ngoliba ward, Gatuanyaga ward) in Thika Sub-County.

Stratified random sampling technique was adopted in this study which included different sectors within micro enterprises. The micro enterprises were first stratified according to the nature of their businesses and then samples were then selected from each stratum using stratified random sampling. This enabled the capture of all sectors of micro enterprises in Thika Sub-County. Within each strata or trade area, the owners or managers were picked using stratified random sampling. The study adopted convenience sampling to select an appropriate sample size from the population (Nyagah, 2013). A sample of 100 was selected as the representative sample size from the owners or managers of micro enterprises operating within Thika Sub-County.

Data was analysed using Statistical Package for Social Sciences (SPSS Version 25.0) which is the most recent version. Descriptive statistics such as frequencies, percentages, mean score and standard deviation were estimated for all the quantitative variables and information presented in form of tables. Inferential data analysis was done using regression and correlation analysis. The regression analysis was used to establish the relations between the independent and dependent variables. Regressions were used because the procedure uses two or more independent variables to predict a dependent variable.

6. Results

6.1. Firm Factors

As a preliminary study units review, the analysis of the enterprises revealed the following firm factors.

6.2. Gender of the Respondents

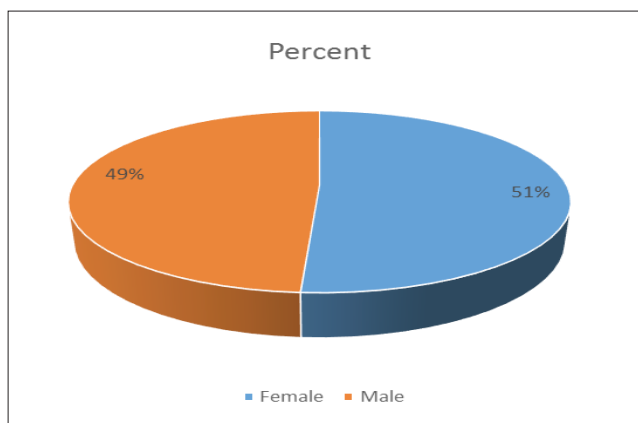


Figure 2: Gender of the Respondents

From the findings, most of the respondents were female as indicated by 51% while the rest were male at 49%. The results indicate that the two genders were adequately represented in the study since there is none which was more than the two-thirds. The study findings concur with Kimuru (2018) who revealed that the female gender could be dominating the micro enterprises sector in Thika Sub-County. The findings however negate those of Kangethe (2018) who found that 75% respondents in manufacturing micro enterprises in Kenya were males.

6.3 Respondents Age Bracket

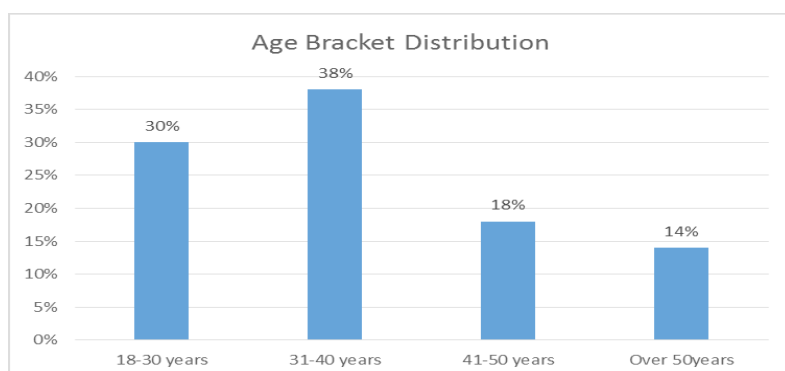


Figure 3: Age Bracket Distribution

The study recorded the highest numbers of business owners and/or managers in the age bracket between 31 and 40 years indicated by 38%. Kyalo (2016) suggested that the prime age for entrepreneurial activity was between 30-40 years. These findings concur with those of Nabutola (2015) and Owino (2017) who

explained that the younger owner/manager have the necessary motivation, energy and commitment to work and is more inclined to take risks.

6.4 Category of Business

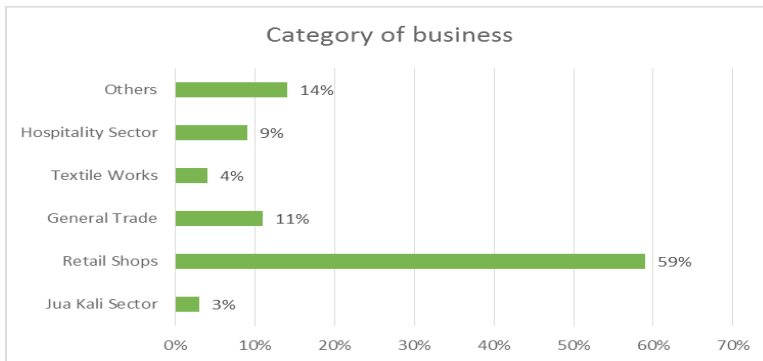


Figure 4: Category of Business

From the findings, most respondents indicated that their business belonged to Retail Shops as illustrated by 59%. This can be attributed to the fact that Retail Shops needs lower start up costs than other specialised categories thereby making entry into the business easy for many. The findings concur with those by Madatta (2011) who revealed that most of the micro enterprises are based on trading sector which is easier to start and have a wider market but also require minimal qualifications.

6.5 Existence Period of the Business

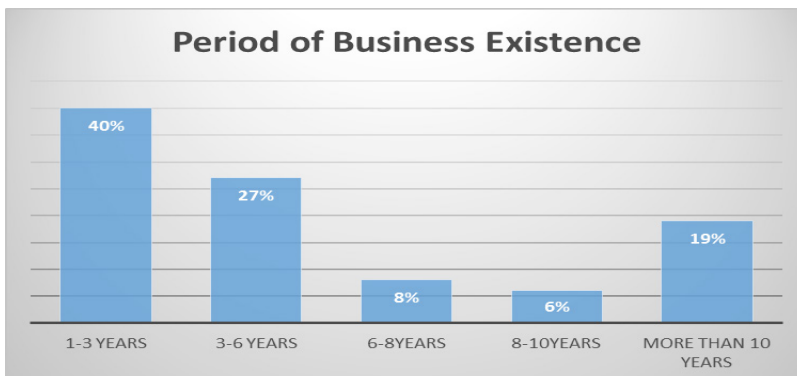


Figure 5: Period of Business Existence

As per the findings, most of the businesses have been in existence for a period of 1-3 years demonstrated by 40%. This showed that most the enterprises were young and therefore, the entrepreneurial leadership may not have had the required work experience to spur them to high growth rates (Nyang'au, 2014). The results contradict those of Bunyasi (2015) who found that majority of the micro enterprises in Thika had been in existence for over 10 years and have therefore grown over time by adopting the critical factors of human capital, access to finance and access to business information among others.

6.6 Position Occupied in the Business

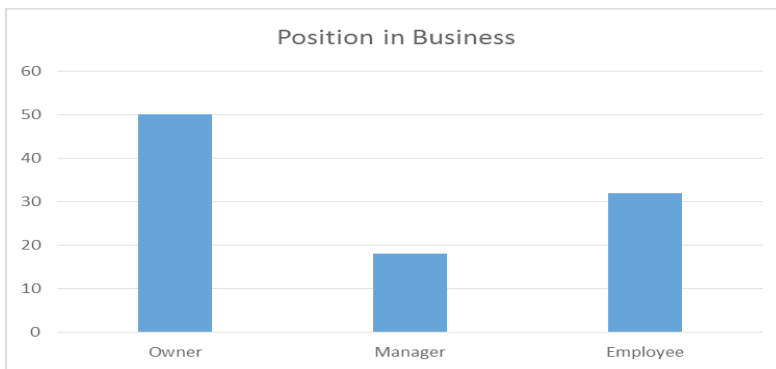


Figure 6: Respondents Position in the Business

Majority of the respondents were the business owners demonstrated by 50%. This is supported by Sitharam & Hoque (2016) who found that most of the respondents (69%) were the micro enterprise owners or both the manager and owner. This is reflective of the nature of the micro enterprises, which are mainly run by owner-managers.

6.7 Sources of Capital

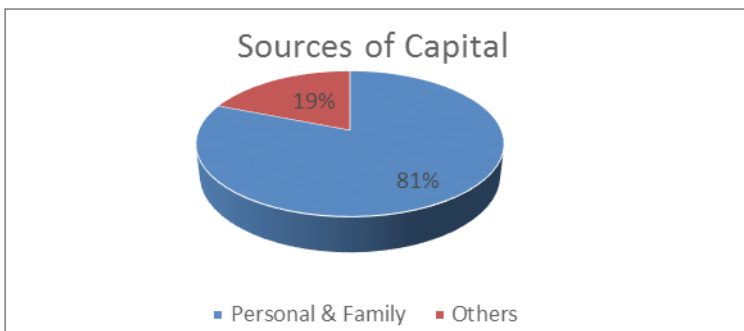


Figure 7: Sources of Capital

Most of the respondents indicated that the source of their income was from personal savings and family as revealed by 81%. The results concur with those of Kamunge et al. (2014) who established that majority (75 %) of micro enterprises in Limuru Town Market obtained their initial capital from personal savings. Similarly, Mutoko & Kapunda (2017) found that the majority of manufacturing micro enterprises in Botswana use their own money (79 %) to start and run their business.

6.8 Level of Education

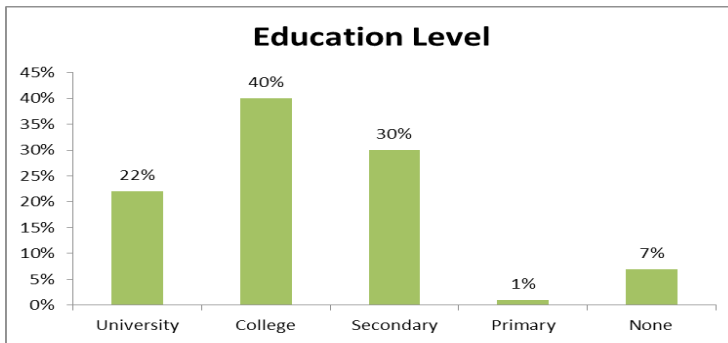


Figure 8: Level of Education

Most of the respondents indicated their highest level of education as college represented by 40%. The study found that most of the respondents had a good educational background to manage the micro enterprises. According to Nyang'au (2014), one might expect higher levels of formal education to spur micro enterprise growth by enhancing firm capabilities. However, the results contradict the argument by Ardic et al. (2011) who established that many micro enterprises are owned by individuals with minimal education background based on the fact that many of them do not land into the job markets thus create their own businesses.

6.9 Micro Enterprise Growth

The study sought to establish the growth trend of the micro enterprise in Thika Sub County. The findings were as follows.

The findings in Table 2 indicate that all the two items of micro enterprise growth were placed under the same component. Its coefficients were greater than 0.4 hence the items needed no amendments.

6.9.1 Firm's Profitability Performance

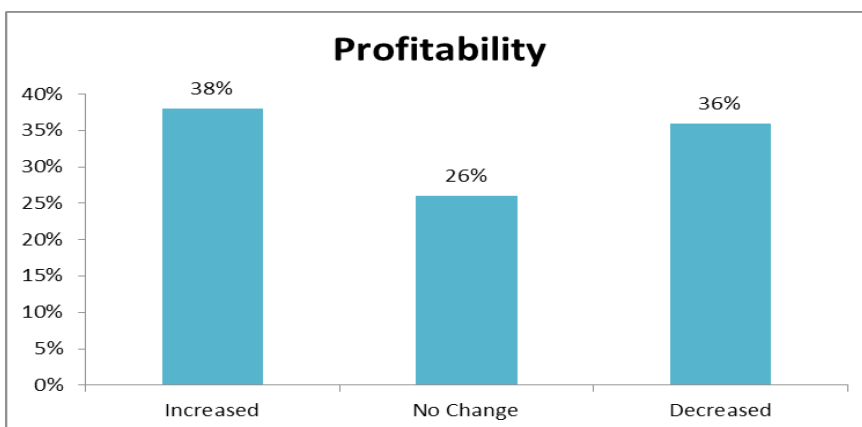


Figure 9: Firm's Profitability Performance

Most of the respondents stated that their business profitability had been increasing for the last three years as depicted by 38%. Others indicated that their business have had decreasing profits for the last three years illustrated by 36% and others indicated constant profits for the last 3 years.

6.9.2 Firm's Sales

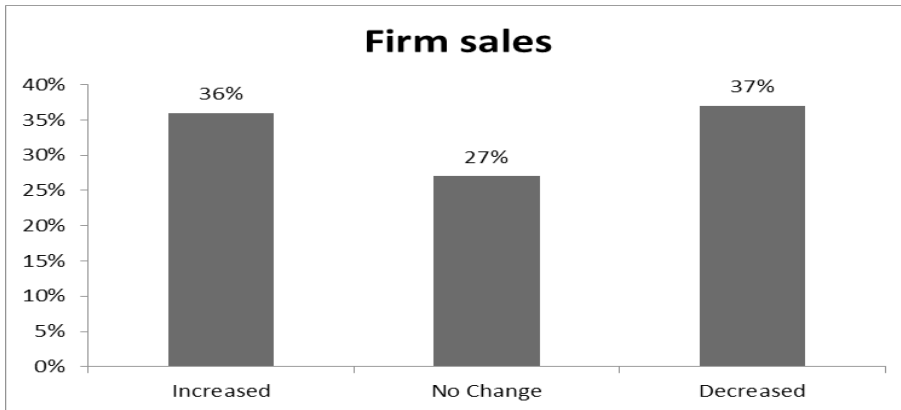


Figure 10: Firm's Sales

The findings in Figure 10 depict that sales of most businesses have been decreasing as demonstrated by 37%. Other indicated an increase in sales in their business for the last 3 years evidenced by 36% and constant sales for the last 3 years was indicated by 27%.

6.10 Tests of Hypotheses

The study utilized regression analysis to test for the study hypotheses. The findings were presented in various subsections.

6.10.1 Hypothesis One

To test the first hypothesis that “There is no relationship between Kiambu County Government policy frameworks and micro enterprises growth in Thika Sub-County”, the study conducted a regression analysis. The model that was used to test the hypotheses:

$$Y = a + \beta_1 X_1 + e$$

Y = Growth of micro enterprises in Thika Sub-County

a = Constant; β_1 = Beta coefficient

X_1 = Policy frameworks

e = error term

Table 7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.031 ^a	.001	-.009	1.68041
a. Predictors: (Constant), Policy Framework				

The findings in Table 7 reveal that R-Square value was 0.001, which indicates that the policy framework explain 0.1% of the variation in the growth of micro enterprise in Thika Sub-County. The remaining 99.9% variations in growth of the micro enterprises are explained by other factors.

Table 8: Analysis of Variance (ANOVA^a)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	.260	1	.260	.092	.762 ^b
	Residual	276.730	98	2.824		
	Total	276.990	99			
a. Dependent Variable: Micro Enterprise Growth						
b. Predictors: (Constant), Policy Framework						

From the ANOVA Table, the finding illustrate that the F calculated was 0.92 and sig. value was 0.762. Since F calculated (0.092) was less than F critical (3.938) and sig value (0.762) was greater than 0.05, the overall model was insignificant.

Table 9: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.868	.437		8.852	.000
	Policy Framework	.020	.065	.031	.303	.762
a. Dependent Variable: Micro Enterprise Growth						

From the findings the regression equation was:

$$Y = 3.868 + 0.020X_1$$

The findings demonstrate that holding policy framework constant at zero, the growth of micro enterprises had a coefficient of 3.868. Further, the study established that policy framework would lead to 0.020 insignificant positive changes in growth of micro enterprises in Thika Sub-County. From the study findings, the null hypothesis was accepted and it was concluded that there is no relationship between Kiambu County Government policy frameworks and micro enterprises growth in Thika Sub-County.

6.10.2 Hypothesis Two

To test the second hypothesis that “Kiambu County Government business skills training programmes do not influence micro enterprises Growth”, the study conducted a regression analysis. The model that was used to test the hypotheses:

$$Y = a + \beta_2 X_2 + e$$

Y = Growth of micro enterprises in Thika Sub-County

a = Constant; β_2 = Beta coefficient

X_2 = Business skills

e = error term

Table 10: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.127 ^a	.016	.006	1.66748
a. Predictors: (Constant), Business Skills				

The findings in Table 10 reveal R-Square value at 0.016, which indicates that the business skills explain 1.6% of the variation in the growth of micro enterprise in Thika Sub-County.

Table 11: Analysis of Variance (ANOVA^a)

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	4.501	1	4.501	1.619	.206 ^b
	Residual	272.489	98	2.781		
	Total	276.990	99			
a. Dependent Variable: Micro Enterprise Growth						
b. Predictors: (Constant), Business Skills						

From the ANOVA Table, the findings illustrate that the F calculated was 1.619 and sig. value was 0.206. This suggests that the overall model was insignificant since F calculated (1.619) was less than F critical (3.938) and sig value (0.206) was greater than 0.05.

Table 12: Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	4.321	.309		13.981	.000
	Business Skills	-.055	.043	-.127	-1.272	.206
a. Dependent Variable: Micro Enterprise Growth						

From the findings the regression equation was

$$Y = 4.321 - 0.055X_2$$

The findings demonstrate that holding business skills constant at zero, the growth of micro enterprises had a coefficient of 4.321. Further, the study established that business skills would lead to negative 0.055 changes in growth of micro enterprises in Thika Sub-County. Therefore, the study accepted null hypothesis and concluded that Kiambu County Government business skills training programmes do not influence micro enterprises growth.

7. Conclusions

Based on the findings, most of the respondents were female however the study was not gender biased as data was collected from approximately equal number of respondents from both genders. The study found that most of the respondents were aged between 31 and 40 years and their highest level of education was college. The study further established that most of business in Thika Sub-County was Retail Shops which have been existence for a period of 1-3 years. The study revealed that micro enterprises were owned by individuals whose source of their income was from personal savings and family.

The study sought to establish the growth trend of the micro enterprise in Thika Sub -County and ascertained that in most business in Thika Sub-County have had their profitability increasing for the last three years and surprisingly the sales of most businesses have been decreasing over the same period. The study assessed how business skills affect micro enterprises growth in Thika Sub-County. It was established that Kiambu County Government business skills training programmes do not influence micro enterprises growth. This was supported by the fact the most of the business stakeholders did not see any need for training in business knowledge and practices on business growth. It was clear that most of the business stakeholders refuted on the importance of training in accounting, financial and marketing skills and training in computer and internet skills.

The study concluded that Kiambu County Government policy frameworks affect micro enterprises growth. Although the initiatives have not led to reduced process of acquiring/renewal of licenses and less business registration requirements. The study established that Kiambu County Government business skills training programmes do not influence micro enterprises growth since it clear that training in accounting, financial and marketing skills and training in computer and internet skills might not improve the business growth.

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Capital Structure and the Financial Position of the Commercial Banks Listed at the Nairobi Securities Exchange, Kenya

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Abstract

The purpose of the study was to assess the relationship between capital structure and financial position of the eleven banks quoted on the Nairobi Securities Exchange. The particular study sought to establish the extent nature of relations between capital structure and the financial position of banks using the following questions; whether there is a relationship between debt and Equity levels of all the banks quoted in the NSE. Two there is a relationship between capital structure and financial position. There is a relationship between capital structure and asset turnover of the quoted banks of the NSE Lastly what was the effect of capital structure on profitability. The literature focuses on the importance of knowing the in-debtiness of the commercial banks in relation to investors and borrowers of such banks. The research used descriptive research design to describe the relationship of the variables in order to justify the research findings. The data that was correlated for the purpose of the study was only secondary in nature obtained from the Capital Markets Authority of Kenya from the financial statements from the eleven (11) commercial banks quoted on the Nairobi Securities Exchange. The study had shown that the major components of capital structure are debt and equity. Secondly, the results of the study showed that there was no significant statistical relationship between capital structure and assets of the eleven banks quoted. Lastly, the results of the study showed that there was no significant statistical relationship between capital structure and financial profitability of the banks quoted on the Nairobi Securities Exchange.

Key Words: Capital Structure, Financial Position, Commercial Banks, Nairobi Securities Exchange

1. Introduction

There had been extensive reaserch on capital structure as a subject but little had been done on the relationship between capital structure and the financial position of the banks quoted on the Nairobi Securities Exchange market. According to Ross, Westerfield and Jordan (2002), increasing the amount of debt in proportion to equity increases the riskiness of a bank. The riskiness in turn may affect the performance of a bank. The motivating guide to this sudy was linking performance of banking sectors to capital structure and since there exists a variation of banks in terms of capital structure composition yet pervious studies have shown that there was no optimal capital structure composition of equity and debt (Ross, 2002), there was a need to study whether capital structure had an impact on the financial position of banks quoted on the Nairobi Securities Exchange. The purpose of the study was therefore to examine the relationship between capital structure and the financial position of the banks quoted on the Nairobi Securities Exchange.

2. Literature Review

2.1 Components of Capital Structure

Capital structure comprises of debt and equity, the proportion of the debt and equity depends with the firm and usually vary in different organizations. Cheng (2009) studied the effects of the financing mix in capital structure on operating performance. Findings from the study indicate that banks should not solely rely on a single source of financing either debt or equity while banks are advised to incorporate both two sources to raise capital. The empirical literature on corporate capital structure started with Modigliani and Miller (1958) capital structure irrelevance proposition. In the subsequent years, researchers have developed a number of theories that have discussed about the relevance of the capital structure choice for determination of banks financial performance and position.

The most important and dominant theories of capital structure include the trade-off and pecking order theories (Harris, 1991) but the study was to also be looking at two more others that is the agency theory and the life stage theory. According to Gracia and Mira (2008) in their study based on Spanish small and medium sized enterprises found out that both trade-off and pecking order models are useful in explaining the capital structure.

The trade-off theory based its research on taxes (Modigliani and Miller, 1963), bankruptcy and financial distress cost (Warner, 1977) suggest that banks have a unique optimal capital structure that balances between the tax advantage of debt financing and the costs of financial distress and bankruptcy.

The tradeoff theory had it that organizations seek to have debt that balances the tax advantages of additional debt against the cost of possible financial distress. Whereas the pecking order theory says that banks borrow rather than issue equity, especially when internal cash flow is not sufficient to fund capital expenditures. Thus, the amount of debt to be borrowed was reflected by the banks cumulative need for external funds (Myers, 2001).

There had been a long debate on trade off versus pecking order theory of capital structure, however according to Fama and French, (2005) it was probably time to stop running empirical horse races between them as stand-alone stories for capital structure. Perhaps it was best to regard the two models as stable mates with each having elements of the truth that help explain some aspects of financing decisions.

The researchers on latter phase capital structure studies have tried to estimate the speed at which banks try to reach the optimal or target capital structure. The adjustment speed depends on the costs of adjusting the leverage. The research based on the estimation of speed of adjustment to target capital structure had been termed as dynamic trade-off theory, this research had been quite extensive (Mahakud, 2012)

2.1.1 Debt

Debt was the long term and short term borrowing that a firm had, mostly the long-term borrowing was used to finance the capital structure of the bank and was at an interest which was pegged on to the agreement between the lender and the bank, on the obligation of the firm to repay at a particular time (Ross, 2001).

When it comes to debt, Myers and Majluf (1984) theory of pecking order, debt was considered as the last resort after a bank had realized that its internal financing that its equity and retained earnings are not enough. According to Mahakud and Jitendra, (2012) under pecking order there was no optimal capital structure since the observed debt ratio was the cumulative outcome of the pecking order financing behavior overtime.

The tradeoff theory of capital structure predicts that firms was to choose their mix of debt and equity to balance the cost and benefits of debt. Tax benefits and control of free cash flow problems are argued to push organizations to use more debt. The theory describes an organization optimal capital structure as the mix of financing that equates the marginal costs and benefits of debt (Zander, 2010).

The size of the organization determines capital structure on the basis of external financing mostly debt financing this was due to the fact that large banks have an access to the stock exchange market since meeting the requirement for being listed was a kind of easier compared to small banks. Large organizations have a lower agency cost since they have a lesser volatile cash flow and can easily access the capital market.

Debt offers organization a tax shield, therefore this makes banks to pursue higher level of debt in order to gain maximum tax benefits and in the end, increase their profitability. On the other hand, higher levels of debt increase the possibility of an organization going into bankruptcy. (Myers, 2001).

In the agency theory of capital structure, Jensen (1998) and Stulz (1990) add to the discussion on the mitigation of manager-shareholder conflict by stating that because of debt a firm was committed to pay out its cash thus reduce cash available for management in terms of personal use. Thus, mitigation of conflict agency becomes necessary and constitutes advantages of debt financing.

When it comes to increased levels of debt by organization, managers should be very careful so was to mitigate the risk factor which may lead to bankruptcy. According to Leland and Pyle (1977) they propose that managers was to take debt-equity ratio as a signal, by fact that high leverage implies higher bankruptcy risk.

According to Grossman and hart (1982), there are a number of benefits by using debt, most notable one being on agency conflict whereby bankruptcy was expensive for managers concerned with maintaining control of organization. This ensures that the bank's capital structure was effectively used so as to avoid bankruptcy and what ends up in the long run was better financial performance and position of a bank.

According to Frielighaus, Mostert and firer, (2005) organizations are like living organisms in that they undergo through various stages of life, from birth to death, at each particular life stage organizations have typical behaviors. They assert that the more debt should be utilized by banks as they mature from birth. However, they also acknowledge that little had been done to test this theory empirically. Hovakimiam, Opler and Titman (2001) are also in agreement with this theory by stating that banks should use higher debt to fund assets but this should be progressively as the banks mature through its life stages. As banks grow they usually have low or high growth opportunities, because of this bank require financing mostly debt. According to Datta, Iskhandar and Raman (2005) banks that have high growth opportunities have more debt in their capital structure.

2.1.2 Equity

According to Ross, (2001), equity was the contribution of the shareholders that stands up an organization and enable it to be in an operation. In other words, it's the component of capital minus the debt meaning that it's the owners of the bank capital contributions. It was the ownership interest of shareholders that was the common and preferred stockholders.

More equity was required in starting up an organization but as the business was growing ability to access debt financing also increases. This was consistent with Kimki, (1997) study on intergenerational succession in small family business: borrowing constrains and optimal timing of success.

A study on debt – equity choice by Hovakimiam, Opler and Titman (2001) showed that banks usually increase their equity depending on financial performance in that profitable firms have high equity – less debt and on the other hand banks that have high stock price, they are more likely to seek more equity than debt and may even end up repurchasing debt. Organizations have different growth partner, there are those that have high growth opportunities, others have low or no growth opportunities at all. According to Jensen (1986) banks with great investment opportunities have low debt levels meaning that they employ more equity to debt.

Equity point of view from the pecking order theory of capital structure by Myers and Majluf (1984) was that banks follow a pecking order of incremental financing choice that prioritizes internal funds to the top. Internal funds are own equity that includes retained earnings, according to this theory the most important component of capital structure financing was equity, debt comes in when equity was not enough.

Seifert and Gonenc (2008) in their study titled, “The international evidence on pecking order hypothesis” they found title support for pecking order behavior in the US, UK and Germany for the period 1980-2004. This was largely attributed to the information asymmetry due to widespread ownership of stock whereby insiders know more than outsiders especially the investors. They also found evidence supporting pecking order behavior in japan during the 1980s and 1990s. According to study by Zender (2010) on debt capacity and tests of capital structure, bankruptcy and other agency costs provide banks

with incentives to use less debts hence more equity and this was contrary to the tradeoff theory that encourages banks to use debt after analyzing the cost and benefits of debt. An organization growth influences the capital structure in terms of the needs of the bank which in turn dictate whether the debt or equity, banks with expected growth are not supposed to collateralize their assets hence more equity than debt and this was true in relation to a study by Rajan and Zingales (1995) which noted that organizations with expected growth should be equity financed than debt financed.

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 11 banks were selected from the list of quoted 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 three years period (2012, 2013 and 2014) for all quoted banks. This three 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 banks

4. Results and Discussion

4.1 Components of capital structure

The study had established that capital structure had two components namely debt and equity. From the 11 banks used in the study each bank had Debt and Equity as their main component of Capital Structure. The way a bank balances the two components was the bone of contention in capital structure since there was no ideal capital structure because different banks have different capital structure needs? The study established that the 11 banks used in the study are all using Debt & Equity as their main source of capital structure. This was consistent with Cheng (2009) who studied the effect of financing mix in capital structure on operating performance. Findings from his study indicate that banks should not solely rely on a single source of financing either debt or equity while firms are advised to incorporate both two sources to raise capital.

The 11 banks used in the study are all listed on the Nairobi Securities Exchange meaning that they can easily access funds especially debt since meeting the requirements for being listed was kind of easier to the eleven banks used for study when compared to small banks. The study was in agreement with Wang, (2011) in his study of banks in the organization where he argued that large banks have a lower agency cost since they have a lesser volatile cash flow and can easily access the capital markets.

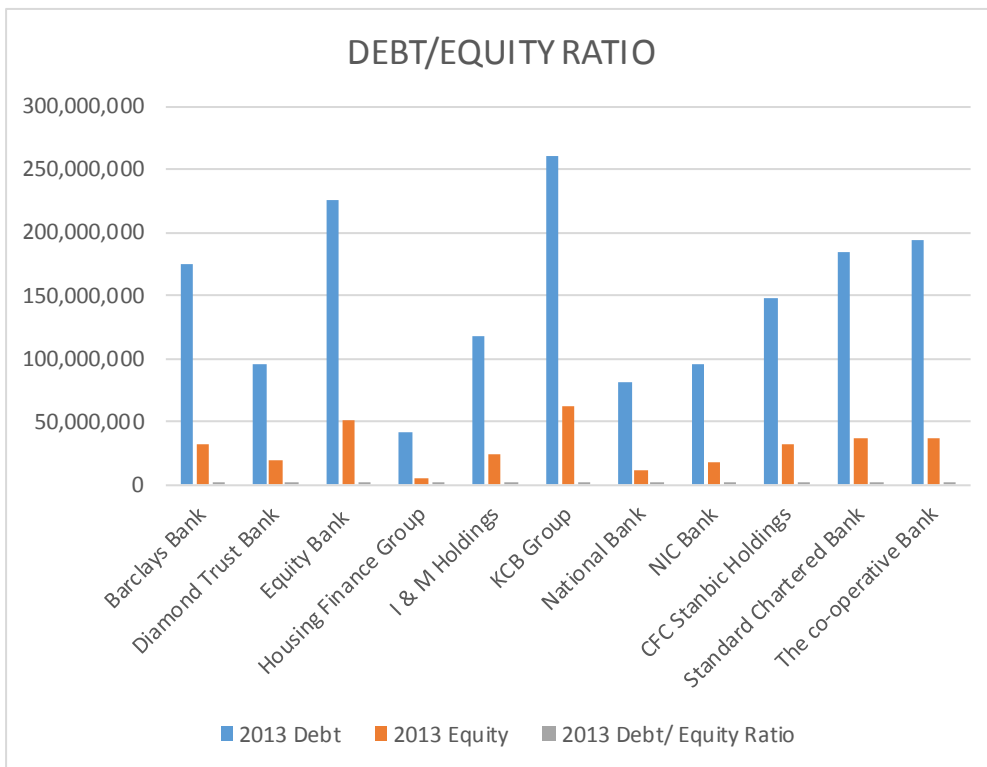


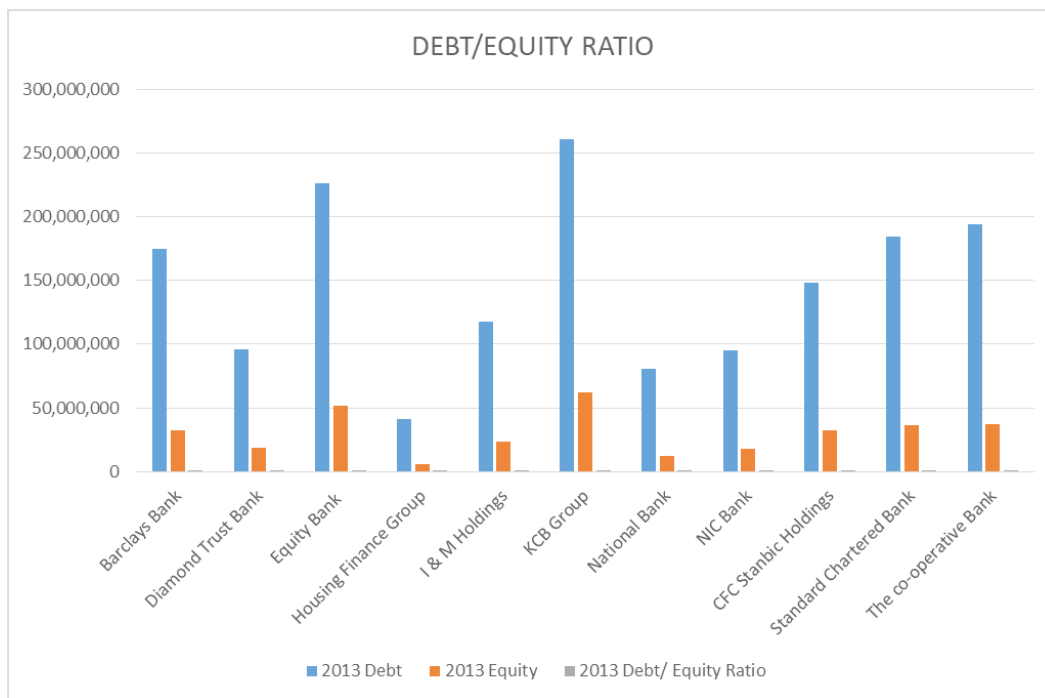
Figure 4.1: Relationship between Debt Equity Levels for the Banks

4.2 Relationship between Capital Structure and Assets

According to Regression Analysis, there was no significant statistical relationship between capital structure and assets of the banks quoted on the Nairobi Securities Exchange. This had been seen by the 11 banks that were used for the study after analyzing their Debt Equity Ratios with Return on Assets during the period 2012-2014. The study was consistent with Titman and Wessels (1988) study that does not indicate a relationship between a bank’s assets and leverage.

There was a high degree of correlation between Debt Equity and Return on Assets though there was no significant statistical relationship between the two variables. Assets are usually used as collateral for borrowing debt by firms. When Assets are used as collateral a number of things are considered. First consideration was how the asset was tangible because it was believed that tangible assets are more liquid than intangible assets. Secondly how was the liquidity level of the asset in terms of it being converted to cash because assets with high liquidity assets increase a bank’s accessibility to debt financing.

Figure 4.2.: Relationship between Debt Equity Levels for the Banks



From the study, banks growing their capital structure over the years have also been increasing their assets base proportionately with the capital structure. This was consistent with Christian Riis Flor, (2008) study on “Capital structure and asset: effects of an implicit collateral” which had it that as a bank grows especially its capital structure then its assets base should grow proportionally with the capital structure since assets represent the face value of a bank. The key to this proportionality was effective utilization of assets that ensures there was capital optimization and this can give room to debt financing and even debt renegotiation.

4.3 Relationship between Capital Structure and Financial Performance

The analysis of the study using Regression had shown that the degree of correlation between Capital structure and Return on Equity was low and there was no significant statistical relationship between capital structure and Return on Equity. When it comes to profitability the degree of correlation between capital structure and Pre –Tax profit was higher and lower on capital structure with After Tax Profit meaning that Tax had effect on capital structure. There was also no significant statistical relationship between capital structure and profitability.

The study found out that there was no relationship between capital structure and the financial performance of the banks listed on the Nairobi Securities Exchange. This was after analyzing Debt Equity Ratio with Return on Equity and Profitability ratios of the 11banks used in the study for the period of 2012 – 2014. This was consistent with a study by El-Sayed Ebaid, (2009) based on a sample of non-financial Egyptian listed banks from 1997 to 2005 which showed that capital structure choice had a weak-to-no impact on a bank’s performance.

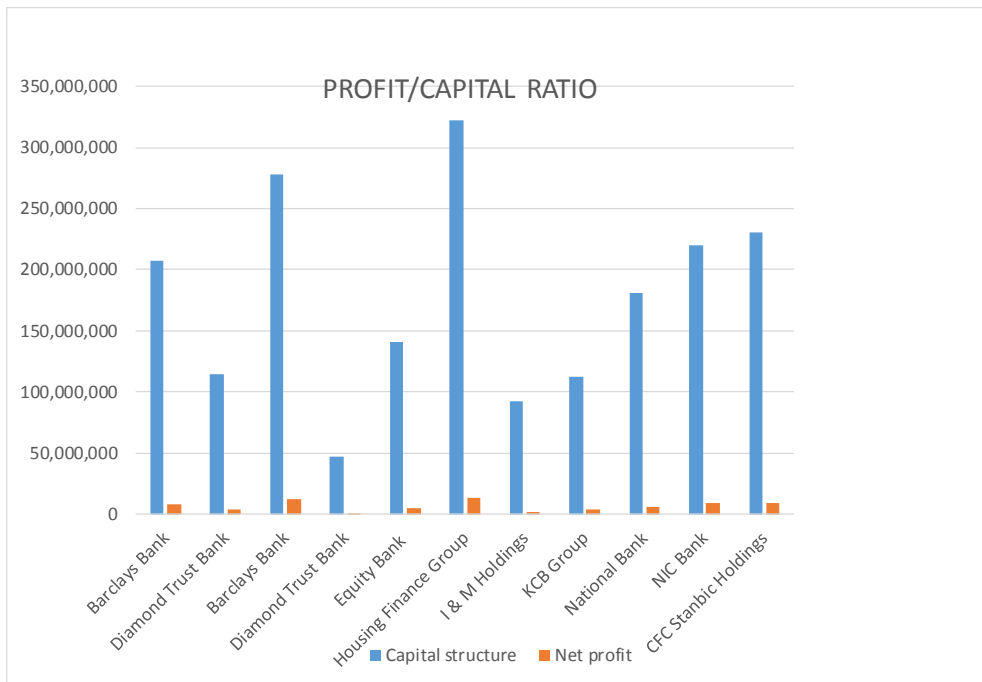


Figure 4.3: Profit Capital Levels for the Banks

On the other hand, the study established that the way a bank manages its Debt and Equity over the years determines the performance. This means that a well-managed and utilized Debt – Equity combination results to increased profits. This was in agreement with (Elliot, 2002) study that a bank manager’s primary duty was to manage the bank in a way that maximizes shareholder’s wealth which had to be reflected by increased profits and cash flows.

5. Conclusion

Capital structure has two major components namely debt and equity, there was no ideal ratio combination of debt and equity; banks should be able to come up with ways that can balance the two on the basis of profitability and bankruptcy avoidance. The best way was balancing between the tradeoff theory and the pecking order theory since they have some good elements in them. For instance, from the pecking order, banks should use internal finances such as retained earnings, if they are not enough they resort to debt financing meaning that internal financing was first priority over debt financing.

Based on the findings of the study, it is argued that listed banks have an easy access to funds as compared to other banks that are not listed on the Nairobi Securities Exchange. Banks should maximize this easy access to come up with an optimal Debt – Equity ratio that was profitable to a bank and at the same time was less risky. Lastly bank managers should always take debt-equity ratio as a signal of risk and bankruptcy. This was due to the fact that high leverage implies higher bankruptcy risk.

Assets may be used as collateral for borrowing debt by banks thus increasing the capital structure component of debt. At the same time, a bank using assets as collateral should consider tangibility of the assets and liquidity of the assets because the two determines accessibility to debt financing.

Banks should ensure that as they grow their capital structure their assets base also grow proportionally with the capital structure. This was because assets represent the face value of a bank. The key to this proportionality was effective utilization of assets that ensures there was capital optimization in viable income generating business ventures which can also create an opportunity for debt financing and even debt renegotiation.

Capital mix of Debt and Equity seriously affects the performance of a bank and its long-term survival in business. Banks should ensure that they get an optimal balance of Debt and Equity that works well with the bank since each bank was different from others. Other than an optimal mix of Debt Equity, the banks should effectively and efficiently use the capital structure. This was ensure that performance in terms of profitability was enhanced while at the same time risk was minimized.

Profitability of a bank was as a result of the capital structure decisions, which whether short term or long term. The decisions affect the profitability of a bank, while at the same time increase the risk of the bank investment. Bank managers should make good decisions in regards to the capital structure of their firms. In relation to that corporate governance comes handy especially in the relationship between capital structure and a bank's performance.

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Effects of Inventory Management on the Performance of Machakos University, Kenya

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Abstract

Inventory refers to the stock of the products a firm holds or is manufacturing for sale and the components that makes up a product. Inventory management entails controlling the availability of such stock to ensure it isn't in shortage or excess. It is a vital requirement in companies because whereby keeping inventory adds value to the company operations in many ways such as creating bulk inventory and effective service delivery to customers, avoiding unnecessary hold up of working capital, acts as insurance against error in demand forecast, they also pose major costs to the organization. The study was based on the following research objectives; to ascertain the extent at which inventory control affects productivity, to examine whether there is relationship between inventory management and organizational effectiveness, to determine the nature of relationship between demand management and customer satisfaction and also to determine the effects of just-in-time in Machakos University. The targeted population constituted the staff members of the procurement and stores and other user departments at Machakos University. The researcher used descriptive research design and stratified sampling method with a sample size of twenty six respondents, Primary data collection method was used through use of questionnaires. Since inventory is a crucial determinant in production, its management has a direct relationship with the productivity of an organization. Poor inventory management in the university led to increased costs and poor performance which in return negatively impacted on the institution's productivity levels. Proper demand management leads to highly satisfied customers and vice versa. If demand is well managed, stock outs will be eradicated, items will be supplied in good time and the customers will be happy that their expectations were dully met. The findings proved that the university's users were dissatisfied with the main cause being poor management of the demand. JIT has a positive impact on the growth of the purchasing unit. If materials are availed in the right time of use then operations will be smooth and unnecessary inventory carrying costs will be eliminated. This will lead to a more efficient firm that will have the capacity to grow.

Keywords Inventory Management, Inventory, Effects

1. Introduction

Inventories are vital to the successful functioning of manufacturing and retailing organizations. They may consist of raw materials, work-in-progress, spare parts/consumables, and finished goods. It is not necessary that an organization has all these inventory classes. But, whatever may be the inventory items, they need efficient management as, generally, a substantial share of its funds is invested in them. Different departments within the same organization adopt different attitude towards inventory.

This is mainly because the particular functions performed by a department influence the department's motivation. For example, the sales department might desire large stock in reserve to meet virtually every demand that comes. The production department similarly would ask for stocks of materials so that the production system runs uninterrupted. On the other hand, the finance department would always argue for a minimum investment in stocks so that the funds could be used elsewhere for other better purposes, (Sawaya Jr. and Giauque 2010).

Inventory management is pivotal to an effective and efficient organization. It is also vital in the control of materials and goods that have to be held (or stored) for later use in the case of production or later exchange activities in the case of services. The principal goal of inventory management involves having to balance the conflicting economics of not wanting to hold too much stock. Inventory problems of too great or too small quantities on hand can cause business failures. If a manufacturer experiences stock-out of a critical inventory item, production halts could result. Moreover, a shopper expects the retailer to carry the item wanted. If an item is not stocked when the customer thinks it should be, the retailer loses a customer not only on that item but also on many other items in the future. The conclusion one might draw is that effective inventory management can make a significant contribution to company's profit as well as increase its return on total assets. It is thus the management of this economics of stockholding, which is appropriately being referred to as inventory management. The reason for greater attention to inventory management is that this figure, for many firms, is the largest item appearing on the asset side of the balance sheet. (Feng Yang, 2010) has argued that supply chains have evolved from traditional forecast-driven push to demand driven pull systems over time, and that postponement is playing an increasingly important role in a supply chain. (Peter F. Wanke, 2004) states that inventory management approaches are a "function of product, operational and demand related variables such as delivery time, obsolescence, coefficient of variation of sales and inventory turnover" and that logistics managers are more likely to decentralize inventory in order to stock product close to the customer's facility if the customers demand a reduced delivery time.

Graman (2006) argued that the cost of holding inventory, extensive product proliferation and the risk of obsolescence, especially in rapidly changing markets makes the expense of holding large inventories of finished goods excessive and that high demand items naturally have safety stock assigned to them but in many organizations there are so many very-low demand items that keeping any stock of these items is unreasonably expensive, so they argue that companies must now provide good service while maintaining minimal inventories.

Therefore, inventory management approaches are essential aspects of any organisation. Inventory represents an important decision variable at all stages of product manufacturing, distribution and sales, in addition to being a major portion of total current assets of many organizations. Inventory often represents as much as 40% of total capital of industrial organizations (Moore, Lee and Taylor, 2003:321). It many represent 33% of company assets and as much as 90% of working capital, (Sawaya Jr. and Giauque, 2006:121). Since inventory constitutes a major segment of total investment, it is crucial that good inventory management be practiced to ensure organizational growth and profitability.

According to Wanke (2004), historically, however organizations have ignored the potential savings from proper inventory management, treating inventory as a necessary evil and not as an asset requiring management. As a result, many inventory systems are based on arbitrary rules. Unfortunately, it is not unusual for some organizations to have more funds invested in inventory than necessary and still not be able to meet customer demands because of poor distribution of investment among inventory items (Chalotra, 2013). Based on the above analogy, therefore this paper evaluates the inventory management and organizational performance, with respect to Machakos University as well as its extended Machakos University Hotel & Conference Centre. Inventory management issues exist here with the University witnessing frequent supply delays, stock out complaints and large amounts of redundant stock.

2. Statement of the Problem

Problems of managing inventory have been around for a very long time. We usually think of stocks as being held by organizations to allow efficient and continuous operations. In most organizations, direct materials represent up to 50% of the total product cost, an amount which greatly affects the performance of the organization. Cases of under stocking may cause organizations to stay off production, thereby resulting to organizational ineffectiveness and customer disgruntlement. On the other side maintaining too much stock items may add to nothing more but tying up working capital and increasing carrying costs and thus the need to come up with alternatives on how to mitigate these problems.

The study was guided by the following Research objectives:

- i) To ascertain the extent at which inventory control influence performance of Machakos University.
- ii) To determine the nature of relationship between demand management and performance of Machakos University.
- iii) To determine the effect of just –in –time on the performance of Machakos University

3. Literature Review

3.1 Theoretical Framework

Inventory management across the supply chain is a big challenge for improving coordination among members of value chain (Singh, R.K. 2011). (Singh, Garg, & Deshmukh,2007) have observed that inventory management is an important strategy for improving competitiveness and inventory needs proper control because it becomes the largest assets of a business. Previous studies have come across a few directions for future research. (Chalotra 2013), suggested that future research can be done by taking into account dimensions like quality management, shared goals and objectives, Supply Chain Management ethics, transportation management, warehousing management, commitment and collaboration. Future researchers can also under taken regarding inventory management from the perspective of wholesalers and retailers for medium and large scale industries. According to (Wanke, 2004), the study revealed, retailed practitioners indicated that they understand the importance of supply chain practices but have diverse views regarding matching of practices, competitive advantage and organizational performance.

This leads to the gap at the point where customers' inputs are needed to be translated into strategies. The retailers should keep in mind all the business dynamics for better organizational performance.

On the other hand Singh (2011) argues that for effective implementation of Vendor Managed Inventory (VMI), the management should focus on managerial aspects such as better inventory management, supply chain integration, production planning and control, vendor development, automation of processes, employee involvement, investment in information systems and infrastructure and effective marketing process. Due to that, he also suggested future researchers could further analyze the importance of these factors for different sectors under different business environmental conditions by using Structural Equation Modeling (SEM) approach. Meanwhile, (Singh, et al (2007), confirmed the need for implementing quality management as an integrated system instead of just a loose set of quality practices. This is particularly interesting as many firms are focused on tools and practices instead of creating a quality management infrastructure that will lead to long-term positive results. In this research however, the researcher focused on four key independent variables that would determine the effectiveness of inventory management in any given organization.

3.2 Inventory management

The effective and efficient functioning of a productive system requires the regular demand and supply of inventory at the input transformation and output phases of the production process. Management is also seen as the effective and efficient utilization of resources for the achievement of organization objectives. To ensure the achievement of the objective there must be free flow of material, unencumbered at every stage of the production process.

In Kenya, there are many soft drink production companies in the beverage industry and they all source their raw materials from few of not the same market. With the present economic meltdown, organization are after these scarce resources to product their product. Therefore, the urgency for the effective and efficient management of inventory in form of raw material, work-in-progress and finished goods constitute significant proportion of assets of most organization.

Inventory items cost money to acquire, they cost money to store and to look after, which means storage facilities has to be provided so as to make sure that these materials or items do not get spoilt until they are turned into sellable goods, they do not produce money. When stocks are held, it means tying down capital that would have been used in other areas, so it all represent cost and should be managed properly to acquire efficiently. We must however, hold stocks to meet production needs and sales needs. This is because if we do not hold stocks in sufficient quantities we face the risk of running out of stock. Similarly, if we short of finished goods, we may disappoint our customers. Inventory shortage in both these forms will likely lead to loss of customers and money. For the organization not to have above problems they should strike a balance between too much stocks (over inventory) and carrying too little stock This is essentially the importance of inventory management, managing assets of all kinds is basically an inventory problem, the same method of analysis applies to cash and fixed assets as to inventories themselves.

3.3 Relationship between demand management Performance

There's is a strong, positive impact of customer satisfaction on willingness to pay, and they provide support for a non-linear, functional structure based on disappointment theory. In addition, the second study examines dynamic aspects of the relationship and provides evidence for the stronger impact of cumulative satisfaction rather than of transaction-specific satisfaction on willingness to pay. When disruptions occur at any stage and evaluate multiple strategies for protecting customer service if a disruption should occur. The strategies considered took advantage of the network itself and included satisfying demand from an alternate location in the network, procuring material or transportation from an alternate source or route, and holding strategic inventory reserves throughout the network. I conducted numerical analysis and provided recommendations on selecting strategic mitigation methods to diminish the impact of disruptions on customer service. I demonstrated that the greatest service level improvements could be made by providing both proactive inventory placement to cover short disruptions or the start of long disruptions, and reactive back-up methods to help the supply chain recover after long or permanent disruptions.

3.4 Just-in-Time

Just in Time or JIT purchasing has been defined by (Dobler et al 1996) as an inventory control philosophy whose goal is to maintain just enough material in just right place at just the right time to make just the right amount of product. JIT purchasing concept can provide competitive advantages in manufacturing and service oriented firms. One of the most critical success factors of a manufacturing organization in producing quality product is its ability to acquire quality material at the right time and right quantity. JIT require close attention of its supply base and in-bound logistics. JIT could bring improvement on internal and external communication, improve supplier performance and warehouse space requirement reduction. Internal process can be brought under control and focus should on the extension on the extension on the application of JIT philosophy to suppliers. This requirement had provided the foundation and urge for long-term partnership and strategic alliance.

JIT is a philosophy from Japan. JIT manufacturing involves efficient production of high quality goods using minimum amount of Raw materials, WIP (Work in progress), and Finished Products. Just in Time or JIT philosophy aims at eliminating all kinds of waste. JIT also seeks continuous improvement in terms of quality and productivity. The system operates with very little inventory and the output reaches at the next workstation 'Just in time'. The final assembly is put just before the sale takes place. The goods will not be produced until and unless they are needed, and this depends on the demand for the product. There are Seven Ws in Just in Time or JIT of it tends to curb: Waste of overproduction, Waste of waiting, Waste of transportation, Waste of processing, Waste of stocks, Waste of motion, Waste of defectives.

A study found that JIT system had positive effects on the organization since its implementation four years ago. Some of the advantages of JIT includes; Improve returns on investments (ROI) by reducing carrying cost, JIT philosophy saved on warehouse space and cost, quality goods delivered at all the

time and increased collaborative relationship that facilitated good suppliers-customer relation. JIT philosophy also encouraged the Total quality management (TQM) principle of zero defect, proliferation or wastage. This philosophy also discouraged double handling of goods. Finally, JIT philosophy saved on holding cash that would otherwise be employed in other business.

However JIT philosophy was not 100% perfect and therefore needed to be improved. Some of the views given included: Better communication and integration of systems with the suppliers, Frequent visits to the supplier to audit their process, Use of standard specifications rather than own tailored specifications, Training workers on the use and importance of JIT philosophy in the organization and the management should also be committed to the policies of JIT implementation.

3.5 Summary of the literature review

Chalotra (2013), established that there are three motives for holding inventories, which are transaction, precautionary and speculative motives. Lyson (2003) states that inventory serves as an insurance policy against the unexpected breakthrough, delays and other disturbance that could disrupt ongoing activities. According to review poor inventory control techniques, inadequate staff competencies, poor funding are some of the factors that limit effective inventory control. Pandey (2005) emphasized that stock represents money and similar control measures should be taken on stock as it the case of cash. It's important to have a good stock record system as it help in preventing stock out, overstocking, deterioration, obsolescence and high carrying cost. A sound stores record system is therefore vital for procurement decision making. Effective stock records are important to an organization which expects to operate profitably or offer quality services. Late posting have undesirable effects.

4. Research Methodology

The researcher used descriptive research design to describe the phenomenon as it exists. Therefore, it is undertaken in order to ascertain and be able to describe the characteristics of the variable of interest in a situation. It will take the description of inventory management and organizational performance. The study area was Machakos University stores department and Machakos University Hotel and Conference Centre and the study population consisted of the procurement managers and staff. Survey was also conducted on some customers to get more information. Descriptive statistics were used in data analysis.

5. Results and Discussions

From the analysis of the study data, it was established that the university was not optimally productive due to poor inventory management. Late deliveries, multiple customer complaints, massive dead stock, stock outs and halted operations due to material deficiency are the key findings of the study. Demand is not properly matched and that leads to inefficiency in the performance of units within the university which directly means the institution is under productive. The university incurs a lot of costs also due to the poor inventory management. An analysis of the findings also revealed that customers at the university were dissatisfied with the procurement department due to instances of stock outs and late delivery of materials. Most of the operations were thus delayed due to this thus aggravating the users.

These elements occurred due to poor demand management practices that could not properly align supply factors to the material requirements of the users in the required timelines. In regards to Just-in-time buying, the university has not properly implemented it thus the benefits are yet to be realized. The procurement department acknowledges the benefits of JIT but feel under supported by the management to this end. Elements of overstocking are clearly evident in the findings in the form of dead stock, which is a core cost sought to be eliminated by JIT. Carrying costs play a key role in diminishing the institution's returns as well as tying its capital which could be effectively used in other developmental avenues.

6. Conclusions and Recommendations

Based on the findings of the study, it can be concluded that since inventory is a crucial determinant in production, its management has a direct relationship with the productivity of an organization. Poor inventory management in the university led to increased costs and poor performance which in return negatively impacted on the institution's productivity levels.

Proper demand management leads to highly satisfied customers and vice versa. If demand is well managed, stock outs will be eradicated, items will be supplied in good time and the customers will be happy that their expectations were dully met. The findings proved that the university's users were dissatisfied with the main cause being poor management of the demand.

JIT has a positive impact on the growth of the purchasing unit. If materials are availed in the right time of use then operations will be smooth and unnecessary inventory carrying costs will be eliminated. This will lead to a more efficient firm that will have the capacity to grow.

The university ought to take appropriate measure to manage its inventory in terms of matching their inventory needs with the prevailing supply factors and customer trends. This will help reduce the ongoing cases of stock outs and overstocking. To this effect, the management can hold training forums for the procurement department staff on efficient inventory management practices and offer their full support to the department as well. The purchasing personnel and the management should understand that if users are dissatisfied then it means operations are not running well. Attempts to ensure that user demand is well organized to provide what they request in the specifications given should be employed for better performance. The university's management take time to learn the benefits of JIT to any organization and its requirements so as to move in the same tune with the procurement team in embracing this practice for better results.

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Effect of Prudential Guidelines on Financial Performance of Licensed SACCOs in Kiambu County, Kenya

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Abstract

Savings and Credit Cooperative Societies (SACCOs) play a critical role in Kenya's financial sector in terms of financial access, savings mobilization and wealth creation. In 2008, the government of Kenya introduced SACCO Society Regulatory Authority (SASRA) legislations to streamline operations of the SACCO sector after continued complaints of mismanagement, misappropriation of members' savings and poor financial performance by the members. The aim of this study is to investigate the effect of capital adequacy guideline on financial performance of licensed savings and credit cooperative societies (SACCOs). More specifically, the study sought to investigate the effect of capital adequacy on financial performance of licensed SACCOs in Kiambu County in Kenya operating between the years 2014 and 2018. Two theories; Agency theory and stakeholders' theory were used to study the capital adequacy guideline effects. Secondary data was used in this study, where a census survey was preferred as the population of the study was small. Secondary data collection sheet was used for collecting secondary information regarding SACCO performance. The data was sorted, coded and input into the statistical package for social sciences (SPSS) for production of tables, descriptive statistics and inferential statistics. The results indicated that the SACCO capital adequacy guideline has a positive effect on capital ratio and which led to an increase in return on assets (ROA). From the findings, the study concluded that capital adequacy significantly influence financial performance of the SACCOs. The correlation results showed that capital adequacy regulation improved financial performance of the SACCOs as measured by ROA. The study recommends that SACCO managers should consider other factors alongside the guidelines in formulating policies governing the running of the SACCO's in Kiambu County.

Keywords: Savings and Credit Cooperatives, Capital Adequacy Guideline, Financial Performance

1. Introduction

Capital adequacy is one of the prudential guidelines which are the general standards issued by the regulating bank (the central bank) for proper and accountable functioning. A measure of the capital strength of a SACCO is the capital adequacy ratio, which is the amount of a firm's regulatory capital expressed as a percentage of its risk-weighted assets (Aruwa, & Mohammed, 2011).

Specifically, this paper sought to investigate the effect of capital adequacy guideline on financial performance of licensed SACCOs in Kiambu County in Kenya operating between the year 2009 and

year 2018. Financial performance was measured by return on asset (ROA). There are 163 SACCOs licensed to operate in Kenya (SASRA, 2019). Kiambu County has 11 licensed SACCOs.

Capital adequacy refers to a relative measure which establishes the maximum level of leverage that a financial institution is allowed to reach on its operations (Jansson, 1997). It is measured by the ratio of risk-weighted assets relative to regulatory capital, which has been internationally recommended as a capital adequacy ratio of 8% (Jansson, 1997).

1.2 Problem Statement

After continued complaints by SACCO members, the Government of Kenya introduced SACCO Society Regulatory Authority (SASRA) guidelines in 2008 to streamline operations of the SACCO sector to tackle mismanagement, misappropriation of members' savings and poor financial performance.

The objective of the study is to investigate the effect of capital adequacy guideline on financial performance of licensed SACCOs in Kiambu County, Kenya. Therefore, the study sought to answer the following question: What is the effect of capital adequacy guideline on financial performance of licensed SACCOs in Kiambu County, Kenya? The conceptual framework portrayed the independent variable, Capital Adequacy (Capital/Assets Ratio), affecting Financial Performance (ROA) which is the dependent variable.

2. Literature Review

2.1 Theoretical Framework

2.1.1 Agency Theory

This theory was promoted by Berle and Means (1932) and states that problems exist in modern firms due to division of ownership and control because owners or principals. This happens in the SACCOs which hire by electing the management board as their agent. This theory was found suitable for this study because it conceptually helps to understand SACCO as entities which are under two participants namely the SACCO managers and the shareholders.

Secondly, agency theory suggests that employees or managers in SACCOs can be self-interested yet the shareholders expect them to act and make decisions in their interest. Shareholders further expect the SACCO managers to operate within the SASRA regulations. On the contrary, Padilla (2002) posits that agents may not necessarily make decisions in the best interests of the principals, as they may succumb to self-interest, opportunistic behavior. With such setbacks, agency theory reinforces the need for a separation of ownership and control in order to align the goals of the management with that of the owners (Bhimani, 2008; Jensen & Meckling, 1976).

2.1.2 Stakeholders Theory

Proposed by Freeman (1984), the theory challenges the agency theory and argues that every firm has relationships with many stakeholders. Stakeholder theory suggests that the purpose of a business is to create as much value as possible for stakeholders. In order to succeed and be sustainable over time, executives must keep the interests of customers, suppliers, employees, communities and shareholders aligned and going in the same direction (Padilla, 2002).

Donaldson and Preston (1995) argue that this theory focuses on managerial decision making and interests of all stakeholders have intrinsic value, and no sets of interests are assumed to dominate the others. SACCOs assume obligations with multiple stakeholders whose demands may not be met in entirety; stakeholder management must tailor its activities to curtail the negative effects of interests among the stakeholders which may culminate in stifling meaningful performance of SACCOs. The theory is useful in this study as SACCOs are expected to build better relationships with their primary stakeholders so that they can obtain greater returns. SACCOs have social responsibility activities used to build moral capital among their stakeholders which promotes safety against a loss of the company's reputation during problematic periods (Godfrey, 2005).

Consequently, stakeholder management is part and parcel of a SACCO's strategy and it constitutes a variable that influences financial performance (Bhimani, 2008). Therefore, SACCO managers ought to take their role of decision making more carefully by taking cognizance of interests of stakeholders. This further implies that stakeholder interests have intrinsic value and no sets of interest are assumed to dominate others in the organization (Odhiambo, 2012). This theory enabled the study to establish the importance of allowing all stakeholders to play their respective roles in SACCO affairs.

2.2 Extant Literature Review

SACCOs regulations place emphasis on legal, policy and operational reviews aimed at ensuring that DT-SACCOs are strengthened to conduct their savings mobilization and provision of credit activities without the necessity to change their legal form of being cooperatives (SASRA, 2010). Chavez (2006) on PEARLs rating found the financial performance of Kenya SACCO sector extremely weak and the weaknesses were transferred to such areas as governance, fiscal discipline, financial, operational, internal controls, and the risk management.

Kamau (2010) found a number of causes of financial distress within co-operative societies businesses in developing countries which included mismanagement as the most prominent in lending and spending, and these negatively affected the financial performance of SACCOs. The number of individuals using SACCOs as financial service provider have been on a decline as from 2009 at 13.5% in 2009 to 9.1% in 2013 and the major reason established was the deterioration in financial stability and efficiency in SACCOs key functions (CBK, 2011). Wanjiru (2012) did a descriptive study on the effect of financial regulation on financial performance of deposit-taking microfinance institutions in Kenya targeting the 6 deposit-taking

microfinance institutions. The study found that the supportive Deposit Taking Microfinance Regulations of 2008 led to the improvement in financial performance of DTMs. The regulations contributed to increase in the value of loans outstanding, total assets of DTMs, the profitability of DTMs and the respective shareholders' equity. The study recommends comprehensive impact analyses prior to implementation of new regulations in the financial sector particularly micro finance institutions; a long-term view when structuring regulatory framework to provide DTMs a clear view of the thresholds to attain on the path to institutional development and transformation.

(CBK, 2011). Waiganjo, Wanyoike, and Koitaba, (2015) studied the effect of SASRA Regulations on SACCOs' financial performance in Nairobi County. More specifically, the study sought to investigate the effect on staff competence, quality of board of directors and corporate governance on financial performance of SACCOs. The findings revealed that the quality of the Board of Directors was an important aspect in improving the SACCOs financial performance as per the SASRA regulations are concerned although compared to the other two variables it was weaker. Their findings further revealed that SACCO staff competence as required by SASRA regulations had a strong influence on the financial performance of the SACCOs in the area. This study also found that corporate governance had a significant effect on SASRA regulations and the SACCOs financial performance and hence emphasized corporate governance in order to strengthen the operations of the SACCOs (Waiganjo, et al).

Legislations and regulations have been enacted to protect shareholders, build confidence, ensure that market failures are corrected, redress information asymmetry and ensure transparency (SASRA, 2010). SACCO sector stability impacts long-term economic growth through effect on the efficiency of intermediation and allow monitoring of the users of external funds, thus affecting the productivity of capital employed and improving financial performance. This impacts the volume of saving, influences the future income-generating capacity of the economy and also affects the stability of the whole economy (WOCCU, 2015). Ali (2013) studied the impact of regulatory and supervisory framework on microfinance in Kenya and found that the microfinance sector including SACCOs require regulations in order to achieve massive and sustainable delivery of financial services to the lower income section of the population. Ferri and Kalmi (2014) studied regulatory burden and its effect on credit unions and found that high capital requirements by regulatory bodies can affect the growth of credit unions. Muriuki and Ragui (2013) studied the effect of SASRA regulations on cooperate governance and found that regulations on cooperate governance enhanced performance of SACCOs. Meagher (2002) investigated the effects of capital adequacy requirements as the main regulatory tools for the financial institutions and found that the requirements performed two main duties. First, as a „risk sharing function“ of buffering against losses and protecting depositors and limits the recourse to deposit insurance. Second, they limit the moral hazard issue of shareholders incentive to take on excessive risk in order to maximize share value.

Carpenter (2010) found that capital adequacy as required by SASRA in the context of functional reserves in banking expressed as a capital ratio of liquid assets must be held comparable to the amount of money that is lent out. This requirement is put into place to ensure that these institutions are not participating or holding investment that increase the risk of default and that they have enough to sustain operating losses while still honoring withdraws. The capital adequacy ratio is the percentage of bank capital over its risk weighted asset (Boyd, 2008). In the Kenyan context, the non-remittance of members' deductions by employers to the SACCOs has a negative impact on the SACCO performance and provides negative effects manifested in liquidity problems leading to low returns on loans (Chege, 2006).

3. Research Methodology

Descriptive research design was adopted in this study. The main purpose of a descriptive design is to describe state of affairs as they exist (Kothari, 2004). Descriptive research design which be used to identify and obtain information on the characteristics of a particular issue and data collected Thornhill (2007). The quantitative and statistical techniques were used to summarize the information of SACCOs and to describe "what exists" with respect to conditions of capital regulations. Descriptive research design has been used by other researchers like Waiganjo, Wanyoike, and Koitaba (2015) to study the effect of Compliance to SACCO Regulatory Authority (SASRA) Regulations on Financial Performance of Deposit Taking Savings and Credit Co-operatives (SACCO) in Kenya.

The population of this study was the 11 licensed SACCOs in Kiambu County by January 2019. The study undertook census survey as the population of the study was small and sampling was not suitable. Secondary data was used for analysis and was collected using data collection sheet from the financial statements of the various licensed SACCOs.

In addition, SASRA reports were used to obtain secondary data for the financial performance variable (ROA). Data analysis was done using both descriptive and inferential statistics. SPSS was applied. The researcher used tables in data presentation and also regression analysis to help make inferences to the Secondary data.

4. Results and Discussions

The respondents provided information about the effect of capital adequacy regulation on the different cooperative societies' performance. The key issues that responses were provided include Core Capital, Core Assets, Total Deposits and Management Strategies.

4.1 Descriptive Statistics

Core Capital:

MILLIONS	SERIES
Less than 10	0
10 – 15.9	10
16 – 20	0
20.9 – 25.9	5
26 and above	15

Table 1

Table 1 provides information about the cooperatives core capital defined by the Sacco Societies Act, 2008 as fully paid up members' shares, retained earnings, disclosed reserves, grants and donations all of which are not meant to be expended unless on liquidation of the Sacco society. The cooperative societies had core capital of 10m to 15.9m, 20.5m to 25.9m and above 26 million respectively. However, regulations require that the minimum core capital of the SACCO Society shall at all times be Kshs.10 million (ten million shillings) which must be met before a license is issued. The above responses show that the SACCOs complied with the capital adequacy requirements as one of the main regulatory tools by SASRA.

Core Assets:

MILLIONS	SERIES
Less than 10	0
10 – 15.9	5
16 – 20	0
20.9 – 25.9	0
26 and above	25

Table 2

Table 2 indicates that the SACCOs under study maintain the minimum Core capital of not less than ten million shillings which must not be less than ten percent of total assets. These SACCOs therefore meet the SASRA requirements of capital adequacy which is shown in their financial statements.

Percentage of Total Deposits

PERCENTAGE	SERIES
Less than 8	0
8.5 – 13.5	5
14 – 18.5	5
19 – 23.5	5
24 and above	15

Table 3

Table 3 shows the percentage of total deposits which indicate that the pool of members' savings deposits and shares to finance their own loan portfolios rather than rely on outside capital is high. The responses in figure 3 indicate that the cooperative societies met the capital adequacy requirement of core capital which should not be less than eight percent of total deposits (SASRA Capital guidelines, 2015).

Management Strategies

RESPONSES	SERIES
Sell of shares	11
Licensing	6
New members	8
Attract customers	11
Innovations	9

Table 4

Table above indicates that SACCOs use management strategies where 11 responses reported on sale of shares, 6 responses that the cooperatives use licensing strategies, 8 reported existence of strategies of recruiting new members, 11 had strategies to attract customers and 9 indicated the existence of innovation strategies. Role of strategies is to mitigate and minimize any challenges for the benefit of the cooperatives and its shareholders.

The above findings are consistent with the Sacco society's regulatory authority guidelines (2015) which requires cooperative societies to have contingency plans for dealing with liquidity problems or crisis situations. Comparatively with the above findings on strategies indicate that SACCOs have an early warning signal that enables SACCOs to identify any approaching crisis that can make them non complaint.

The findings show that the SACCOs studied have strategies for making up for cash-flow shortfalls in crisis situations. They can also cater for the increased deposit run-off during a crisis, more aggressive sale of shares to raise deposits required and the good public relations management that the strategies above can help a Sacco reduce the uncertainties of market participants and demonstrate that the highest levels of management are attentive to any problems that may exist.

Profitability of SACCO before Capital Adequacy:

	N	MINIMUM	MAXIMUM	MEAN
Excellent	1	1	1	1.00
Very Good	1	3	3	3.00
Good	1	11	11	11.00
Average	1	4	4	4.00
Poor	1	0	0	0.00
Valid N;	1			

Table 5

Table above shows 11 respondents indicated that profitability before the capital regulation was good, followed by four respondents for average profitability. Three respondents reported that Sacco performance was very good; one reported an excellent performance and none of the responses indicated poor performance before the introduction of the capital adequacy regulation.

Profitability of SACCO after Capital Adequacy

	N	MINIMUM	MAXIMUM	MEAN
Excellent	1	9	9	9.00
Very Good	1	11	11	11.00
Good	1	1	1	1.00
Average	1	0	0	0.00
Poor	1	0	0	0.00
Valid N;	1			

Table 6

Table 6 indicates the responses for performance after the introduction of SASRA regulations. Nine respondents reported excellent performance, twenty reported very good financial performance and only one respondent reported good performance. These findings are in line with that of Chege (2006) who found that non-remittance of members’ deductions by employers to the SACCOs was responsible for a negative effect on SACCOs’ performance. It was indicated that these negative effects were brought about by liquidity problems leading to low returns on loans an issue that capital adequacy regulations addressed.

4.2 Inferential Statistics

Correlations:

		ROA	CAPITAL ADEQUACY
Pearson Correlation	ROA	1.000	
	Capital Ad.	0.159	
Sig. (1-Tailed)	ROA		
	Capital Ad.	0.399	
N	ROA	5	5
	Capital Ad.	5	5

Table 7

As indicated in the Table 7, there is a statistically significant positive correlation between ROA and SASRA regulations (Pearson’s R =. 0.159, p = 0.399). However, it is significant at 95% level of confidence, (p>0.05).

From the correlation results, it is evident that there is a positive correlation between capital adequacy regulation and ROA as a measure of financial performance. Table shows the coefficient of variation of 0.159 indicating that 15.9% of the financial performance was explained by capital regulations and the

remaining 84.1% by other factors. The correlation results showed that capital adequacy regulations and ROA as a measure of financial performance have significant correlation with ROA at 95% level of confidence. This may be due to the strict general SASRA regulations working well for cooperatives.

5. Conclusions

The findings show that SACCOs observed capital adequacy regulations where the minimum core capital was maintained although capital adequacy requirement was still a challenge. Furthermore, SACCOs had strategies and innovation strategies to attract customers. Strategies were put in place to mitigate and minimize any challenges for the benefit of the cooperatives and its shareholders. However, there was improvement in capital adequacy after implementing regulations and as a result SACCOs were able to maintain liquidity levels as a percentage of savings deposits above 15%. As required by the SACCO society act of 2008 cap 488. The cooperatives fully complied with the capital regulation and as such the correlations results were positively statistically significant between ROA and SASRA regulations Pearson's $R = 0.159$, $p = 0.399$ at 95% level of confidence, $p > 0.05$.

The correlation results therefore showed capital adequacy improved financial performance of the SACCOs as measured by ROA. This study recommends that SACCO managers should consider other factors likely to affect performance of deposit taking SACCOs alongside the capital adequacy regulations and formulate policies to govern SACCOs in Kenya.

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Contribution of Rural Tourism Product Development on Tourist Numbers in Tharaka Nithi County, Kenya

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Abstract

United Nations world Tourism Organisation (UNWTO 2014) identifies rural tourism among the alternative forms of tourism that require prioritization in an attempt to enhance product development and community participation. The study sought to examine the contribution of rural tourism product development on tourist numbers in Tharaka Nithi County, Kenya. The study adopted descriptive cross-sectional survey research design. The target population was 106,899. Proportionate random sampling technique was used to select a sample size of 382 respondents. Questionnaires were used to collect data. Piloting of the research instruments was done to enhance reliability and validity. Data collected was analyzed by using SPSS. Categorical regression was done to determine the coefficients scores for each rural tourism product towards influencing the visitation numbers in rural destinations. The study established that rural tourism product development influences the number of tourists that visit a destination. It concludes that product development contributes to increase in tourism resources and facilities, which in turn affects the tourist numbers in a destination. This study recommends that tourism developers in Tharaka Nithi County should develop tourism facilities as they will appeal more to visitors hence increase the numbers visiting the destination. It is anticipated that the finding of this study will provide valuable reference for local community, tourist developers, county governments and tourism policy makers on the development of rural tourism.

Key words: Rural tourism, product development, tourist numbers.

1. Introduction

Rural tourism is a form of alternative tourism that has been highly developed across the globe due to its anticipated economic benefit (Sharpley, 2002). Generally it has been developed on private controlled development approach where most of the tourism facilities are privately owned. Private investors include tour operators, car hire companies, hoteliers and other tourism business suppliers (Lane 2015). In many countries however, rural tourism development has enjoyed substantial encouragement, support and, in some cases, direct financial assistance from both the public and private sectors (Fleischer & Pizam, 1997).

Rural tourism is a rapidly growing industry in Europe and North America, experiencing an annual growth rate of 6%. In many rural areas it has become an important source of livelihood for the rural population. For example, the annual proceeds from rural tourism in England amount to \$14 billion

and it provides 380,000 jobs (Arnold 2004). In Canada, it accounts for 3% of the rural labor force (Bollman 2005). Rural tourism has become an important and dominant factor in the rural economy of Western economies (Fleishcer 1997). In Europe rural destinations are among the most popular for summer holidays, educational holidays and weekend breaks (Edmunds 1999). For example, it has been estimated that rural tourism in England generates about 9 billion annually (Countryside Commission, 1995). European rural tourism has focused on rural circuit planning and routing of tourists. Integration of these efforts with product enhancement has highly resulted to better rural tourism performance (council of Europe, 2010).

Rural tourism is widely promoted as an effective source of income and employment, particularly in peripheral rural areas where traditional agrarian industries have declined. In Africa, a number of established tourism destinations have turned to rural tourism in order to diversify their tourism products and markets and to spread the benefits of rural tourism (Irina, 2012). Given the expected growth of tourism there is a great optimism for rural tourism. Numerous agencies and academic researchers have identified tourism as a potential economic development tool, particularly for rural communities (Okech, 2008).

Rural Tourism is increasingly being used as a development strategy to improve the social and economic well-being of rural areas (UNWTO, 2014). In Kenya rural tourism development has enjoyed substantial intervention and support. However over the last three decades, it has suffered a severe downturn, with falling employment and income levels in traditional industries contributing to a vicious circle of economic decline and socio economic problems (Ezeuduji, 2013). As a result, not only has rural tourism been embraced as a potential means of reversing this decline but also, given the intimate relationship between the socio economic health of rural areas in general and the prosperity of the farming community in particular, it has become an integral element of rural development policy (Humaira, 2010). This increasing dependence on and support for rural tourism development is based upon a number of perceived benefits it potentially provides to rural areas.

Tharaka Nithi County has a number of rural tourism sites. The availability of rural tourism resources in the County points to the potentiality of the region to growth and in enhancement of socio economic benefits to relevant rural tourism stakeholders. (Muturi, 2013). Tharaka Nithi County considers these resources as important assets albeit the model for development is lacking (Tharaka Nithi County strategic plan 2013). There is need in development of rural tourism development model that will aid in rural product development and diversification.

1.2. Study Objective and Conceptual Framework

The study sought to examine the contribution of rural tourism product development on tourist numbers in Tharaka Nithi County and was guided by the conceptual framework in Figure 1.

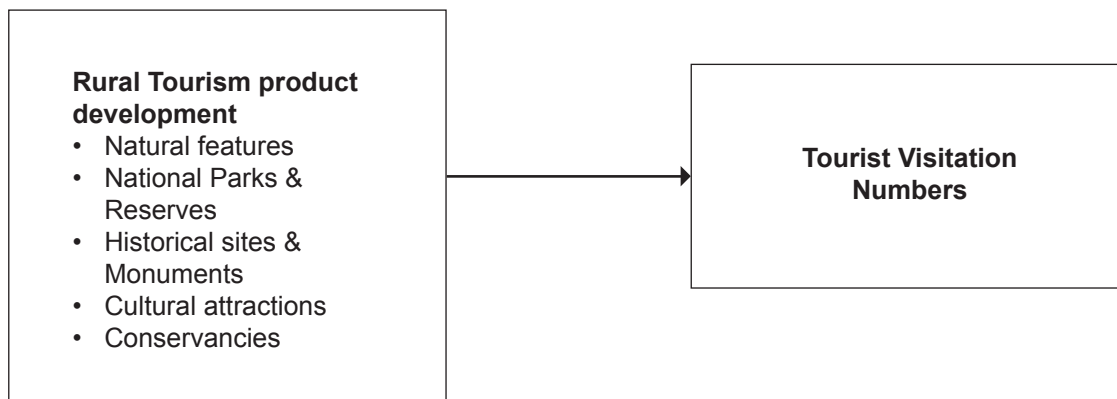


Figure 1: Relationship of Rural Tourism Product Development on Visitation Numbers, Average Length of stay and Expenditure

Source: Researcher (2018)

The following hypothesis guided the study:

H₀1: There is no relationship between rural tourism product development and tourist visitation numbers.

2. Literature Review

2.1 Rural Tourism Product Development Contribution to Tourists Visitation Numbers

Rural tourism depends on a wide range of public and private owned resources (Mary & Desmond, 2007) and unique cultural symbols of traditional societies and traditions practices that provide important resources for rural tourism (Jansen-Verbeke 1990, Gannon 1993, Middleton 1996). Rural tourism products may include the natural and cultural resources which may be owned by the public sector, (Richards, 2001). Natural resources include natural features e.g. wildlife, forests, landscapes which are conserved in conservancies and National parks and reserves while Cultural tourism resources may include historic buildings and monuments, cultural events galleries and museums. These have been promoted by different tourism destinations (O'Connor, 2003).

Government of Kenya (2010) reports that national parks and reserves developed in rural setting are the major centers for tourism in the country, hosting increasing numbers of international tourists particularly from western countries such as Germany, the United Kingdom, United States, Italy and France, for wildlife viewing and photography. A widespread of tourism resources is in Place with over 10% of its land area currently gazette as national parks, national reserves and forest reserves which are mostly located in rural destinations (KWS, 2010)

These products of rural tourism are classified according to the length and season. In relation to length, the tourism product are classified according to how long a tourist stays in a rural destination and in relation to season the tourism product is classified according to the number of tourists visiting a rural destination in high and low season. (Wiatrak 1998, Sikora 1999, Gaworecki 2000). Moreover, rural tourism products and services are usually supplemented with experiences (Roberts & Hall 2001). Rural tourism thus provides the whole range of services and products.

Rural tourism could be a strategy for sustainable development for rural areas while being a tool for product development. (The Centre for Sustainable Tourism in East Carolina University (2011)). The Centre for Sustainable Tourism in East Carolina University conducted a study on organizing resources for tourism product development in rural areas. The study reports that successful and sustainable rural tourism development ensures economic prosperity while still maintaining community values and quality of life. It further indicates that regardless of the level of community development a community is pursuing, a thorough understanding of the interrelationship of the components of the tourism industry and rural resources is required. It concludes that in order to increase the numbers of tourists visiting rural destinations tourism development must go beyond the brochures and this requires conscious involvement in an action driven, results oriented planning process that includes the integration of organizational development, community involvement, tourism product development and tourism product marketing.

A study by Zhang (2011) on rural tourism product development in China had an aim of establishing rural tourism products suitable for development. The results indicated that the rural product comprises of the core product being the cultural tourism supply (monuments, cultural events, local culture) and the related specific cultural tourist services such as information and education. The study reports that rural tourism product is developed as tourism demand variables. The study concluded that, rural products are categorized into various categories which include historic, artistic, regional, religious, recreational and scientific rural tourism products.

Garrod, Wonell & Youell (2006) in their study of re-conceptualizing rural tourism resources in South Africa, focuses on the case of rural tourism while illustrating the advantages of adopting a sustainable development approach. The study reports that much can be achieved in raising the profile of rural tourism and the nature of its interdependence with rural resources by re-conceptualizing the rural resource as a kind of capital asset of the rural tourism industry.

In Kenya a few studies have been conducted on rural resources and rural products. Okech (2008) in her study of promoting rural tourism in Kenya and Romania focuses on Luanda rural region in Western Kenya. The study reviewed district development plans to assess the strategies put in place for the development agenda in Luanda division. The study reports that the government had developed minimal effort to boost rural tourism in Kenya. It concludes that a lot has to be done in terms of developing tourism products especially in the rural areas where most of the tourism resources are located.

Tharaka Nithi County has adequate rural tourism resources that include natural and cultural resources, (County report 2013). However this resources have not been fully developed. The County is at the exploration stage of the destination cycle characterised by inadequate development of rural tourism facilities Butler (1989). This has led to the decline in the number of tourists visiting the destination.

2.2 Theoretical Framework

This study was guided by Tourist Area Life Cycle model (Butler, 1980) while supported by Lopa, Marecki, (1999) theory of development of tourism by periods. Butler (1980) evolution cycle of destinations theory explains that tourism development in destinations involve six main stages which include exploration, involvement, development, consolidation, stagnation and rejuvenation stage. In exploration stage the locality is discovered by the people who appreciate its beauty and culture. Involvement Stage is characterised by small but steadily increasing flow of tourists, they encourage local businesses to start providing tourist services and sell goods to the travellers. Development stage is the dynamic growth period. The flow of tourists is rapidly increasing. Attracted additional investment reduces the local nature services of the business. At consolidation stage the number of tourists is still growing. Marketing tools are used in order to prolong the tourist season in order to attract more tourists. At stagnation stage of the cyclic model, the number of tourists is growing steadily. At this stage, an opportunity to join or go to the next cycle is emerging. At rejuvenation stage the number of incoming tourists is stabilizing. These results in economic, social, political, and environmental problems.

Tourist Area Life Cycle model (Butler 1980) is complimented by Lopa, Marecki (1999) who characterizes the development of tourism by using many relevant periods: a) the period when the number of tourists is constantly increasing; b) the period when the number of tourists reaches a maximum; c) the period when the number of tourists stabilizes or stops to grow; d) the period when the number of visitors is decreasing. This tourism development cycle can be described as an impact of incoming tourists' number on the result. When the development of tourism is not yet at a high level, the area usually attracts low-income tourists, which tend to spend less and stay in cheap accommodation establishments or tents.

3. Research Methodology

The study adopted a descriptive cross-sectional survey research design. This design allowed the researcher to gather information, summarize and interpret the data and assists in obtaining relevant information concerning the phenomena and whenever possible draw general conclusion from facts discovered at a specific time (Cray 1992). The study was conducted in Tharaka Nithi County which has a population density of 356, 330 people (KNBS 2009).

The study targeted a population of 106,899 which is 30% of the entire population that practice tourism in Tharaka Nithi County (County reports 2015). This constituted 53,450 local communities, 35,633 tourists and 17,816 tourism developers in the three regions of Tharaka Nithi County who are the main players in rural tourism product development. The sample size of 383 was then derived according to Krejcie and Morgan (1970) formulae. The study utilized questionnaires as the main data collection instruments.

Data was collected using questionnaires, coded and analyzed using descriptive and inferential statistics via Statistical Package for Social Science (SPSS) software. Categorical regression was done to determine the coefficients scores for each rural tourism product towards influencing the visitation numbers in rural destinations. Hypotheses was tested at alpha (α) = 0.05 level of significance.

4. Results and Discussion

4.1 Respondents Characteristics

The respondents were asked to indicate their age as per given age brackets. The results indicated that 42% were aged between 35-45 years, 26% were aged between 45-55 years, 16% were aged between 25-35 years, while 10% were aged between 15-25 years and finally 6% of the respondents were aged above 55 years. The gender of the respondents indicated that male visitors accounted for slightly more than half of the respondents with a proportion of 71% compared to 29% female respondents.

Occupation results indicated that majority of the respondents were involved in farming as their main occupation with scores of 28%, those who were business men accounted for 23%, self-employed were 21%, while 19% worked in the private sector and 9% worked as civil servants.

The hypothesis sought to determine relationship between rural tourism product development and tourist visitation numbers. Respondents were asked whether they were aware of existing tourism facilities in the region, 84% said they were aware of the existing tourism facilities while 16% of the respondents declined.

4.2 Test of Hypothesis

Categorical regression was done to determine the coefficients scores for each rural tourism products towards influencing the visitation numbers of tourists in rural destinations. The significance levels were sought at $p \leq 0.05$. Results indicated that the model was statistically significant. (Adjusted $R^2 = 0.52$, $F = 70.74$, $p < 0.01$). This means that the model could explain 52% of the variance sought in the test variables.

Five independent variables were tested to determine their effect on visitation numbers.

These included; Natural features, National parks and reserves, Historical sites and monuments, Cultural attractions and conservancies. Among these, National parks and reserves ($p < 0.01$) were significant. The other four values were insignificant ($p > 0.05$). This is indicated on table 1.

Table 1: Regression Coefficients Showing Effects of Rural Tourism Product Development on Tourist Visitation Numbers

	Standardized Coefficients		Df	F	Sig.
	Beta	Std. Error			
Natural features	0.70	0.87	1	0.65	0.42
National parks and reserves	0.39	0.24	2	2.64	0.04*
Historical sites and monuments	0.02	0.28	1	0.00	0.10
Cultural attractions	0.42	0.32	1	1.79	0.18
Conservancies	-0.84	0.90	1	0.08	0.35

The research findings in the table 3 indicated that National parks and reserves played a significant role in determining the tourist numbers visiting a destination. The other variables (natural features, historical sites and monuments, cultural attractions and conservancies) were not significant meaning they did not play a role in determining the tourists numbers visiting a destination. Therefore, the null hypothesis that there is no significant and positive relationship between tourism product development and the tourist numbers in rural tourism was rejected.

The findings agree with a study conducted by Mary & Desmond (2007) who observes that product development is perceived to importantly convince various tourism categories. Many rural tourism destinations therefore develop essential product features in order to achieve increase in tourism numbers. However Butler tourism destination life cycle model (1989) clearly demonstrates the relationship between the tourism products and levels of development. At the exploration stage there is little or no infrastructure for tourism and small numbers of adventurous visitors are the ones attracted by the areas natural and cultural attractions. At involvement stage local investment and government agencies develop the infrastructure and this increases the number of visitors in the area. As the tourism facilities increase so as the development of the area and the number of visitors. When an area is completely developed with facilities then it increases its attractiveness and many visitors visit hence increasing the benefits.

Rural tourism development in Tharaka Nithi is arguably at the exploration stage. At this stage destination teams and tourism organisations initiate tourism programmes while disseminating information regarding the existing tourism activities. Although this stage does not have adverse effects it is often challenged by prevailing low tourists numbers, Inadequacy of tourism products, infrastructures and is less focused on the customer

According to Lopa, Marecki (1999) who characterizes the development of tourism by using many relevant periods: a) the period when the number of tourists is constantly increasing; b) the period when the number of tourists reaches a maximum; c) the period when the number of tourists stabilizes or stops to grow; d) the period when the number of visitors is decreasing. This tourism development cycle can be described as an impact of incoming tourists' number on the result. When the development of tourism

is not yet at a high level, the area usually attracts low-income and less tourists, who tend to spend less and stay in cheap accommodation establishments or tents.

Rural tourism product development initiatives are also promoted in Kenya National tourism policy. The policy emphasizes on tourism product diversification through rural tourism development and community based initiatives. It further points that efforts shall focus on reversing Kenya's image of 'mass' tourism and poor quality accommodation, improving operational quality and increasing numbers to this core product segment.

5. Conclusion and Recommendations

The study sought to determine relationship between rural tourism product development and tourist visitation numbers. The research findings were indicative of the fact that National parks and reserves played a significant role in determining the tourist numbers visiting a destination. The other variables i.e. natural features, historical sites and monuments, cultural attractions and conservancies were not significant meaning they did not play a role in determining the tourists numbers visiting a destination. Therefore, the null hypothesis was rejected and the conclusion was that there is significant and positive relationship between tourism product development and the tourist numbers in rural tourist. Based on the findings of the study the County Government of Tharaka Nithi is urged to develop rural tourism products in order to increase the number of tourists visiting the County.

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Assessing the Impact of Social Media Usage on Academic Performance of University Students at Gretsia University, Kenya

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Abstract

The purpose of the study is to establish the influence of social media on the performance of university students in Gretsia University. The 21st century is characterized by developments in the technological space. As a result, most young people are hooked up to devices consuming most of their time and they therefore become unproductive in other endeavors. The highest amount of their time is spent on social media platforms. Technology though meant to ease the way we do things has also been found to have adverse effects. The objectives of the study are; to determine the relationship between the amounts of time spent social media sites and performance of university students, to establish the prevalence of social media usage on academic performance of university students. The study will employ descriptive research design. A questionnaire will be distributed to 80 students. Quantitative data will be collected, summarized and analyzed to show relationship between social media usage and performance of academic students in Gretsia University.

Keywords: Social media usage, academic performance, university students

1. Introduction

Social Media Networks have been in existence for quite some while now; they can be traced back to the mid-2000s and have been more popular among the youth. According to Abdulahi, Jalil, and Lumpur, (2014), Social Media Networks (SNS) are web-based services that allow an individual to come up with a public or semipublic profile within a system, together with a number of other like-minded users, whom they share a connection while accessing connections with those made by others within the system. Different sites have different terms for such connections. These sites are unique in that they enable individuals to meet with people they would have otherwise interacted with due to different geographical locations. The greatest motivation for young people to join these platforms is to ensure that they make and retain strong relationships and friendships, (Abu-shanab, 2015).

Social influence has an effect on the behavior on social circumstances of individuals, and has significant contribution to their attitudes and intentions towards certain behaviors, (Yen, 2013). Since their inception these sites have attracted droves of users, most of them having integrated these sites into their day to day practice (Abdulahi et al., 2014). The emergence of Social Networking sites is now widespread within college and university students, where they provide a platform for users to connect and communicate with each other. The sites are however considered to have negative effects and become platforms for sharing pictures, sharing experiences and relieving stress among students (Luke & Meranga, 2017).

Students in this information era are required to use the internet as an important resource in their research work and studies. With developments in the technological space, more and more SNSs are gaining entry into the market and most of these consumers being students. This has become a major concern since it is almost impossible to determine whether the sites are used for constructive engagement, or are a deterrent to academic use of internet among university students, (Maturi, 2018). Maturi (2018), continues to say that the lack of appropriate policies for the right use of these networks, makes it almost impossible to determine their importance in academics.

With increased broadband access, there is an increased access of these social sites among students even outside their universities internet coverage. The cost of accessing internet has drastically reduced with the price wars among market players benefitting the users a majority of whom are the youth. (Chew et al., 2011). Most students and a majority of the youth take to Social Networking Sites to build their personal identities with a positive or negative impact on users' self-esteem. Users with a high self-esteem will be motivated to communicate with their peers through these sites. Users suffering from low self-esteem and dissatisfaction with life are linked with a low usage of these sites. The sites have however been linked with an increase in the strength of offline and online relationships. (Abu-shanab, 2015).

2. Problem Statement

The internet has revolutionized our lives in the 21st Century, turning the world into one global village. The way we interact, communicate, learn and build knowledge in comparison to yester years, reveal a total transformation in this field with the world today becoming a global village. Electronic commerce and mobile banking are significant successes brought about by this new development. Internet usage has also grown tremendously, with most of the users accessing the internet on their mobile phones and other handheld devices.

With the benefits cited, there are adverse effects that have come up with the continuous usage of the internet, especially among college going youth. The rate at which young people more so are accessing online, convergent, mobile networks and networked media is unparalleled. The contributor to this has been the constant changes in technological advancement. Most young people spend most of their time in social engagements through these sites as opposed to using them for academic activities (Ndung'u, 2017).

Academic performance of students is facing neglect and challenges since most students are easily distracted due to the availability of these sites are unable to fully concentrate in class, which in turn affects their academic performance. Students have been seen to devote more attention to social sites than they devote to their studies (Ayoola, 2016).

A study by (Abdulahi et al., 2014) on the Negative Effects of Social Networking Sites Such as Facebook among Asia Pacific University Scholars in Malaysia found that there was a negative linear relationship

between the variables under study. This implied that there social networking sites had a negative effect on the academic performance of students.

A study by (Luke & Meranga, 2017) on The Implications of Using Social Networking Sites for The Academic and The Non-academic Staffs in Two Indonesian Private Universities revealed that continued use of Social Networking Sites affects the job performance of university employees. It was also discovered that these sites had negative implications for sharing work.

(Khormi et al., 2016) studied Addiction to Social Media among Students at Jazan University. They found out that continued usage of SNSs had adverse effect on the academic life of the students. The students were spending too much time on these sites which in effect had a negative impact on their studies.

Very little has been done in the local context to study the influence of Social Networking Sites on the academic performance of university students. It is against this backdrop that the study sought to study the Influence of Social Networking Sites on Academic Performance of Gretsas University Students.

3. Objectives of the study

- i. To determine the purpose of use of social networking sites on academic performance of university students
- ii. To establish the dependence of social networking sites on academic performance of university students

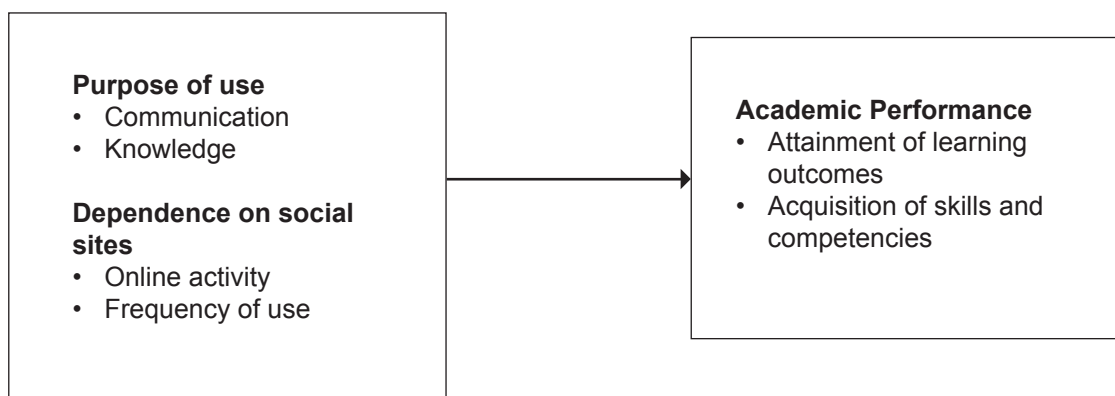
4. Research Questions

- i. Does purpose of use of social networking sites affect academic performance of university students?
- ii. To what extent does dependence on social networking sites affect academic performance of university students?

5. Conceptual Framework

Independent Variable

Dependent Variable



6. Research Methodology

6. Research Methodology

The study used a descriptive survey research design to describe the characteristics of the population under study. Convenient sampling method was used to collect a sample of 100 respondents from a population of 2000 students. Quantitative data was collected through the use of questionnaires. Both descriptive and inferential statistics were used in data analysis.

Regression Model

$$Y = B_0 + B_1X_1 + B_2X_2 + e$$

•Where:

•Y = Academic Performance (Dependent Variable)

•X1 = Purpose of use

•X2 = Dependence on Social Sites

•B0 = Constant term

•B1, B2 = Beta Coefficients

•e = error term

7. Results and Discussion

Which social networking site do you spend most of our time on?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Facebook	4	4.3	4.3	4.3
	Whatsapp	57	62.0	62.0	66.3
	Instagram	4	4.3	4.3	70.7
	YouTube	16	17.4	17.4	88.0
	Google+	8	8.7	8.7	96.7
	Others	3	3.3	3.3	100.0
	Total	92	100.0	100.0	

From the findings, most of the students spend most of their time on WhatsApp as indicated by the highest frequency of 57 respondents. This is followed by YouTube with a total frequency of 16 respondents.

How much time do you spend on Social Media Networks in any given day?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Never	1	1.1	1.1	1.1
	Less than 1 hour	10	10.9	10.9	12.0
	1-6 hours	49	53.3	53.3	65.2
	6-12 hours	18	19.6	19.6	84.8
	Above 12 hours	14	15.2	15.2	100.0
	Total	92	100.0	100.0	

On the amount of time spent on Social Networks, a majority of students spent an average of 1-6 hours in a day, followed an average of 6-12 hours. This indicates that a significant amount of time when students are active is spent on these sites in a day.

Purpose of Use

	N	Mean	Std. Deviation
I always use Social Networking Sites to find new information	92	4.27	1.120
I use Social Networking Sites to connect with friends and family	92	4.37	1.045
Social Networking facilitate my engagement in group discussions	92	3.47	1.271
I engage my lecturers for assistance with academic work on social networking sites	92	2.77	1.319
New information related to my field of study is obtained through the use of social media networks	92	3.99	1.074
I rely entirely on information obtained through social media networks without consulting other sources of information.	92	2.90	1.258
My course requires me to spend a lot of time online accessing assignments and class presentations.	92	3.32	1.240
Valid N (listwise)	92		

Most students reported that they use social networks for social purposes such as connecting with friends and family. This is indicated by a mean of 4.37 and a standard deviation of 1.045. This is closely followed by the usage of social network to find new information, with a mean of 4.27 and a standard deviation of 1.12. Those who consulted their lecturers through this platform were the least with a mean of 2.77 and a standard deviation of 1.319.

Dependence on Social Networking Sites

	N	Mean	Std. Deviation
Checking social media messages is the last thing I do before going to sleep	92	3.72	1.295
On any given day, I will log in into more than social media platform.	92	3.60	1.232
I always feel anxious when social media is unavailable	92	3.55	1.329
Checking social media messages is the first thing I do when I wake up	92	3.29	1.530
I feel more comfortable expressing myself through social media, as opposed to face to face interactions.	92	3.23	1.392
I always feel as if I have lost something when I don't use social media.	92	3.10	1.383
I always access social media when having meals	92	2.65	1.410
Valid N (listwise)	92		

On any given day, most students reported that checking social media messages is the last thing they do before going to sleep. This is as indicated by a mean of 3.72 and a standard deviation of 1.23. The students were however not involved so much with these sites while having meals as indicated by a mean of 2.65 and a standard deviation of 1.41.

Academic Performance

	N	Mean	Std. Deviation
Social media is a useful learning tool in the university	92	4.38	.924
Social sites have helped to harness my research skills	92	4.09	.910
Use of social sites has helped to improve my communication skills	92	3.90	1.177
Social sites have helped to improve my academic performance	92	3.90	1.017
Access to social sites while attending academic discussions limits my engagement in these meetings.	92	2.71	1.330
Access to social sites while in the library distracts me from my studies	92	2.68	1.437
I am always tempted to use social media networks in class which distracts me from my lectures.	92	2.52	1.418
I spend more time on social media networks in comparison to the amount of time dedicated to my studies	92	2.48	1.346
Valid N (listwise)	92		

On academic performance most students reported that Social Networking Sites are useful learning tools in the university with a mean of 4.38 and a standard deviation of 0.924. Most students however indicated that they did not spend more time on these networks in comparison to their studies as indicated by a mean of 2.48 and standard deviation of 1.346.

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.418	2	9.709	28.837	.000 ^b
	Residual	29.965	89	.337		
	Total	49.384	91			

a. Dependent Variable: Performance

b. Predictors: (Constant), Dependence, Academic

The model is significant, as demonstrated by a positive F ration of 28.837 and a p value of 0.000

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.627 ^a	.393	.380	.58025

a. Predictors: (Constant), Dependence on social networking sites, Academic performance

The coefficient of determination (R^2) indicates Social Networking Sites affects academic performance by 62.7%. Other factor not included in this study influence academic performance by 37.3. These factors should inform future studies in this subject.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.993	.382		2.596	.011
	Academic	.253	.097	.218	2.601	.011
	Dependence	.434	.066	.552	6.581	.000

All the values of the study are significant, with indicating a p value of less than 0.05. Dependence on Social Networking Sites is the strongest contributor to the dependent variable (academic performance) with a beta coefficient of 0.43, followed by academic purposes with a beta value of 0.253

Correlations

		Purpose of use	Academic Performance	Dependence on social networking sites
Purpose of use	Pearson Correlation	1	.313**	.172
	Sig. (2-tailed)		.002	.101
	N	92	92	92
Academic Performance	Pearson Correlation	.313**	1	.589**
	Sig. (2-tailed)	.002		.000
	N	92	92	92
Dependence on social networking sites	Pearson Correlation	.172	.589**	1
	Sig. (2-tailed)	.101	.000	
	N	92	92	92

** . Correlation is significant at the 0.01 level (2-tailed).

There is a positive linear relationship between the independent and the dependent variable. Purpose of use on academic performance represents the value of $r = 0.313$, on the other hand dependence on Social Networking Sites indicates the highest value of $r = 0.589$ on academic performance demonstrating a strong linear relationship between the two variables.

8. Conclusions and Recommendations

From the findings, a positive linear relationship has been established between Social Networking Sites and Academic Performance. The study recommends that future research should employ other methods such as observation of the study units. Other factors not studied in this research should also influence future research work in this subject.

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Effect of Innovation Strategies on Performance of Real Estate Firms in Mavoko Sub-County, Kenya

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Abstract

The two main aims that every business organization must endeavor to achieve are attaining a position of competitive advantage as well as enhancing a firm's performance relative to its competitors. An innovative implemented strategy can have a noteworthy effect on the realization of viable improvement level. In Kenya the real estate sector is very competitive and therefore having a competitive advantage is key for survival. This study sought to assess the effect of innovation strategies on real estate firms' performance in Mavoko Sub-County, Kenya. Specifically, the study sought to; determine how Process Innovation Strategy, Product Differentiation Strategy, Technology Strategy, and Innovative Customer Service Strategy influences performance of real estate firms in Mavoko Sub-County, Kenya. This study used census method since the population was small and the firms were easily accessible. Primary data for this study was collected using a questionnaire as its key instrument. SPSS version 25 then aided in analyzing data as it was most apposite and user-friendly for analyzing attitudinal responses that are management related. Data collected was then analyzed through descriptive statistics and inferential statistics and presented using frequency distribution tables and figures. The findings revealed that 90.3% of the total variance in the dependent variable (Performance of Real Estate Firms) could be significantly explained by combined independent variables (Process Innovation Strategy, Product Differentiation Strategy, Technology Strategy, and Innovative Customer Service Strategy). The study therefore concluded that Process Innovation, Product Differentiation, Technology, and Innovative Customer Service Strategies had significant positive effect on the performances of real estate firms in Mavoko Sub-County, Kenya. Therefore, the study recommended that the firms should make use of this strategies so as to boost their performance.

Key Words: Firm Strategy, Innovation, Performance

1. Introduction

Firms develop strategies that enable them achieve their basic goal of maximizing the wealth of their shareholders. Innovative strategies are protracted exploit plans that are invented to aid a company to improve and devour a competitive advantage over its competitors by responding to numerous changes in its environment (Zott & Amit, 2008). A firm's performance, on the contrarily, is the outcome of accomplishments of an organization or investment for a certain duration. There is a connection between innovation and performance of a firm whereby having a competing advantage it is highly likely that the firm will have a worthy performance in the industry it operates in.

The last decade has seen massive growth of the realtor business in Kenya for the reason that the property market is reacting to demand that has been fashioned by the escalating middle class with disposable income and in which persons have become able to purchase homes and others service their mortgages. As a result, there have been many players into real estate firms to content this demand. Competition is hence no amazement; the firms have to improve their main competencies to deliver unique products at reasonable costs for their survival (Muli, 2013).

According to Gathuru (2014), Kenyan real estate market has been quite rewarding especially for foreign investors with profit margins ranging 20%-30%, which Luesby (in Muguchia, 2012) opined is impossible even in places like the United States of America or European markets. Foreign real estate organizations have developed luxury properties worthy millions of dollars at the high-end market focusing on diplomats, expatriates and wealthy Kenyans. The Knight Frank's 2011 Prime International Residential Index (PIRI) indicated that luxury realtors in Kenya recorded the highest increase in profits globally. Comparatively, Nairobi's high-end real estate value increased by twenty five percent and 20% at the coast region of Kenya than other major cities such as London (12.1%), Miami (19.1%), New York (3.1%), Singapore (4.7%), Moscow (9.8%) and Shanghai (-3.4%) (Mercy, 2012).

The Hass Property Index (2013) reports saturation in the high-end real estate area and observes that this price growth might be untenable in future. Some of the major projects include Thika Greens Limited (TGL) that stands on 1,135 acres of land in Thika, \$650 million golf estate that is set to have 4,000 housing units when completed. Another close-by project on 774 acres is Migaa in Kiambu County. The project that Home Afrika Ltd is developing will have 2,500 housing units and an 18-hole golf course. Land prices have skyrocketed in areas neighbouring these projects due to anticipation of demand by sellers and new amenities that have been established that are projected to transform the dormant area into a mega urban estate for high- and middle-income earners. Real estate industry in Kenya is very competitive and therefore having a competitive advantage is key for survival. The major ones include Lloyd Masika Limited, Hass consult, Dunhill Consulting Limited among others.

However, in the last 5 years, the sector has been affected negatively by financial crisis that affected the entire world. There has been also a massive expansion of the real estate that calls for innovation and new strategies by the stakeholders in the sector for them to keep abreast with the challenges. Studies have projected that succeeding of competitive environment is the precursor to the significant performance of a firm (Raduan, Jegak, Haslinda & Alimin, 2009). Competitive superiority results from factors such as types of diversification, operational efficiency as well as organizational structures (Kunc & Morecroft, 2010). Attaining a position of competitive superiority and enhancing a firm's performance as compared to its competitors are two of the main aims that business organizations should endeavor to achieve. An innovative implemented strategy can have noteworthy effect on the realization of viable improvement level (Lai, Lin & Wang, 2015).

2. Review of Extant Literature

2.1 Process Innovation Strategy

Process innovation embraces quality function deployment and business process reengineering (Calantone, Harmancioglu & Droge, 2010). A supplier who efficiently works on productivity gains regularly can expect to come up with products that provide similar or even better performance at a lower cost with time. Such reduction in cost will flow down to the customers as lowered prices. Process innovation is fundamental for both core product supply and in the support part. Both components require meeting and maintaining of quality standards.

Managing process innovation especially in the case of services is quite a challenging activity (Gallouj & Savona, 2009). Developing and implementing the process of innovation needs energy to get past change resistance. A chain of imitative, incremental, late innovations might bring about a cumulative undesirable effect to the innovating firm. However, this strategy looks as if less dynamic as compared to proactive innovator strategy even though none of them is automatically and always better. Reactive innovators tend to support the creative genius less and are more supportive of systematic progress in a logical fashion (Kasten, 2009).

2.2 Product Differentiation Strategy

A firm that uses differentiation strategy should focus on developing and investing in distinguishable products that customers can perceive rather than cost reduction. The most critical success factor in differentiation strategy implementation is developing and maintaining creativeness, innovativeness and firm learning (Kim & Atuahene-Gima, 2010). Successful differentiation is founded on carrying out a study to identify the behaviour and needs of the buyers so as to establish what they regard as valuable and important. The features that a majority of the customers desire are then used to build a product that meets preferences of the buyer. Competitive advantage is brought about by coming with a product that significantly differs from competitors' products.

Differentiation efforts in most cases end up rising production costs. Achieving profitable differentiation is done by counterweighing the lower margins of profit through increasing sales volume or by maintaining differentiation cost under the premium price that is commanded by the differentiating characteristics or (McNally, Cavusgil & Calantone, 2010). Differentiation aims to create products or a service at the broad market that customers perceive as unique across the industry. The product can then be sold at a premium price by the firm. The uniqueness is achieved with brand image, design, technology, network, features, customers' service or dealers. Differentiation earns the firm an above-average returns as the subsequent brand loyalty lowers customers' price sensitivity. Resultant costs are usually handed down to the customers (Stankevicius & Jucevicius, 2010).

2.3 Technology Strategy

Information and communication technology (ICT) has been observed to have potential and capability to help in achievement of innovative strategy (Stanko & Calantone, 2011). The rate at which firms are installing computer systems including hardware and software as well as making use of the Internet for communication and information sourcing is evidence of the increased awareness in the real estate sector. The gains that firms get from information and communication technology usage include overall attainment of increased returns and efficiency. E-commerce is premised to bring about a new commercial revolution by providing a direct and inexpensive means of exchanging information as well as to buying or selling services and products (Afuah, 2014). This marketplace revolution has triggered a real estate sector revolution for development of a system of payment that meets the demands of the electronic marketplace. Consequently, e-commerce potential benefits have been touted widely (Porter, 2007).

Porter emphasized empowerment of real estate capabilities by use of technology. In the context of real estate, technological advancement in creates new opportunities that result in service quality improvement while responding to changing competitive conditions and volatile economic environment (Mitchelmore & Rowley, 2010). At the firm level, in addition to adoption of technology in integrating delivery networks for building close relationships with clients, real estate businesses also acquire technology to improve analysis of information that entail product usage, customer segmentation, transaction behavior of the customer, demographics, that subsequently increase the market share and profitability.

2.4 Innovative Customer Service Strategy

Functional quality focuses on how the product gets to the client. This entails behavioral and psychological aspects that include performance of task by employees, how the service is done, accessibility to the provider and what employees say. Thus, unlike functional quality that is quite difficult to evaluate, technical quality is easy to evaluate objectively (Raymond & St-Pierre, 2010). The model further accepts that customers have a firm image, which functions as a filter and as a quality impact in itself. The quality perceived by customers is the end product of evaluating the firm or the product and comparing between what was experienced and what was expected, while considering the influence that the image has on the organization. Nowadays quality is one of the most vital elements service firms employ in their strategic management. Providing customers with high-quality products helps the firm secure their satisfaction as well as loyalty and in returns ensures long-term success and long-term survival of the firm (Nayak, Noida & Agarwal, 2011).

Customer service is usually an integral part of a company's consumer value proposition. Variant models that seek to assess and measure the determinants of quality of service have been created. SERVQUAL is founded on the view that a gap exists between expectations of customers in terms quality of service delivered and their actual performance evaluation of that particular service provider. Since the introduction of SERVQUAL instrument by Grönroos (cited in Kindström and Kowalkowski, 2014), many scholars have made use of, extended and come up with a 22-item scale to study quality of services in various sectors of the service industry (Hardwick, Anderson & Cruickshank, 2013).

3. Research Methodology

This research project used descriptive research design. The study targeted all the 32 registered real estate firms operating in Mavoko Sub County of Machakos County. This was a census of all the 32 registered real estate firms operating in Mavoko Sub County of Machakos County. A sample of 96 respondents was used for the study. The study managed to collect 90 questionnaires. However, after checking for consistency and cleaning the data as well as removing the outliers, the study remained with 86 duly filled questionnaires which represented a response rate of 89.6% of the sampled 96 respondents. While various scholars do not agree on a response rate level that is acceptable for data analysis, Baruch and Holtom (2008) posited that surveys encounter a response rate that hardly surpasses 50%. They continued to suggest that a rate of response that exceeds 50% is acceptable and forms a good basis for analysis of data. Oso and Ifijeh (2016) supports this argument that for a social study, responses bearing over 60% response rate are sufficient for making adequate research conclusions.

4. Results and Discussion

4.1 Descriptive Findings on Study Variables

4.1.1 Process Innovation Strategy

The study generated a descriptive statistics table of Process Innovation Strategy and the findings were summarised in Table 1. From the findings, 33.7% agreed that the firm has introduced new technology that has substantially changed the way the main product is produced, 39.5% agreed that the firm has hired key personnel to facilitate smooth running of its processes, 32.6% agreed that their firm offers formal as well as on job training to its employees to deliver better on its mandate to its customers, 31.4% agreed that the management encourages innovation in all firm's processes and rewards the best innovative employees, and 32.6% agreed that their firm's ability to have better processes has enabled us stay ahead of the competition.

Table 1: Descriptive Statistics for Process Innovation Strategy

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The firm has introduced new technology that has substantially changed the way the main product is produced	0.0%	16.3%	30.2%	33.7%	19.8%
The firm has hired key personnel to facilitate smooth running of its processes	2.3%	12.8%	19.8%	39.5%	25.6%
Our firm offers formal as well as on job training to its employees to deliver better on its mandate to its customers	8.1%	23.3%	22.1%	32.6%	14.0%
The management encourages innovation in all firm's processes and rewards the best innovative employees	4.7%	16.3%	26.7%	31.4%	20.9%
Our firm's ability to have better processes has enabled us stay ahead of the competition	3.5%	19.8%	20.9%	32.6%	23.3%

4.1.2 Product Differentiation Strategy

The study generated a descriptive statistics table of Product Differentiation Strategy using SPSS software and the findings were summarised in Table 2 which shows that, 37.2% agreed that their firm has a wide variety of products, 40.7% agreed that their firm empowers customers by providing them with diverse products to choose from, 40.7% strongly agreed that increase in number of products offered has led to increase in customer base, 41.9% agreed that their firm modifies existing products to fit market demand so as to attract new customers as well as entice the existing ones, while 37.2% strongly agreed that their firm's ability to develop new products has enabled us stay ahead of the competition.

Table 2: Descriptive Statistics of Product Differentiation Strategy

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Our firm has a wide variety of products	7.0%	10.5%	18.6%	37.2%	26.7%
We empower our customers by providing them with a wide variety of products to choose from	2.3%	10.5%	19.8%	40.7%	26.7%
Increase in number of products offered has led to increase in customer base	7.0%	8.1%	18.6%	25.6%	40.7%
Our firm modifies existing products to fit market demand so as to attract new customers as well as entice the existing ones	3.5%	16.3%	11.6%	41.9%	26.7%
Our firm's ability to develop new products has enabled us stay ahead of the competition	3.5%	9.3%	19.8%	30.2%	37.2%

4.1.3 Technology Strategy

The study used SPSS software to generate a descriptive statistics table of Technology Strategy and the results were summarised in Table 3 which indicates that 38.4% agreed that their firm has various technologically enabled products, 36.0% agreed that digital supported products have reduced the average cost of transaction, 30.2% remained neutral on the statement that technological products offer their customers considerable convenience, 36.0% agreed that technology has improved their customer satisfaction level, 30.2% agreed that their firm commits resources to sustain and manage technological products, and 41.9% agreed that their customer base has increased as a result of more digital products.

Table 3: Descriptive Statistics for Technology Strategy

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Our firm has various technologically enabled products	3.5%	5.8%	36.0%	38.4%	16.3%
Digital supported products have reduced the average cost of transaction	2.3%	16.3%	29.1%	36.0%	16.3%
Technological products offer our customers considerable convenience	3.5%	12.8%	30.2%	27.9%	25.6%
Technology has improved our customer satisfaction level	3.5%	9.3%	31.4%	36.0%	19.8%
Our firm commits resources to sustain and manage technological products	7.0%	11.6%	24.4%	30.2%	26.7%
Our customer base has increased as a result of more digital products	5.8%	7.0%	36.0%	41.9%	9.3%

4.1.4 Innovative Customer Service Strategy

Using SPSS software, the study generated a descriptive statistics table of Innovative Customer Service Strategy and the findings were summarised as shown in Table 4. The results summarised in Table 5, 38.4% agreed that their firm's customer service is very reliable, 43.0% agreed that the customers get instant response to their demands, 45.3% agreed that their firm has quality customer relationship, 38.4% agreed that the management has in places means to quicken service delivery, and 33.7% agreed that the management ensures that customers are in touch with the firm all the time.

Table 4: Descriptive Statistics of Innovative Customer Service Strategy

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Our firm's customer service is very reliable	0.0%	12.8%	16.3%	38.4%	32.6%
The customers get instant response to their demands	2.3%	9.3%	23.3%	43.0%	22.1%
Our firm has quality customer relationship	2.3%	9.3%	17.4%	45.3%	25.6%
The management has in places means to quicken service delivery	7.0%	8.1%	36.0%	38.4%	10.5%
The management ensures that customers are in touch with the firm all the time	2.3%	16.3%	22.1%	33.7%	25.6%

4.1.5 Real Estate Firms' Performance

The study generated a descriptive statistics table of Performance of Real Estate Firms from the data and presented the findings in Table 5. From the table, 45.3% said their customer base was good, 37.2% said their market share was good, 47.7% said their customer satisfaction was good, 36.0% said their general growth rate was average, and 47.7% said their level of profitability was good.

Table 5: Descriptive Statistics of Real Estate Firms' Performance

	Very Poor	Poor	Average	Good	Very Good
Customer Base	2.3%	5.8%	33.7%	45.3%	12.8%
Market Share	1.2%	11.6%	23.3%	37.2%	26.7%
Customer Satisfaction	0.0%	8.1%	25.6%	47.7%	18.6%
General growth rate	0.0%	8.1%	36.0%	32.6%	23.3%
Level of profitability	0.0%	4.7%	27.9%	47.7%	19.8%

4.2 Regression Analysis

A regression analysis between the Independent Variables (Process Innovation Strategy, Product Differentiation Strategy, Technology Strategy, and Innovative Customer Service Strategy) and the Dependent Variable (Real Estate Firms Performance) was carried out and the findings were presented in Table 5, Table 6 and Table 7. Table 5 shows that R^2 was .903 meaning that all independent variables (Process Innovation Strategy, Product Differentiation Strategy, Technology Strategy, and Innovative Customer Service Strategy) contributes 90.3% to the total variance of Real Estate Firms Performance (the dependent variable).

Table 5: Model Summary of Independent Variables and the Dependent Variable

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.950 ^a	.903	.898	.26930

a. Predictors: (Constant), Innovative Customer Service Strategy, Technology Strategy, Process Innovation Strategy, Product Differentiation Strategy

The Anova Table 6 shows that the p-value was .000 (below the 5% threshold) and hence, the Combined Independent Variables (Process Innovation Strategy, Product Differentiation Strategy, Technology Strategy, and Innovative Customer Service Strategy) were statistically significant to the Dependent Variable (Performance of Real Estate Firms).

Table 61: Anova Table of Independent Variables and the Dependent Variable (Firm Performance) ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	54.664	4	13.666	188.442	.000 ^b
	Residual	5.874	81	.073		
	Total	60.538	85			

a. Dependent Variable: Real Estate Firms Performance

b. Predictors: (Constant), Innovative Customer Service Strategy, Technology Strategy, Process Innovation Strategy, Product Differentiation Strategy

Table 7 indicates that all independent variables (Process Innovation Strategy, Product Differentiation Strategy, Technology Strategy, and Innovative Customer Service Strategy) contributed significantly (p-values below the 5.0% threshold) to the optimal model shown below;

$$\text{Performance of Real Estate Firms (Y)} = .355 - .125X_1 + .509X_2 + .177X_3 + .320X_4$$

Table 7: Coefficient Table of Independent Variables and the Dependent Variable (Performance of Firms)

Coefficients^a						
Model		Unstandardized		Standardized	t	Sig.
		Coefficients		Coefficients		
		B	Std. Error	Beta		
1	(Constant)	3.052	1.376		2.217	.029
	Cyber Risk Management and Oversight	.053	.054	.059	.993	.323
	Cyber Threat Intelligence and Collaboration	.102	.075	.135	1.369	.174
	CyberSecurity Controls	.143	.067	.194	2.129	.036
	Cyber Incident Response and Resilience	.355	.055	.555	6.470	.000

a. Dependent Variable: Combating Banking Fraud

The regression analysis reveals that Process Innovation Strategy had a negative coefficient implying that an increase in Process Innovation Strategy decreases Performance of Real Estate Firms. This finding contradicts that of Massa and Testa (2008) who observed that process innovation is related positively

to organisation growth and that of Varis and Littunen (2010) who found that firm performance was directly affected by process innovation. Murat Ar and Baki (2011) further noted that process innovation significantly and positively affected organisations performance. However, all these studies were carried out in different sectors of the economy and different geographical locations from the one used in this study (real estate firms in Mavoko Sub-County, Kenya).

Product Differentiation Strategy was found to have a significant, positive and strongest effect on Real Estate Firms' Performance (the dependent variable). In a similar study, Löfsten (2014) noted that product innovation dimensions such as efficacy and efficiency were strongly and positively related to performance. The findings were similar to those of Artz, Norman, Hatfield and Cardinal (2010) whose findings revealed that product innovation strategy affected performance of the organisation significantly. Artz *et al.* (2010) observed that exceptional profits were generated by product innovation especially when introduced products face indirect or little competition that leads to higher product margins in the long run. In a similar finding, Bowen, Rostami and Steel (2010) and Calantone, Harmancioglu and Droge (2010) admitted that product innovation affected revenue growth positively.

Technology Strategy was observed to have a positive and significant influence on the dependent variable (Performance of Real Estate Firms). In a similar study by Karanja (2009), the author observes that companies that strongly adopt innovation strategies that are technology-enabled are the ones that have better chances of competing and also create higher shareholder value. The findings further indicated that Innovative Customer Service Strategy had a positive significant impact on the dependent variable (Performance of Real Estate Firms). In a similar study, Karabulut (2015) noted that the internal business processes dimension leads managers to develop excellent internal business processes to sustain customer satisfaction after they determine factors achieving customer satisfaction. The learning and growth perspective define structure, critical factors, internal business processes, and customer processes to improve the growth of the firm in the long term. These findings were consistent with the argument of Padma, Rajendran and Sai Lokachari (2010), who maintained that improved service quality endows companies with social and commercial significance.

5. Conclusions and Recommendations

The study sought to find the effects of Process Innovation Strategy on real estate firms' performance in the Sub-County of Mavoko, Kenya. From the study findings, both correlation and regression analysis revealed that Process Innovation Strategy significantly affected real estate firms' performance in the Sub-County of Mavoko, Kenya. The study therefore concluded that Process Innovation Strategy affected real estate firms' performance in the Sub-County of Mavoko, Kenya. In a comparative study on how product and process innovation affects performance, Wolff and Pett (2004) found that changes in product are related positively to profitability and growth of firm. Van Auken, Madrid-Guijarro and Garcia-Perez-de-Lema (2008) study of performance and innovation of manufacturing SMEs in Spain noted that there was positive relation between innovation process and performance. Fagerberg and Verspagen (2009) emphasized that process innovation can have a more hazy effect due to its cost-cutting nature as compared to introducing new products.

The study sought to establish the effect of Product Differentiation Strategy on performance of real estate firms in Mavoko Sub-County, Kenya. The study concluded that Product Differentiation Strategy affected real estate firms' performance in the Sub-County of Mavoko, Kenya positively as the study results, especially correlation and regression which showed that Product Differentiation Strategy effect on the performance of real estate firms was positive and statistically significant. Therefore, an increase in Product Differentiation Strategy had an effective increase on real estate firms' performance in the Sub-County of Mavoko, Kenya. Similar researches indicate an association between financial gain and product innovation (Cozza, Malerba, Mancusi, Perani & Vezzulli, 2012) and revenue growth (De Faria & Mendonça, 2011). Other similar studies have shown that firm performance is positively affected by product innovation (Bowen, Rostami & Steel, 2010; and Calantone, Harmancioglu & Droge, 2010). Boachie-Mensah and Acquah (2015) indicated that product innovation was positively and significantly linked with performance of the firm. Hernandez-Espallardo and Ballester (2009) also found that product innovation had a significant positive effects on performance of the organisation.

Further, the study assessed the effect that Technology Strategy had on the real estate firms performance in Mavoko Sub-County, Kenya. The study concluded that Technology Strategy was positively and significantly related to real estate firms' performance in the Sub-County of Mavoko, Kenya as was indicated in the correlation and regression results. In a similar study, Atandi and Bwisa (2013) noted that where technology was adopted as a process innovation potential, a connection existed between firm performance and new technology. Consistent with this study finding Anderson, Potočnik and Zhou (2014) who also noted that organisation performance and new technology had a significant association.

The study also sought to find out the effect that Innovative Customer Service Strategy had on real estate firms' performance in the Sub-County of Mavoko, Kenya. From the correlation and regression findings, the study made a conclusion that Innovative Customer Service Strategy positively and significantly affected real estate firms' performance in the Sub-County of Mavoko, Kenya. The study results were consistent with the statement by Wicks and Roethlein (2009) that an organization that consistently satisfies its customers, enjoy higher retention levels and greater profitability due to increase customer loyalty. Agbor (2011) noted that satisfaction service quality and of customers have been shown to improve the general organizational profitability.

The general objective of the study was to assess the effect that innovation strategies have on real estate firms' performance in the Sub-County of Mavoko, Kenya. From the findings therefore, the study recommends that the firms should make use of Process Innovation Strategy, Product Differentiation Strategy, Technology Strategy, and Innovative Customer Service Strategy so as to enhance their performance.

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Linking Strategic Personal Branding and Organizational Competitive Advantage: A Review of the Literature and Research Agenda

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Abstract

Personal branding is all about understanding the unique characteristics of rational and emotional attributes, strengths skills and values using them to differentiate one self and guide career decisions. Competitive advantage grows from the values an organization creates for its employees and their individual branding potential and customers that exceed the cost of creating it. The study was conducted was to critically review the conceptual literature on the constructs of strategic personal branding and organization competitive advantage. Theoretical and methodological gaps were done for future purposes of research to be conducted on strategic personal branding and competitive advantage. Social identity theory, Resource Based View (RBV) theory and SERVQUAL model guided the study.

Key words: Strategic personal branding, Organization competitive advantage, Service quality, Competitive environment

1. Introduction

According to Kotler & Keller (2006), a brand is a name, term, sign, symbol, design or combination of all intended to identify goods or services of one seller to differentiate them from those of competitors. Further, Moore & Reid (2008) describe branding as an act of creating a brand. In the same vein, personal branding is a planning process in which people make efforts to market themselves (Belk, 2013; Khedher, 2014). A personal brand with clear distinctions and reputable image becomes an object of desire for professionals and other leaders.

Every individual has a personal brand but most people are not aware of this and do not manage it strategically, consistently and effectively. The success of an outstanding Personal brand is created by others especially in a developing country like Kenya. Through this personal relationship and good reputation it could move an upcoming leader up the career ladder. McCarthy (2015) indicated branding as an important aspect towards a career success. Personal branding is traced back by Peters (1997) in an article called brand called you. In life personal branding becomes a more sustainable vehicle compared to marketing and sales when eliminating competitors. Strong and successful personal branding entails managing perceptions, controlling and influencing how others perceive you and think about you (Rampersad, 2008).

A personal brand should reflect the real you and build your values, strengths, uniqueness and genius. The aspect of competitive advantage is conceptualized into two ways, cost focus and differentiation. Competitive advantage is an unobservable construct that encompasses all latent characteristics of competitive advantage concept and separates it's from its sources and that of performance concept (Sigalas & Pekka-Economou, 2013). Individuals need well defined competitive advantage features that they can strategically employ to their personal branding outlook to differentiate themselves with other competitors. The use of competitive advantage brings about quality services which is an essential tool while marketing our personal brands.

The main reason this study was conducted was to critically review the conceptual literature on the constructs of strategic personal branding and competitive advantage. Empirical literature and gaps were also identified on the linkages between strategic personal branding and competitive advantage. Finally, a review of theoretical and methodological gaps was done for future purposes of research to be conducted on strategic personal branding and competitive advantage. This study also recommends the adoption of a conceptual framework for implementation of the relationship between strategic personal branding and competitive advantage.

This article is conceptualized around the following research prepositions:

Preposition 1: Deployment of strategic personal branding in an organization will positively affect an organization's competitive advantage

Preposition 2: The adoption of service quality by organizations will mediate the relationship between deployed strategic personal branding and organizational competitive advantage

Preposition 3: Competitive environment as an external variable will moderate the relationship between the deployed strategic personal branding and organization's competitive advantage.

2. Focus of the Study

The concept of strategic personal branding is relatively new in development and its conceptualization. The concept is traced back to the work done by Tom Peters in 1997 that brought into limelight this concept in terms of its nature and role played in giving an organization a competitive advantage. Although little studies have been done in this line of context, personal branding reflects unique characteristics of rational and emotional attributes, strengths skills and values used to differentiate one-self from others and guide career decisions giving an organization a competitive advantage,. Personal brand could be measured differently according to different authors. However, the aspect of competitive advantage in an organization is a buzzword that has not well been conceptualized by most authors in line with the concept of strategic personal branding (Markides, 2000). The use of different components of strategic personal branding as measure of competitive advantage by different authors is an issue that needs to be addressed. Consequently, the definitions, theories and models used to anchor competitive advantage lack commonality and meaning, hence a key issue to address (Sigalas & Pekka-Economou, 2013: O'Shannassy, 2008: Rumelt, 2003).

The purpose of this paper is to review the extant literature on the construct of strategic personal branding and how it brings about the organizational competitiveness and contribution in a manner that benefits an organization in real life situation. The paper seeks to identify and fill existing theoretical and empirical gaps from previous works not addressed on the construct of strategic personal branding and the competitive advantage it bring to an organization. Secondly, the paper aims to offer a better understanding of the concept of strategic personal branding in addressing the needs of various stakeholders and its contribution to helping organizations have a competitive advantage over others.

Finally, upon further empirical proofs, the finding of this paper will contribute immensely in decision making on appropriate government and organizational policies in determination of contributing factors that bring success to various entities. Lastly, the scholars in the filed of organizational studies will find a firm base theoretically, as bulding for future research through empirical studies.

3. Conceptualization of the key constructs

This section will be based on discussion of four construcs that emerged from this study wich include Strategic personal branding, Competitive advantage, competitive environment and service quality.

3.1 Personal Branding Concept

The term personal branding was used first by Tom Peters in 1997. Personal branding concept is an essence of planned self-marketing (Karaduman İ. , 2013). Self-marketing is an aspect that was greatly used by politicians and celebrities for some decades but as at known it cuts across all professionals such as managers, scientist, students, higher education teachers, and librarians among many other (Kucharska, 2017). Personal branding is an act of knowing one's skills and presenting those skills in a well arranged platter to others (Brems, Temmerman, Graham , & Broersma, 2017). Therefore, personal branding from above definitions it is all about understanding the unique characteristics of rational and emotional attributes, strengths skills and values using them to differentiate oneself and guide career decisions (Busch & Davis, 2018).

Personal brand could be measured differently according to different authors; in this study we will adopt the concepts on social identity theory. The theory suggest people assign perceived exemplary features of a social group to themselves and acts consistently with these qualities in maintaining a positive self-defining relationship with the group or other member of the group. Social identity has cognitive, affective and evaluative elements each activated in different context. In a social setting cognitive aspect relates to self-awareness of the group characteristics that define self-categorization. Affective aspect being a sense of emotional attachment to a group with positive feelings associated with membership such as enthusiasm and belonging. Lastly, evaluation is a membership perception of how non-member sees the group which influences collective.

3.2 Competitive Advantage Concept

Competitive advantage being a key concept in business science explains factors causing differences in performance among organizations (Ceccagnoli, 2009). However, some authors have argued that competitive advantage term is a buzzword that cause confusion in understanding as a result of different meanings attached to it in different contexts making its true definition elusive (O'Shannassy, 2008). Porter (1985) argue that the concept of competitive advantage starts from the organization ability in creating superior value products for its buyers through low-pricing and provision of unique bundle of benefits such as product branding that may offset expected higher price of products. This is in line with arguments of Ansoff (1965), a first strategic scholar who defined competitive advantage as unique characteristics of an individual product markets that give an organization a strong competitive edge over others. Sigalas & Pekka-Economou (2013) defined competitive advantage as an exploitation of market opportunities that neutralize competitive threats and that centering on key properties of an individual product markets was a source of competitive advantage. Such particular properties may include product differentiation, cost leadership, and other product features such as branding.

Extant literature in organizational studies have shown that competitive advantage is basically achieved when an organization acquires or develops a set of attributes that outperforms its competitors in either profits margins or other significant results of its engaged activities such as market share, technological advancements, product quality or through its significant resources (Wang, 2014). This has also been argued by proponents of the Resource Based View (RBV) theory, who viewed resources as scarce commodity in an organization but specialized as a source of competitive advantage due to their immobility and heterogeneity. Barney (1991) posits that resources in an organization which are valuable, imperfectly imitable, rare and non-substitutable will cause a sustained competitive advantage due to their historical dependency, causal ambiguity and social complexity. Porter (1985) found that competitive advantage grows from the values an organization creates for its employees and their individual branding potential and customers that exceed the cost of creating it. According to Porter (2012), organizations should therefore think strategically by competing to be the best with unique value proposition compared to other firms and avoid competing with rivals on same dimensions. This brings the idea of personal branding for firms to create an edge over others. To achieve this and expands its market, an organization should therefore focus on their employees personal brand potential, target customers and their needs requirements in terms of product features, services and related prices.

Kotler and Keller (2008) observed that personal branding at employee level in an organization was considered as an indirect part of the firm's internal marketing strategy in creating value for its client and thus giving an advantage for the organization over others. This type of branding gives employees opportunities to show their personal capabilities and be able to develop them in line with other opportunities that may emerge from the markets and opened to new creative ideas, innovations and unique strategies that may contribute to the wellness of an organization and hence giving it a competitive advantage.

According to Mangold and Miles (2005) and Schweitzer & Lyons (2008), personal brand by employees is a source of competitive advantage for an organization and many talented employees will look for employment relationship that favour them and invest more in their personal growth. This, therefore calls for need create a higher value addition by enhancing better relationships between employers and their employees through identification of potential employees that can maximumly provide the organization with more value addition that gives it a competitive advantage. Grumen and Saks (2011) posit that improvement in performance of an organization may results from its high employee engagement levels and active participation in making decisions for the organization. In addition, encouraging employees to use their developed personal talents and abilities in creating more knowledge has an advantage in form of organizational competencies (Shahzad et al, 2012).

Although most companies believe that a name brand as well as high salaried employees will give them a competitive advantage, various studies have shown otherwise. Bogdan (2011) found that companies that creates genuine opportunities and exhibits better desirable cultural setups that enhances individual employee branding will have a relative advantage over many multinational organizations that offer higher pay. This is as a result of unchanged personal characteristics and belonging to some set up of values that guides these employees in remaining loyal to the organization and thus giving it a competitive advantage over other organizations. According to Lair, Sullivan and Cheney (2012), people in the organization and their careers when marketed as brands gives an organization a competitive advantage over other organizations.

3.3 Service Quality Concept

Lewis and Mitchell (2010) defined Service quality as the extent to which a service meets customers' needs or expectations. Service quality can also be defined as the difference between customer expectations of service and perceived service (Gakii & Murigi , 2019). If expectations are greater than performance, then perceived quality is less than satisfactory and hence customer dissatisfaction occurs. Service quality is a comparison of expectations with performance. A business with high service quality will meet customer needs whilst remaining economically competitive. Improved service quality may increase economic competitiveness (Gole, 2015).

There are a couple of elements that constitute quality service delivery and they vary according to nature of business and products being offered by an organization (Lim, 2010). Some of the key elements include empathy which is the caring individualized attention the firm provides its customers and assurance to build confidence. Also, a firm should ensure there is consistent and good customer service with established communication channels. Gakii & Murigi (2019) content that with Lim that some of the constructs used for service quality included Reliability, Security, Competence and Empathy. This is further supported by service quality theory by Parasuraman 1985 that shows how the concept of service quality is conceptualized using SERVQUAL model. This study will use constructs adopted in the SERVQUAL model and Gakii & Murigi (2019) study.

3.4 Competitive Environment Concept

Even though, competitive advantage concept helps to analyze results of an organization in a competitive market, contemporary changes in the environment in which the organizations exist make competitive advantage more complex in both its relationship between the sources of advantages and expected results (Ceglinski, 2017). However, as the environment becomes more and more turbulent and unpredictable, the speed of response in marketing of organization products becomes a key factor of consideration. This calls for more attention towards product branding as a valuable focus on growth of firms.

The environment in which the organization operates have become more fast-paced and networked with increased knowledge-based work-life such as ability to think widely, use of acquired knowledge and being creative and innovative. Due to competition among people in the environment's labour market, mastering of essential skills is paramount for one to stand out and exercise his or her knowhow. Thus, creation of a personal brand is an asset for an efficient work-life both in the now and the future for success of an organization.

According to Jenni (2017), a lot of new opportunities are on offer due to creation of new online environments as a result of reshaped communication culture due to rise in social media platform compared to traditional media which inhibits ordinary people from being both producers and distributors of content by themselves. Social media markets have enabled creation of new opportunities to individuals such as personal branding and making it visible online. This has proved to be highly beneficial (Safko, 2010).

Social media as an environmental component has enabled people to manage their personal brands easily then thereafter offer opportunity to manage other products and service brands (Laroche, Habibi and Richard, 2013). Thus, social media has also enabled sharing of brand information on wider scale through use of social network sites such as Facebook, LinkedIn, YouTube, Twitter and My Space. Studies done by Lee, Tyrrell and Erdem (2013) showed that among the preferred social sites use, Facebook contributes (29%), LinkedIn (15%), You Tube (13%), Twitter (11%), and My Space (11%). According to Kirtis & Karahan (2011), promoting personal brand through social media is a cheaper option the top management team of a company can take that is most convenient to enhance on marketability of their products on a large segment of the society. Karaduman (2013) pointed that a well-planned personal brand management on social media platform and with increased high level of engagement by top management team of an organization will go a long way in creating value at individual employee and in enhancing of other product brands for the organization.

3.5 The case for a new conceptual model

The reviewed literature has clearly brought about better understanding of the construct of strategic personal branding, the emerging phenomenon and the nature of their relationship to enable better understanding of its nature and role in the context of wider picture of organization competitive advantage over its rivals. From conceptualization viewpoint, the construct of strategic personal branding has been explained by various aspects that include its meaning and role in giving an organization an advantage

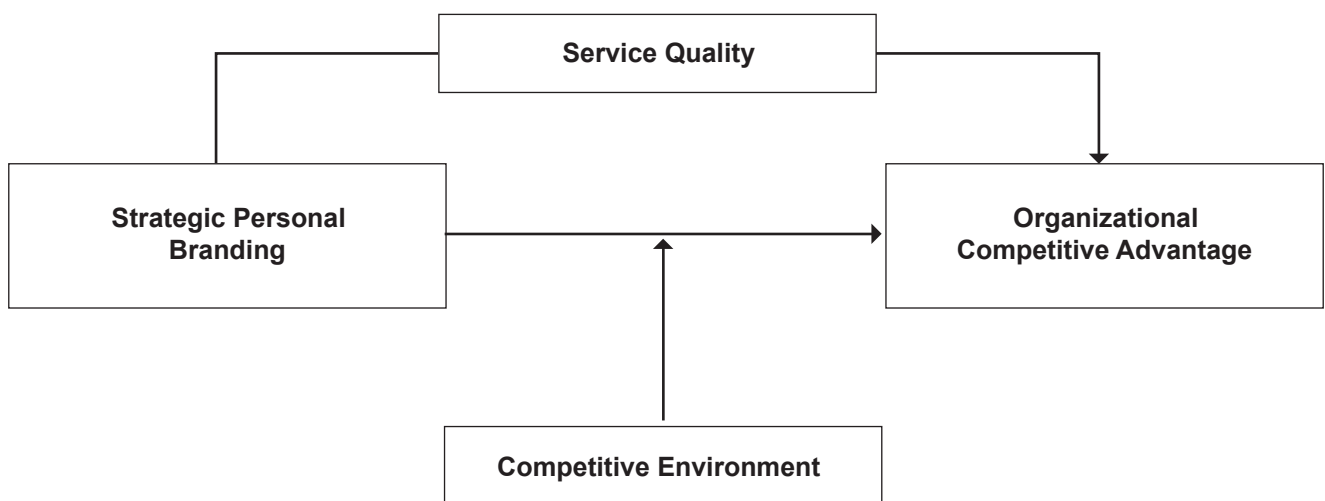
in terms of its competitiveness. According to work done by Busch & Davis (2018), strategic personal branding reflects unique characteristics of the rational and emotional attributes, strength, skills and values that differentiate one-self from others and guide in career progressing. However, to effectively operationalize strategic personal branding to offer a competitive advantage in an organization, there is need for better understanding of other variables of importance.

From the above reasoning, we propose that since many organizations operates in open environment and are subjected to the challenging dynamisms in the environment in which they operates in there is a possibility of other emerging phenomenon that may arise as a result of adoption of the role of strategic personal branding in organization competitiveness. Thus, one of key emerging phenomenon includes the aspect of environment context in which the organization operates in as a contingent variable. Even though, the concept of strategic personal branding has helped to analyze results of an organization in a competitive market, contemporary changes in the environment in which the organizations exist make competitive advantage more complex (Ceglinski, 2017). Thus, the effect of environment context due to its turbulent nature on the relationship between strategic personal branding and competitive advantage is of great interest to the study.

The second stream of emerging phenomenon arises from the effect of service quality and expected delivery on the relationship between strategic personal branding and the derived competitive advantage. From the literature, service quality reflects the extent to which a service meets organization customers' needs and expectations (Lewis & Mitchel, 2010). Gole (2015) attributes improved service quality as a measure of organizational competitiveness. This calls for need for further in-depth understanding of role of service quality on the underlying relationship.

In view of the above arguments, set of previous research done and identified emerging gaps observed in reviewed literature, a conceptual model that is premised on the constructs of strategic personal branding, environment context, service quality and competitive advantage is proposed in Figure 1.

Figure 1. Proposed Conceptual Model



4. Conclusion and Recommendations

From the study, the metaphor of strategic personal branding is closely compared to a ship sailing in water under changing weather and sea conditions rather than a stable environment to reach its destination. The captains must device techniques of overcoming any upcoming obstacles. The concept of strategic personal branding has a far-reaching effect in enhancing organization competitiveness. Further research needs to be carried out through empirical studies to ascertain this narrative.

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The Implication of Financial Risk on Performance of Commercial and Services Listed Companies in Nairobi Securities Exchange

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Abstract

The study sought to assess the implications of financial risk on the performance of the companies listed on the Nairobi Securities Exchange (NSE), Kenya in the commercial and services segment. The study was anchored on the agency theory. The study applied explanatory research design and the target population was the 14 companies listed under the Commercial and Services segment of NSE. Secondary panel data contained in published annual reports for the period 2013-2017 was collected. Panel regression model was applied with the random effect model being used based on the Hausman specification test. Findings showed that credit risk had a positive significant effect on return on assets (ROA) while liquidity risk had a negative insignificant effect on ROA and operational risk had a positive insignificant effect on ROA. The study findings further show that the agency theory brings out possible mismatch between factors that motivate the management team versus the shareholders' best interests in terms of risks undertaken by companies. The study recommends that the top management of Commercial and Services companies should use the cost-to in-come ratio frequently to inform business performance and strategic development goals.

Keywords: Performance, Risk, Commercial and Services companies, Nairobi Securities Exchange.

1. Introduction

Commercial and Services companies fulfil an intermediary function in the economy (Armstrong, 2017). Their business activities involve connecting the producers with the end consumers. In playing the intermediary role, these companies offer storage, transfer, distribute and sale of the products and services (Kihooto, Omagwa, Wachira & Emojong, 2016).

Global trends affecting performances of commercial companies include increased competition, changes in management structures, customer services management and even rising fuel prices that are reducing the revenues posted by businesses in the airline sector (Agarwal, 2011, KPMG, 2018). Other global trends indicate that digital platforms are taking precedence in customer relationships managements amongst other revenue generation processes for example, purchase of air tickets is being done online, retail consumer purchases are being done through e-commerce websites of such as Amazon and Alibaba (Qicheng & Wei, 2017).

In Kenya, the last few years has seen the performance of companies listed under the Commercial and Services (CAS) segment on the NSE experience mixed fortunes. Longhorn Publishers which is listed under commercial and services segment has been reporting sterling performance between 2013 and 2017 (NSE, 2017; Longhorn Publishers, 2018). The national airline carrier, Kenya Airways (KQ), which is also listed under the commercial and services segment reported the country's worst ever corporate results in history \$258 million for the year 2015-2016 (Kenya Airways, 2016; Okoth & Achuka, 2016). Other companies listed in this segment like Eveready East Africa Limited and Sameer Africa Limited avoided the risk of closure by opting to remain afloat through importing batteries and tyres respectively from China (Otuki, 2016; Eveready, 2016; Sameer, 2017).

Risk can yield the possibility of both pleasant surprises as well as adverse business results with a general hypothesis that there is a direct correlation between the amount of risk taken and the potential for return (Gentry & Pike, 1970; Stulz, 1996; Woods, 2008; Kinyua, Gakure, Gekara, & Orwa, 2015; Were, 2015). How well or poorly a firm performs has been linked to risks taken by management of the firms and risks therefore remain a significant factor especially when they affect companies' performance (Muriithi, 2016). In this study, the risk factor was broken down to credit risk, liquidity risk and operational risk. Credit risk was proxied by debt to income ratio (Elder, 2016); liquidity risk was proxied by current ratio (Kamau & Njeru, 2016); while operational risk was proxied by cost to income ratio (Muriithi, 2016). According to the Capital Markets Authority, there has been a declining trend in financial performance results posted by companies in the NSE, with eighteen companies out of the sixty-seven registered companies issuing profit warnings in the financial year of 2016 alone (CMA, 2016). At least twenty-five percent of those having dismal performances and almost on the verge of collapsing in the period between years 2013 to year 2017 were from the Commercial and Services companies. These includes Uchumi supermarkets, Kenya Airways, Deacons, Hutchings Biemer, Atlas Developmen, Eveready and logistics firm Express Limited which have been on the spotlight (Bwire, 2015; Kangethe, 2015; Aglionby, 2016; Munda, 2017). The question arises as to whether the performance of these Commercial and Services companies varies due to the risk exposures they face or due to the varied businesses in which they participate, and this is what the researcher sought to determine.

2. Literature Review

2.1 Theoretical Literature Review

The study was supported by agency theory. Agency theory is linked to performance of these companies and how the managers undertake financial risks. According to Jensen and Meckling (1976), Fama (1980), the agency problem began when and where the directors of public companies did not have the same business interests as those of partners in a private company would. The first agency problem begins when agents take actions that are contrary to the agreement, which are assumed riskier by the principal.

The agency theory brings out possible mismatch between factors that motivate the man-agement team versus the shareholders' best interests. Normally, the managers and shareholders have diverse interests.

Consequently, their risk appetites will vary. While share-holders may require high-risk projects with higher investment returns, management on the other hand might prefer low risk projects with lower returns on investments. The main objective of the agency theory is to bring out the need for alignment of these two parties varying interests in the organization and to have a unified objective of wealth maximization and firms' success. When company report profit warnings and that the firm is in the verge of collapsing then it will bring about conflicts between the managers and the shareholders. This makes agency theory significant for this study being the main theory that the study is anchored on.

2.2 Empirical Literature Review

Isiaka (2018) assessed how liquidity risk affected insurance companies' performance listed in Nigeria. Liquidity risk was independent variable with the proxy being claim loss ratio, premium growth and leverage. For firm performance, ROA was used as proxy. The study adopted panel multiple regression techniques. The findings revealed that leverage had a significant negative effect on return on assets. While the claim loss ratio has insignificant negative influence on return on assets while premium growth has positive and in-significant effect on firm performance of listed insurance companies in Nigeria. The study findings from Nigeria are relevant however, the findings may not be relevant to Kenyan contexts due to economic differences. Hence the need to for this research to contextualize the findings from Kenyan economical view. This research study was carried out in commercial and service listed companies in Nairobi Stock Exchange, Kenya.

Mutua (2016) carried out a study in Kitui County, Kenya. Its focus was on how credit risk management influences financial performance of on Savings and Credit Co-operatives (SACCOs). The study found a very strong positive connection between loan policy in mitigation of risk and financial performance of these organisations. The findings support earlier studies that indicated positive correlation between financial performance measured by ROE and credit risk (Ondieki 2011; Kimari 2013). Even the though study findings support the agency theory, they however, isolated other determinants of credit risk by focusing only on internal organisational risks yet companies are also influenced by external changes. This study will therefore add value by shifting focus from SACCOs and instead focussing on financial risk and use of firm size as a moderator factor that influence performance of the Commercial and Services companies which are listed on the securities exchange.

Mathuva (2009) did a study on the effect of operational risk on performance of commercial banks in Kenya. Cost to income was used as proxy to operational risk while ROA and ROE as proxy to performance. Panel regression was employed as the model for the study while minitab software was used to ascertain the significance levels of the research constructs. The research findings showed that operational risk is inversely related with both ROA and ROE as per the sample in the study.

3. Methodology

The researcher adopted an explanatory design for research. According to Maigua and Mouni (2016), the main advantage of explanatory designs is, it allows connection of thoughts to apprehend reason and

effect. The research employed a multiple linear panel regression model to analyse the effect of financial risks on the performance of Commercial and Services listed companies on Nairobi Stock Exchange, Kenya. A multiple panel regression model was suitable for this re-search because of the independent variables, time factor and cross-sectional dimensions (Aiken & West, 1991; Wooldridge, 2010). The study target population was fourteen companies (14) in the Commercial and Services market segment of the NSE for the period of study covering 2013 to 2017 (NSE, 2017). Due to the small number of companies, the study used a census methodology.

3.1 Empirical Model

The general model of the research was defined as:

$$ROA_{it} = \alpha + \beta_1 CR_{it} + \beta_2 LR_{it} + \beta_3 OR_{it} + \varepsilon_{it}$$

Model 1

Where:

ROA_{it} is Return on asset of business i at time t

i is the company under observation with i = 1... 14

t is the time with t=2013... 2017

CR_{it} is Credit risk of business i at time t

LR_{it} is Liquidity risk of company i at time t.

OR_{it} is Operational risk of company i at time t.

α is the Constant term

ε_{it} is the error term

4. Results and Discussion

The results of the research are presented as follows: diagnostic tests, inferential statistics and panel multiple regression.

4.1 Diagnostic tests

This section provides the outcomes of the following diagnostic tests that were conducted to ensure that the collected data did not violate key assumptions of linear regression model: test of normality, test of multicollinearity, panel unit root, and test of heteroscedasticity, autocorrelation test and Hausman test which comprises of fixed and random effect models.

4.1.1 Test of Normality Results

The research used the Jarque-Bera test to test the variables, normal distribution.

Table 1: Normality Test Results

Normality skewness / kurtosis tests					
Variable	Observations	Probability (Skewness)	Probability (Kurosis)	Adj chi ²	Prob>chi ²
My Residuals	50	0.0000	0.0000	35.57	0.0000

Source: Study Data (2018)

Based on the outcomes in table 1, the research used the normality test of Jarque-Bera. Under this experiment, the null hypothesis was that the residuals did not differ considerably from a normal distribution. Since the p-value for the residual is less than 0.05, the null hypothesis was dismissed and the conclusion that the residuals were not normally distributed was therefore dismissed. By thumb rule, a sample size of 30 or more will generally lead in a mean sampling distribution very close to a standard distribution (Saunders, Lewis & Thornhill, 2009).

4.1.2 Multicollinearity Test Results

The researcher used a matrix of correlation to identify multicollinearity between variables.

	Credit risk	Liquidity risk	Operational risk
Credit risk	1.0000		
Liquidity risk	0.2568	1.0000	
Operational risk	0.0954	0.0028	1.0000

Table 2: Correlation Results

Source: Study Data (2018)

As expressed in table 2 the study utilized a correlation matrix to test for multicollinearity. Credit risk, liquidity risk, operational risk were the explanatory variables used in this study. The results indicated that there was no severe multicollinearity since all the coefficients of correlation between the independent variables were below 0.8 as supported by (Gujarati, 2003).

4.1.3 Autocorrelation Test Results

The researcher used the Wooldridge test to evaluate autocorrelation in the information for nil first order.

Table 3: Autocorrelation test for ROA

Wooldridge test in panel data for autocorrelation
H0: no first order autocorrelation
F (1, 9) = 1.201
Prob > F = 0.3425

Source: Study Data (2018)

According to Table 3 outcomes, the Wooldridge test was used in the research for autocorrelation for Model 1. The null hypothesis was that there was no auto correlation. The findings indicated that there was no rejection of the null hypothesis of no autocorrelation as the p value was above the critical value of 0.05 ($P=0.3425 > 0.05$) and therefore no autocorrelation in the data as supported by (Wooldridge, 2013).

4.1.4 Heteroskedasticity Test Results

Heteroscedasticity arises when sizes of observation produce huge variations amongst them. The researcher used Breuch Pagan test to take care of consistent standard errors of heteroscedasticity.

Table 4: ROA test results for heteroskedasticity

Breusch – Pagan test for heteroscedasticity H0: variance constant Variables: Fitted values of ROA $\text{Chi}^2(1) = 1.25$ $\text{Prob}>\text{chi}^2 = 0.2524$
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Source: Study Data (2018)

The research tested for panel heteroskedasticity using Breusch-Pagan test from the output outcomes shown in table 4. The null hypothesis was a homoscedastic error term. Since the calculated p value for ROA (0.2524) is more than the critical p value (0.05), the null hypothesis of Model 1 was not dismissed as supported by Breusch Pagan.

4.1.5 Panel Unit Root Tests Results

To detect the presence of endogenous regressors in the regression model, the researcher used the Hausman Test.

Table 5: Panel Unit Root Test

Variable	Test	Statistics	Significance
ROA	Levin, Lin and Chu	-3.2935	0.0005
Credit risk	Levin, Lin and Chu	-3.0927	0.0010
Liquidity risk	Levin, Lin and Chu	-5.4359	0.0000
Operational risk	Levin, Lin and Chu	-1.5779	0.0294

Source: Study Data (2018)

As reported in table 5 the Levin, Lin and Chu test presented p-values that are less than 0.05. These results resulted in the rejection of the null hypothesis that all panels had unit root for equity return, asset return, credit risk, liquidity risk, operational risk, and firm size. Therefore, the study concluded that all the variables under study did not have unit root and were used at level instead of their first differentiation. This means that the outcome extracted were not misleading (Gujarati, 2003).

4.1.6 Hausman Test Results

The researcher employed the Hausman Test to detect the presence of endogenous regressors in the regression model.

Table 6 Hausman test for ROA

Hausman fe re				
	coefficients			
	(b) fe	(B) re	(b-B) Differences	Sqrt (diag(v_b- v_B) S.E
Credit risk	.606293	.472516	.133777	.135286
Liquidity risk	-.001628	-.001827	.000199	.000868
Operational risk	-.000055	.0000276	-.000073	.000121

b= consistent under H₀ and H_a; obtained from xtreg
 B= inconsistent under H_a, efficient under H₀; obtained from xtreg
 Test: H₀: difference in coefficients not systematic
 $Chi^2(4) = (b-B)'[(v_b - v_B)^{-1}](b-B)$
 $= 1.74$
 Prob>chi² = 0.6842

Source: Study Data (2018)

From the performance outcomes shown in table 6, the null hypothesis was that the model of random impacts was suitable while the alternative hypothesis was that the model of fixed effects under Hausman test was suitable. If the p value exceeded the critical value of 0.05, the null hypothesis should not be dismissed. The P value was higher than the critical value (P=0.6842>0.05) from the outcomes. Therefore, the random effects model for the model was adopted as suggested by (Green, 2008).

4.2 Hypotheses Testing

Table 7 presents the outcomes of the Model 1 regression on the impact of financial risk and performance indices.

Table 7: Regression results with ROA as the Dependent Variable

ROA	Coefficient	Standard Error	z	P> z
Credit risk	.4582179	.0942447	4.86	0.000
Liquidity risk	-.0014809	.0018915	-0.78	0.438
Operational risk	.0286846	.121538	0.24	0.814
_cons	-.1922351	.0808025	-2.38	0.022

F statistics = 8.13
 Prob > chi² = 0.0002

Source: Study Data (2018)

The result in Table 4.12 showed that the F statistics value was 8.13 with a 0.0002 p value that is less than 0.05. This suggests that financial risks have had significant impact on the return on assets of listed companies in Nairobi Securities Exchange in Kenya.

4.2.1 Credit risk and performance of commercial and services companies

The study's first goal was to determine the impact of credit risk on commercial and service businesses' performance on NSE, Kenya. The results are as illustrated in Table 7. In order to achieve this goal a null sub-hypothesis, H_{01} that credit risk has no important impact on the return of assets of commercial and service businesses was developed. The credit risk coefficient ($\beta = 0.4582179$, $p = 0.000 < 0.05$) in Table 7 shows a positive statistically significant relationship between credit risk and asset return.

Consequently, the null hypothesis that credit risk has no significant impact on return on assets of commercial and service businesses was dismissed at 5 percent level of significance. The finding implies that an increase in credit risk results in a performance increase on the listed firms geared towards return on asset. Risk takers firms contribute to positive returns from the investments. The findings are inconsistent with (Mathuva, 2009) who investigated impact of credit risk on return on equity in commercial banks in Kenya and found that credit risk has a significant impact on performance.

4.2.2 Liquidity risk and performance of commercial and services companies on NSE, Kenya.

The study's second objective was to determine the effect of liquidity risk on Commercial and service businesses' performance. The findings summarizing this analysis are in Table 7. A null sub hypothesis was formulated to achieve this objective, H_{02b} , that liquidity risk has no major effect on the results of commercial and services companies on NSE in Kenya. In Table 7 the coefficient of liquidity risk ($\beta = -0.0014809$, $p = 0.438 < 0.05$) shows that there is a statistically adverse link between liquidity risk and performance of commercial and services companies on NSE in Kenya.

Consequently, the null assumption that liquidity risk does not have a major impact on the performance of commercial and service businesses on NSE in Kenya was not dismissed at a significance level of 5% as per the tests. The finding means that a rise in liquidity risk results in a decline in the performance of listed companies aimed at returning on assets. When a company faces liquidity issues, an increase in liquidity risk affects its performance. The finding agrees with financial distress theory which states when a firm cannot meet its obligations when they fall due then they risk that chance of collapsing and even issuing profit warnings which is the case in the study some issued profit warnings which is not appealing to the shareholders. The findings are inconsistent with Wanil and Ahmad (2013) but consistent with Isiaka (2018) whose results from their researches disclosed that leverage had an adverse impact on return on assets.

4.2.3 Operational risk and performance of commercial and services companies

The study's third objective was to determine the impact of operational risk on performance commercial and services companies on NSE, Kenya. The findings summarizing this analysis are in Table 7. A null sub hypothesis was formulated to achieve this objective, H_{03c} , that operational risk does not affect performance of commercial and services businesses on NSE, Kenya was formulated in Table 4.12 the coefficient of operational risk ($\beta = 0.0286846$, $p = 0.814 < 0.05$) shows that the association between operational risk and results is positive and statistically insignificant of commercial and services companies on NSE, Kenya.

Consequently, the null assumption that operational risk does not have a major impact on the performance of business and service businesses on NSE in Kenya was not dismissed at a meaning rate of 5% as per the sample. The finding means that an increase in operational risk results in a rise in the efficiency of the businesses mentioned with reference to return on asset. The finding is relevant as per the study which signifies that companies invest in risky projects which in return yields positive Net Positive Value (NPV) that contributes to improvement of the company performance; the higher the risk the higher the returns. The findings are inconsistent with (Mathuva, 2009) whose study found out that operational risk is inversely related with return on assets.

5. Conclusions and Recommendations

The study concluded that, for companies to generate more revenues, they needed to manage their financial risks. Increased cost-to-income ratios should be an immediate indicator to firms of emerging problems in the cash flow. Costs associated with internal business processes and staff affected the performance of the businesses. The research determined that liquidity risk negatively affected the performance of these companies as proxied by ROA. This explains the profit warnings issued by firms within the study period. The investigation inferred that liquidity if left unchecked may unfavourably influence a firm's performance, capital. It might cause the breakdown of a generally dissolvable firm. In addition, a firm having liquidity issues may encounter troubles in satisfying the needs of providers. The study also concluded that not all risks led to losses. For instance, credit risk strongly impacted positively the performance of businesses from the results of the research.

Based on the results, the research recommends the following. Credit, liquidity and operational risks must be given more consideration by managers. Companies can either loss or gain from risky projects. Credit risk has influenced efficiency favourably. Thus securing new capital when required to improved firms' performance will boost business operations and growth. Liquidity risk had an adverse impact on performance as per the results. The researcher recommends that short-term cash management is very important to the liquidity status of the company and if not well managed it would adversely affect the company's performance despite companies registering high revenue margins. The research advises top management of business and service firms should frequently use the cost-to-income ratio to inform strategic objectives of growth. Any changes to the cost-to-income ratios affect the generated revenues of the companies.

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Influence of Organizational Environment on Employee Job Satisfaction in Two and Three Star-Rated Hotels In Kisumu County , Kenya

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Abstract

This study purposed to establish the influence of organizational environment on employee job satisfaction in two and three star-rated hotels in Kisumu County. The study employed a cross sectional survey design. Respondents were drawn from two and three star-rated hotels from the county. A stratified random sampling was used. Data were collected by use of questionnaires which were validated through a pretest study. Reliability was measured using the Cronbach's Alpha test. Pre-tested questionnaires were then distributed to the sampled size. The responses were coded then analyzed by descriptive and inferential statistics. The findings indicated that organizational environment significantly affected employee job satisfaction ($p= 0.005$) 2-tailed. Further, from the regression analysis, ($R^2 = 0.417$) shows that organizational environment account for 41.7% variation for employee job satisfaction. The study recommends that two and three star-rated hotels should use strategies, practices and policies that entail improving organizational environment to enhance employee job satisfaction.

Key Words: Organizational Environment, Employee job satisfaction, Two-star hotels, Three-star hotels, Kisumu County

1. Introduction

The economic survey positions the Kenyan Hospitality industry at approximately 10 % contribution to the country's GDP, with about 9.3% contribution to employment the year 2015 (K N B S, 2016). This is expected to slowly rise to almost 3% p.a by the year 2026, largely leading to 9.5% of total employment in the country (K N B S, 2016).

A tourism report by Industrial Development Corporation (I D C, 2012) revealed that Kisumu City in Kenya is a newly developing city and may present a prospects for the establishment of an high-class, yet affordable hotel. The Lake Region where Kisumu County lies has a total of 695 hotel rooms available with an occupancy rate of 31 per cent where beds available stand at 958 with an occupancy rate of 26 percent (K N B S, 2012). This continues to increase progressively.

In 2014, (Tourism Concern, 2014) supported by (IUF) revealed that the working environment in the hospitality sector in Kenya is characterized by uneven working hours, split night and weekend shifts, and complicated and tension working situations. The report illuminates that employees are faced by job insecurity and restricted opportunities for promotion. These suggest that there could be low levels of employee job satisfaction.

The trend of improving hospitality sector organisation environment has continued to gain momentum in Kenya and many organizations are investing on providing conducive working environment to their employees ((U N C O P, 2012); (Mokaya & Gitari, 2012)). Although hotels have embraced the concept of improving organisational environment, there is limited empirical data showing the effect of the organisation environment on employee job satisfaction. This study focused on investigating the influence of organization environment on employee job satisfaction in two and three star-rated hotels. The hypothesis tested was as follows:

Ho: There is no statistically significant influence of organizational environment on employee job satisfaction in two and three star-rated hotels in Kisumu County

2. Literature Review

1.1 Organizational Environment and Employee Job Satisfaction

Organizational factors are key determinants in employees' mental and professional security at work, which in turn are positively reflected in employee job performance (Ahida & Sumaya, 2015). They are linked to daily environment where employees carry on their roles and responsibilities (Awases, 2006). Also, employees level of execution might be influenced by authoritative variables fill in load, night shift work, accessibility for resources, training and preparation improvement and supervisor backing which eventually influences their particular occupation satisfaction.

Further, (Yusuf & Metiboba, 2012) revealed that organisational factors are a network of official and unofficial relationship among coworkers; groups as well as superior-subordinate relationship that exist in an organisations. Such interactions (especially the casual interaction), presumably, gives road for spread of majority of the data, what's more learning and additionally cross-treatment from claiming thoughts "around employees". Of course, previous studies have revealed interpersonal relations influences employees morale (Clement, 2000); (Stanley, 2003).

DeStefano, Clark, Potter, & Gavin (2005) sought to investigate how organisatioanl environment factors like involvement, support and innovation influences job satisfaction of employees. The results revealed those factors significantly contribute to employee job satisfaction. A further study by Poulston (2009) found that employees motivation is severely hindered by dissatisfaction of employees with their supervisors.

Ajala(2012) argues that workplace features especially good communication network in an organisation will help and keep attract employees and further motivates them for a healthy living thus improves productivity in organisations and guarantee virile employees and sustenance of the organization. Tio (2014) studied how working environment influences job satisfaction of employees. The findings found out that work environment which includes human work environment and organizational environment provides clear insights on improving employee job satisfaction.

According to Ruchi & Surinder (2014) work environment affects job satisfaction. Their findings suggest that employees workload, work related boredom, stress and fatigue, overtime, cause job dissatisfaction. Moreover, Imrana, Ramesh, Anita, & Manohr (2015) study on how working environment influences job satisfaction of employees and concluded that absence of work pressure contributes towards to job satisfaction of employees.

Ahida & Sumaya (2015) evaluate impact of key authoritative variables namely workload, accessible recourses and administrator bolster and established that the general level of these hierarchical variables influencing execution of expert medical caretakers was high (74.6 %); the workload evaluated the most noteworthy (79.2 %) among the examination measurements as seen by attendants, director bolster (72.0%), and assets accessibility (69.8%).

In the same vein, Gichinga (2016) study to establish employee job satisfaction revealed that leadership style and work environment had a strong effects on employee job satisfaction, but organizational culture least affects job satisfaction.

In conclusion, the reviewed studies on effect of organisational environment were conducted in sectors like health (DeStefano, Clark, Potter, & Gavin, 2005) while (Tio, 2014) and (Ajala, 2012) focused on employee productivity while Thomas (2004) studied employee high performance. Most of these studies established that a number of organizational factors are important for employee job satisfaction. Their studies concludes; a correlation of organizational factors like support, involvement of employees, working relationships, flexible work systems, value of opportunities associated with system and employee job satisfaction. Therefore this study sought to investigate influence of organizational factors on employee job satisfaction in two and three star hotels.

1.2 Theoretical Framework: Herzberg's motivation-hygiene theory

Herzberg's theory asserts that there are some workplace factors that cause job satisfaction (Mausner, Snyderman, & Herzberg, 1959). They further argue that employees seek for high order needs in their employment and they are not contented with the lower-order needs at work. These high orders need include; gratification, advancement, achievement, responsibility, recognition, among others while needs associated with minimum salary levels, secure and pleasant working conditions are low order needs. Herzberg proposed a two-factor model of motivation, in that one set of job characteristics especially incentives leads satisfaction at work, while a separate set of job characteristics leads to dissatisfaction at work. Therefore, organizations should recognize and focus on both sets of characteristics and at no time should they assume that decrease in dissatisfaction leads to increase in satisfaction because satisfaction and dissatisfaction are independent phenomena.

To understand what makes some employees in hospitality facilities more satisfied with their jobs than their colleagues and what hidden processes account for employee's feelings for the same, the study was based on Herzberg's motivation-hygiene theory.

1.3 Conceptual Framework

Figure: 1.1. Shows the key variable of employee job satisfaction in two and three star-rated hotels in Kisumu County, 2018

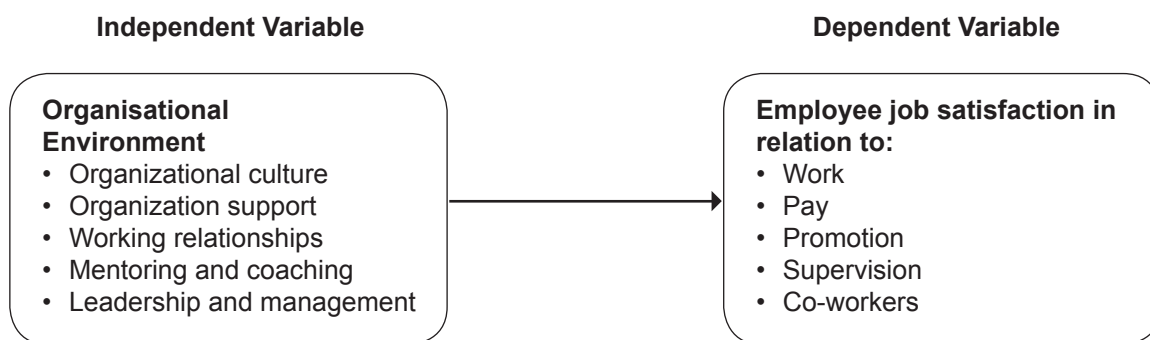


Figure 1.1

Source: Author (2018)

2. Research Methodology

This study adopted a cross-sectional survey design to collect the information on organizational environment and employees' job satisfaction in two and three star-rated hotels in Kisumu County. The study adopted stratified random sampling and the questionnaire was the data collection tool for this study. To measure organizational environment. The first part of questionnaire contained 7 items modified questionnaire by (Marianne & Miemie, 2014). The second part of questionnaire consisted 25 items on dependent variable (job satisfaction), measured using abridged job description index developed by Balzer et al. (1997) that were modified by the researcher. The respondents are asked to respond to each question according to Likert five-point scale, scoring from "strongly disagree", "disagree", "neutral", "agree", and "strongly agree". The higher scores indicate the respondents' agreement with each question. Content and construct validity were utilized for measurement as well as the Cronbach's alpha for calculating the reliability. The research findings are extracted by SPSS statistical software at both descriptive and analytical levels. The one-dimensional tables were utilized to describe the research findings and the parametric statistical tests were used to analyze data due to the data normality and finally the confirmatory factor analysis through SPSS IBM 22 software was utilized for all latent factors of research variables in order to create an appropriate and acceptable measurement model.

3. Results and Discussions

This section presents the research findings and the discussion of those findings. On employee profile; the findings reveal that 64.7% employees were from three star hotels while 35.3% were from two star-rated hotels. Male employees dominated as work force in both categories of hotels. Further, the findings indicated 43.5% were aged between 21 and 30 years and 35.9% aged between 31 and 40 years thus productive enough to work in the hotel industry. Further, 33.7% and 32.6% of employees had diploma and technical certificate level of education respectively. The employees worked in various sections of the hotel and most (41.3%) earned between Kenyan shillings fifteen thousand and thirty five thousands per month as salaries. 52.2% of employees had less than five years work experience and a majority 52.7% were working on contract basis.

3.1 Extent of organizational environment on employee job satisfaction

Table 4.1. Responses on the influence of organisational environment on employee job satisfaction

Respondents on Organizational Environment	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean
	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%	
This hotel support good relations and positive behavior among employees and management	8	4.3	30	16.3	22	12.0	64	34.8	60	32.6	3.75
The management is helpful, engages and offers employees the support and resources to do their work.	6	3.3	28	15.2	34	18.5	80	43.5	36	19.6	3.61
The amount of work I do in this hotel is reasonable	8	4.3	38	20.7	22	12.0	56	30.4	60	32.6	3.66
There are adequate resources in term of space, equipment and staff to meet the hotel's work demands	16	8.7	24	13.0	29	15.8	66	35.9	49	26.6	3.59
I am satisfied with the employee training and development provided by this hotel	12	6.5	36	19.6	37	20.1	54	29.3	45	24.5	3.46
Employees receive close mentoring and coaching in this hotel	21	11.4	21	11.4	43	23.4	65	35.3	34	18.5	3.38
Leadership and the management of this hotel emphasizes on results and humanity	4	2.2	16	8.7	38	20.7	73	39.7	53	28.8	3.84
Average mean	3.6390										

Source: Field Data (2018)

The results revealed that respondents are satisfied with their organisational environment with an average mean of 3.6390 out of 5 as summarised in table 4.1. majority of the respondents 64.7% registered satisfaction with 24.4% being neutral and a few 10.9% were of the opinion of the least satisfied with organisational environment.

3.2 Respondents level of job satisfaction

Table 4.2. Respondents level of job satisfaction

Respondents level of job satisfaction	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean
	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%	
My job gives me the greatest sense of accomplishment and satisfaction	4	2.2	6	3.3	35	19.0	77	41.8	62	33.7	4.02
My job is exciting and interesting	12	6.5	18	9.8	21	11.4	111	60	22	12	3.61
I feel that I am really doing something worthwhile in my job.	1	0.5	3	1.6	22	12.0	88	47.8	70	38.0	4.21
I receive a lot of pleasure and enjoyment by working in this hotel	10	5.4	9	4.9	35	19.0	95	51.0	36	19.6	3.74
My work is somehow challenging	7	2	2	1.1	28	15.2	107	58	40	21.7	3.93
My salary is fair compared to other staff with the same level of responsibility in other similar hotels	33	17.9	46	25.0	49	26.6	37	20	19	10.3	2.80

Respondents level of job satisfaction	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree		Mean
	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%	
The rewards I get from my job are adequate for my living expenses	33	17.9	51	27.7	43	23.4	39	21.2	18	9.8	2.77
I am adequately remunerated for my efforts as an employee in this hotel	33	17.9	16	8.7	30	16.3	69	37.5	36	19.6	3.32
My job provides for steady remuneration	15	8.2	26	14.1	19	10.3	68	37.0	56	30.4	3.67
There are chances for advancement on this job	17	9.2	24	13.0	25	13.6	67	36.4	51	27.7	3.60
Thinking about the next 12 months, there are less chances of promotion in my job.	18	9.8	18	9.8	72	39.1	56	30.4	20	10.9	3.23
Promotion opportunities in this hotel goes to those who deserve them (merit)	24	13.0	65	35.8	46	25.0	30	16.3	19	10.9	2.76
Promotion opportunities are not limited and are fairly adequate in this hotel	14	7.6	28	15.2	34	18.5	61	33.2	47	25.5	3.54
I am satisfied with the hotel promotion policy	17	9.2	26	14.1	37	20.1	76	41.3	28	15.2	3.39
My supervisor is pleased with my work and enables me to perform at my best.	7	3.8	19	10.3	20	10.9	73	39.5	65	35.3	3.92
My supervisor is not a bother to my work	28	15.2	67	36.4	48	26.1	25	13.6	16	8.7	2.64
My supervisor actively listens to my suggestions.	11	6.0	22	12.0	40	21.7	65	35.3	46	25.0	3.61
Overall, my supervisor does a good job.	7	3.8	13	7.1	31	16.8	83	45.1	50	27.2	3.85
My supervisor provides me with regular actionable suggestions on what I can do to improve.	9	4.9	11	6.0	32	17.4	66	35.9	66	35.9	3.92
My coworkers (or team members) are helpful	1	0.5	9	4.9	15	8.2	68	37.0	91	49.5	4.30
The morale with my colleagues is very high	9	4.9	13	7.1	25	13.6	75	40.8	62	33.7	3.91
Majority of my coworkers or team members perform their responsibilities intelligently	4	2.2	7	3.8	36	19.6	73	39.7	64	34.8	4.01
My co-workers put effort in their work	77	41.8	79	42.9	19	10.3	8	4.3	1	0.5	1.79
My co-workers get well along with each other.	2	1.1	6	3.3	34	18.5	80	43.5	62	33.7	4.05
Average mean	3.54										

Source: Field Data (2018)

Overall high mean scores demonstrated employees' satisfaction with various aspects of their jobs. Most were above 3.5 and an average mean of 3.53 out of a total score of 5 as table 4.2. Most employees, about 69% are satisfied with their job while 25% employees were neutral with only 6% were least satisfied with their job. The findings reveal that a large percentage 69% of employees in two- and three-star hotels are highly satisfied with their job despite registering low levels with aspects like promotion, remuneration, and in spite of variability with age, work section, gender or even job levels. Most are satisfied with their supervision they get, present work or job and coworkers. Findings support Herzberg's work that hygiene issues in the place of work contribute to employee job satisfaction or dissatisfaction (1959). The hygienic factors by Herzberg include the work itself in which 79.9% were satisfied, supervision in which 65.2% were satisfied and co-workers in which 67.9%, remuneration in which only 41.3% registered satisfaction and promotion where 49.5% were satisfied. Further, there were insignificant

differences in the levels of job satisfaction across remuneration, promotion, age, gender, work section and job level. On remuneration, the finding supports the findings of (Yogesh & Ashutosh, 2012) who revealed employees dissatisfied with existence salary contributes to low levels of satisfaction with their jobs.

3.3 Influence of Organizational Environment on Employee Job Satisfaction

To establish the influence of organizational environment on employee job satisfaction, regression analysis was conducted. The variable, organizational environment was the predictor representing the independent factors as shown in Table 4.4.

Table 4.4. Model Summary of Employee job satisfaction

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.646 ^a	.417	.407	.44743	.417	42.923	3	180	.000

a. Predictors: (Constant), organizational Environment, Dependent Variable: Job Satisfaction

Source: Field Data (2018)

The R^2 was the measure of variability in employee job satisfaction that is accounted for by the independent variable. The model, ($R^2= 0.417$) shows that the independent variable account for 41.7% variation for employee job satisfaction. Therefore, independent variable in the model has taken into consideration the variation in the employee job satisfaction.

The adjusted R^2 reveals how well the model generalizes and its value should be ideally the same value or a close value to R^2 . In this case, the value of adjusted R^2 was 0.407, showing that if the data was derived from entire population rather than the sample as it the case for the study it account for close to 40.7% least variance in the employee job satisfaction. To test whether the change in R^2 was significant using the F ratio, change statistics was used. This made R^2 to adjust from zero to 0.417 which gave rise to an F ratio of 42.923 significant at .05

Table 4.5. ANOVA^a

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	25.779	3	8.593	42.923	.000 ^b
Residual	36.035	180	.200		
Total	61.814	183			

a. Predictors: (Constant), organizational Environment,

b. Dependent Variable: Job Satisfaction

Source: Field Data (2018)

To test if the model significantly predicted the outcome instead of using the mean the analysis of variance was done (Table 4.5). The F-ratio was the improvement in prediction in that the results fit the model

clearly, relative to the inaccuracy that exists in the model. The F-ratio was 42.923 which was significant ($P < .05$) and likely to happen by probability. The ability to predict the employee job satisfaction was significantly improved by the model.

Table 4.6. Coefficients

Model	Unstandardized Coefficients	Standardized Coefficients			95.0% Confidence Interval for B	Correlations	Collinearity Statistics					
	B	Beta		T	Sig.	Lower Bound	Upper Bound	Zero-order	Partial	Part	Tolerance	VIF
1. (Constant)	1.467	.315		4.664	.000	.000	.846					
Organizational Environment	.360	.044	.560	8.185	.000	.000	.273	.634	.521	.466	.693	1.444

Dependent Variable: Job Satisfaction

Source: Field Data (2018)

Table 4.6 showed the β values and the input of each independent variable to the model. β value indicates that employee job satisfaction has a relation with organizational environment. The positive correlation between the independent variables and the outcome are reflected by positive β values. β value for organizational environment had a positive coefficient thus positive relationship.

The model was then specified as:

JS= 1.467+0.360OE.....Equation 1.0

Where, JS=Job Satisfaction

OE=Organisational Environment

To identify if independent variables had significant input to the model t test was carried out. A significant T-test linked with *b*-values reveals that independent variable has significant input to the model. From the study findings model, the organizational environment ($t = 8.185, P < .05$). Thus, the organizational environment variable had significant input to employee job satisfaction.

The findings showed that organizational environment had significant contribution to the model. Regression coefficients of the independent variable were used to find how strong the influence of the independent variable had on the dependent variable as demonstrated in Table 4.6. From the table, organizational environment with a standardized beta of 0.560 meaning it has a strong significant influence on employee job satisfaction. According to these findings, organizational environment had a positive t value showing

little negative correlation between organizational environment and employee job satisfaction. In conclusion, organizational environment had 56.0% changes on employee job satisfaction. The findings showed that organizational environment accounts for 56.0% change on employee job satisfaction in two and three star rated hotels in Kisumu County.

Given that the variable in the model are held constant the amount of change in employee job satisfaction given a change of one-unit in the value of independent variables is given by the coefficients for the variable. The constant is 1.467, and this is the predicted value when all the independent variable equals zero as in table 4.20. The unstandardized coefficient value for organization environment was 0.360, meaning; one unit increase on organizational environment; would yield 0.360 unit increases on employee job satisfaction.

The study results reveal that respondents are satisfied with their organisational environment with an average mean of 3.6390 out of 5. majority of the employees 64.7% registered satisfaction. There were high scores on hotel promoting good relations and positive behavior among employees and on leadership& the management of the hotel emphasizing on results and humanity. There were low scores on training and development of employees and on employees receiving training and coaching. The pearson correlation revealed a positive affiliation between organizational environment ($r = 0.634$) on employee job satisfaction, significant when $p < 0.05$. The results supports arguments by (DeStefano, Clark, Potter, & Gavin, 2005) revealed that the factors of organization such as involvement, improvement and support contributes considerably to employee job satisfaction. Further, the study supports findings of Thomas, 2004; Ajala, 2012 and Tio, 2014) which established a close connection linking factors organization like support, involvement of employees, working relationships, flexible work systems, value of opportunities associated with system and employee job satisfaction.

Therefore the regression analysis results summarized simple connection between independent variable and factors of consideration by two and three star hotels. The results revealed that the predictor account for 41.7% variation for employee job satisfaction. Therefore, the predictor; organizational environment captured variation in the employee job satisfaction. However, other factors not considered in the study accounted for 69.3%. Ability to predict employee job satisfaction was significantly improved by the model since the F - ratio of 42.923 which was significant ($P < .05$).

The β values for variable was organizational environment (0.360) had a positive relationship between predictors and outcome. The t-test results showed that the organizational environment ($t = 8.185$, $P < .05$). The findings revealed that organizational environment play a significant contribution to employee job satisfaction.

The implication of findings is that hotel industry needs to improve employee job satisfaction, it is imperative to consider organizational environment. However, efforts to improve employee job satisfaction should be focused on enhancing levels of quality of this variable.

The findings agree with Shidhaye, Divekar, Goel & Shidhaye (2011) whose opinion is that conditions of the workplace influences employee job satisfaction and can be increased by improving the standards related to workplace features.

4. Conclusions and Recommendations

The findings indicated that the organizational environment significantly affected employee job satisfaction. Therefore, improving organizational environment can assist two- and three-stars hotels in building a more satisfied employee hence a satisfied workforce. By helping to establish what makes employee satisfied the hotels must come up with a strategy on the aspects which employees are least satisfied with. There is need to look into the aspect of organizational environment especially on training and development as well as mentoring and coaching.

Improving organizational environment to enhance employee job satisfaction is of greater impact and could be revealed if a hotel plans entails different and various aspects of employee job satisfaction policies and practices. Effective organizational environment practices are practices that helps achieve employee job satisfaction and workforce that is stable. There is need to adopt organizational environmental practices in hotels to boost the hospitality sector.

To start with, there is need for employee training and career development in hospitality sector to improve per capita income and employees living standards. Moreover, since the sector employs most young people in the society the government and agencies associated with it should provide incentives to help promote the sector. This will help reduce employment gaps in the country and could assist in increasing the number of tourists, guests in these categories of hotels.

The hotels management should also improve organizational environment by training and development of their employees, provide employees mentoring and coaching to boost employee's satisfaction. Finally, umbrella bodies and the government should provide and make a follow up on the remuneration package offered to employees in these hotels so that they are in line with the requirements.

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Board Structure and Firm Value of Commercial Banks in Kenya: An Empirical Analysis

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Abstract

Firm value is dependent on board structure which leads to increased value. High valued firms attract more investors. Towards firm value protection, minimum capital requirements were raised by the Central Bank of Kenya from 250 million to 1 billion shillings on commercial banks to cushion bank shareholders value. Despite the increased oversight and regulatory efforts on corporate governance to protect and enhance firm value, some commercial banks have recorded low firm value. Hence, this study sought to investigate the effect of board structure on firm value of commercial banks in Kenya. The study was anchored on Agency Theory. Explanatory research design was adopted. Target population was forty three Kenyan commercial banks, where a census was conducted. Secondary data was collected from published financial statements and bank websites for the period 2009 to 2018. STATA version 13.0 was used for data analysis. Descriptive and inferential statistics specifically panel regression was used in data analysis. The study findings established that there is a statistically significant effect between board structure and firm value of commercial banks in Kenya. Therefore, the study concluded that firms with board structure that adheres to industry best practice have high firm value. And as such, this calls for the policy makers of the commercial banks to adopt best board structures will go a long way in improving firm value. There is also need for Central bank of Kenya, Capital Markets Authority and Nairobi Securities Exchange to review existing policies on board structure in order to enable formulation of new and progressive policies to ensure shareholders' value is protected.

Keywords: Board Structure, Firm Value, Commercial Banks in Kenya

1. Introduction

Pandey (2009) posits that a firm value is the total values of all its monetary securities. Firm value is the current value of all the predictable future cash flows to be produced by the assets, reduced at the corporation's weighted regular cost of Capital (Chowdhury & Chowdhury, 2010). Advocates of stakeholder theory, such as Freeman (1994) and DesJardins and McCall (2010), emphasize that corporations should be managed to serve the interests of all stakeholders. Shareholder-oriented proponents as Sundaram and Inkpen (2004) state that shareholder value maximization can be advantageous to all stakeholders as owners are residual claimants.

Klement and Dettman (2015) indicate that CAPE ratio was overvalued in the US stocks being ranked the second lowest in returns globally by having 1.4% returns annually and CAPE ratio of 24.4 which is above the average of 16.6. Other Markets CAPE ratio as: Russia was 5.7 which led to increase of returns from -0.5% to 7% per annum; India with CAPE of 21.3 has 10% returns per year; Greece with CAPE

of 2.9 has per annum expected returns of 22.7%; and South Africa 19.9 with 1.5% returns (Starcapital, 2015). Historically, run-ups in the CAPE ratio measure of value suggest overvaluation (Lansing, 2017).

Statistics on Commercial banks in Kenya document price to book valuation (PTBV) average of 1.4X in the year 2017 as compared to an average of 2.0X for the past 10 years (Cytonn,2017) .Commercial banks acquisition had a multiple of 1.8x, on a stake of 80.3%. The last acquisition of Habib bank the P/Bv was at 0.8X for 100% transaction stake while the real book value was worth Kshs. 2.38 billion and the real transaction was Kshs 1.82 billion (Cytonn,2017).

Firm value can be measured using measures as Tobin's Q, CAPE ratio (cyclical adjusted price earnings) (Sharma, 2011). Market value measures are normally used for public listed companies (Ross, Westerfield, Jordan, & Roberts, 2007). CAPE ratio was adopted in the current study as it corrects for short run fluctuations in EPS as it takes into account inflation to enable comparability of different periods (Luskin, 2017; Star, 2016; Pfau, 2012). CAPE ratio is calculated as market price divided by average EPS for ten years. Corporate board's structure influence firm value.

Larger boards may enhance access to a variety of resources and improved executive supervision (Bredart, 2014). Large boards are more symbolic, but poor communication associated costs may be high than benefits (Habbash & Bajaher, 2014). A size of seven to nine board members is recommended (Reddy, Locke, & Scramgeour, 2010). Board size and market value was established to have a negative relation by some scholars, small boards are associated with high firm value (Tai, 2015). Board size is utilized as a denominator in the calculation of board independence in this study.

Board structure involves independence as Non-Executive Directors (NED's) ratio to the total number of board members. Habbash and Bajaher (2014) indicates that two out of three or a third of the members whichever is the greater should be independent. Deloitte LLC (2013) observed that industry experience of directors is a skill required for the near future board success and Pozen (2010) raises concerns around corporate board industry experience, as being insufficient.

CEO duality, family members, age, composition and board size are collapsed into board independence as they affect board independence. Multiple bank boards to represent busyness of board members which affects attendance. Institutional investors were used to represent ownership structure. This study adopted institutional investors, multiple bank boards and independence for board structure for they have been used by previous researchers. Therefore, this study sought to assess the effect of board structure on firm value of commercial banks in Kenya. Consequently, a null hypothesis: Board structure does not have a significant effect on firm value of commercial banks in Kenya was proposed.

2. Literature Review

This study is anchored on Agency Theory. The proponents of the theory Mitnick (1975) and Ross (1974) explained the separation of the principal who are the owners and agents who are managers of a firm. Jensen and Meckling (1976) stated that agency relationship is due to separation of owners of the firm and the management of the firm. The separation leads to managers who are agents to being entrusted the rights of making decisions by the shareholders who are the principals.

Conflict of interest by the managers arises when they maximize on their own benefits at the expense of owners of the firm destroying shareholder wealth.

Management are prone to make funding decisions that are detrimental to firm value in achieving short term goals (Fatemi & Gift, 2002). Contracts between the management and owners of the firm should be those that encourage the management to be motivated to work and increase shareholders value (Dennis, 2001). Most studies on corporate governance have been anchored on agency theory due to the principal and agent relationship (Filatotchev & Wright, 2011). The theory helps explain the board structure role in the reduction of the agency principal conflict.

Al Manaseer, Al Hindawi, and Sartawi (2012) observed that a positive relationship between foreign ownership, independent board members and bank performance; Chairman and CEO separation have a negative relationship with performance. Quoted banks were estimated at fifteen (15) at Amman Stock Exchange. Study variables included board composition, size, foreign ownership and CEO duality. The study focused on corporate governance effect on performance in Jordan. In addition, to establish if the findings in Jordan can be adapted and applied by Kenyan banks.

Basyith, Fauzi and Idris (2015) found a significant relationship between board structure and performance. They study focused on the relationship between ownership and board structure on firm performance in Indonesia. The study used a balanced panel data for 45 blue chip firms listed from 2010 to 2014 and adopted logistic regression. Use of blue chip companies limits generalization of findings because some banks included in the current study are unlisted. The current study covered a longer period of ten years.

Suganya and Kengatharan (2017) found out that independent directors and size of the board have a significant and positive effect on the performance of financial firms. Separation of the roles of the chairman and CEO and gender diversity were found to have an insignificant effect on performance. The study focuses on only listed firms, which limits generalization of findings to unlisted firms. Therefore, the current study sought to focus on both listed and unlisted banks. Moreover, Sri Lanka and Kenya have known cultural differences thus the study by Suganya and Kengatharan (2017) limits adopting of the findings to the commercial banks in Kenya.

Orozco, Vargas, and Dorado (2018) findings were high reputation of firms has a relationship with big boards and no effect between financial performance and reputation. The study was carried out in Colombia on large firms only, limiting adoption of its findings to the current study which incorporates medium and small banks. The study carried out in Colombia was conducted on a different cultural setting compared to that of Kenya. This causes limitation on generalization of its findings to the Kenyan commercial banking sector. Dependent variable of the previous study was reputational performance creating a conceptualization gap, and thus the study is inconclusive to adopt its findings to the current study which has firm value as the problem variable.

3. Methodology

Research design provides specific direction for a study (Creswell, 2014). Explanatory research design was adopted to enable test of the effect of board structure on firm value of Commercial banks in Kenya. When the researcher is concerned with identifying factors that cause change and explain the operation of a phenomena without manipulation then explanatory research design is deemed appropriate (Kerlinger & Lee, 2000).

The study adopted Panel linear regression analysis. As suggested by Greene (2008) a panel linear regression model was estimated since the data had cross-section and time dimension by Al Manaseer *et al.* (2012); Hassan *et al.* (2016). A regression model was adopted to test the relationship between board structure and firm value. CAPE ratio was obtained by the current market price per share divided by average EPS for ten years.

Empirical model:

$$Y_{it} = B_0 + BX_{it} + \epsilon_{it}$$

Where:

Y_{it} = Firm value, B_0 = constant, B = beta coefficient, X_{it} = board structure, ϵ_{it} = error term.

4. Results and Discussions

This section presents a trend analysis for Board Structures and Firm Value. The study sought to establish whether increasing trends in board structure as measured by multiple bank boards, board independence and institutional investors and firm value measure using CAPE ratio. The results are presented in Figure 4.1.

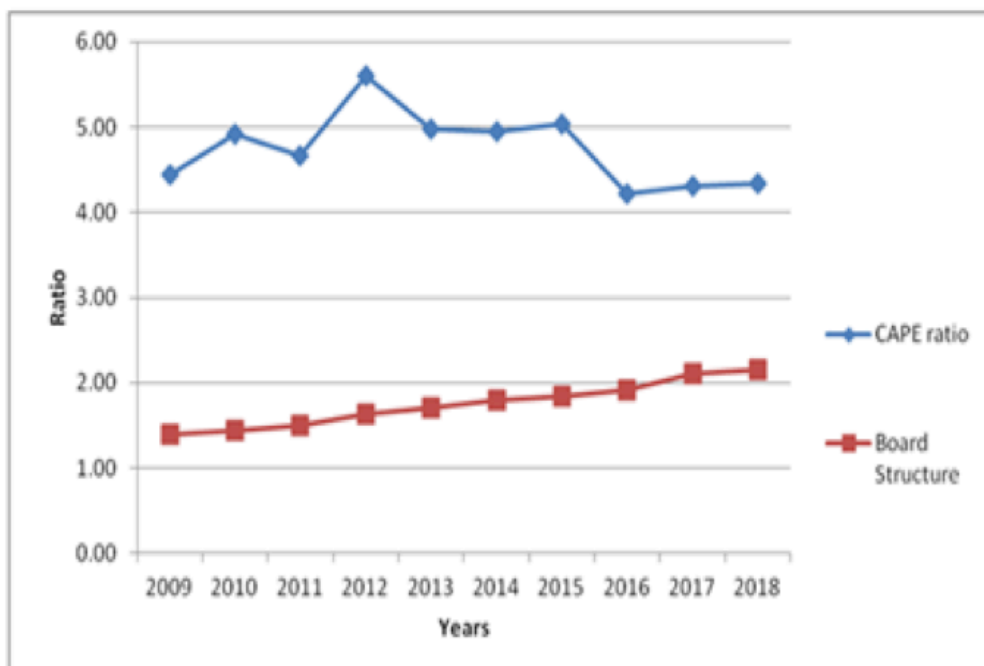


Figure 4.1 Trends in Board Structures for Commercial Banks 2009 and 2018

Source: Research Data (2019)

In view of the results in Figure 4.2 above, board structure for commercial banks in Kenya indicate an increasing trend between 2009 and 2018. On the other hand, firm value increased between 2009 and 2015 and dropped between 2015 and 2016 before increasing slightly between 2016 and 2018. The findings further indicate a relationship between increase in board structures and firm value. The drop in firm value could be as result of other factors other than board structures, the findings shows that board structures remained steady during the entire period of research. The findings concur with those of Koerniadi, Krishnamurti, Tourani-Rad, and Alireza (2014) who found out that those organizations that have good board structure have lower levels of risk in relation to composition of the board, and rights of shareholder. Al Manaseer, Al Hindawi, and Sartawi (2012) similarly found a positive relationship between foreign ownership, independence of board members and bank performance.

Test of hypothesis

The following null hypothesis was tested:

Ho: Board structure does not have a significant effect on firm value of commercial banks in Kenya.

Random effect regression analysis was conducted to test the effect of board structures on firm value of commercial banks in Kenya. The results show that members of industry experience, institutional board members and board independence explained 32.2% of the variation in firm value of commercial banks in Kenya.

The results further show that board independence had the largest impact on firms' value, followed by institutional board members then members with multiple bank boards had the least impact on firm value of commercial banks in Kenya. The finding confirmed that board structure was essential and plays a significant role in determining firm value of commercial banks in Kenya. Board structure gives investor confidence and trust in the firm future which positively impact on market performance of commercial banks in Kenya.

Cape Ratio	Coef.	Std. Err.	z	P> z	[95% Conf.	Interval]
Multiple Bank Boards	0.00195	0.123924	0.02	0.9870	0.24484	0.240933
Institutional investors	0.714833	0.196328	3.64	0.0000	0.330037	1.09963
Board independence	1.86449	0.53796	3.47	0.0010	2.91887	0.81011
_cons	6.298663	0.960503	6.56	0.0000	4.416112	8.181213
Wald chi2(3) = 22.57						
Prob > chi2 = 0.0000						
R-squrae =0.3224						

In view of hypothesis, the study found out a positive and statistically significant effect between board independence, institutional investors and firm value of commercial banks in Kenya ($\beta=0.1.86449$, $p=0.0010$, <0.05 ; $\beta=0.0.714833$, $p=0.0000$, <0.05). Hence the study rejected the null hypothesis that Board structure does not have a significant effect on firm value of commercial banks in Kenya.

The finding also mirrors those of Al Manaseer, Al Hindawi, and Sartawi (2012) who found a positive relationship between foreign ownership, independent board members and bank performance. Similarly, Basyith, Fauzi and Idris (2015) found a significant relationship between board structure and performance. The study specific variables were: independent commissioners, managerial ownership, audit committee and board of directors. The finding of the current study supported those of Koerniadi, Krishnamurti, Tourani-Rad, and Alireza (2014) who found that those organizations that have good governance have lower levels of risk in relation to composition of the board, rights of shareholder.

5. Conclusions and Recommendations

Board structures were found to have a significant positive effect on firm value of commercial banks in Kenya. The study concluded that commercial banks in Kenya with high firm value have adopted best practices in terms of board structures. This study recommends that policy makers from commercial banks should adopt best board structures based on multiple bank boards, board independence and institutional investors. Commercial banks emphasis should be on board independence which is a key element of corporate governance followed by institutional investors and lastly by multiple bank board members. Hence, Commercial banks managers should ensure that their board is independent.

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CLUSTER

3

Sub-Theme 5: Education

Sub-Theme 6: Community Development

Sub-Theme 7: Communication

&

Sub – Theme 8: Health Sciences

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Conservation of the Marakwet Traditional Irrigation System in Marakwet County in Kenya: Opportunities and Threats

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Abstract

The traditional irrigation furrows in Marakwet County are located in the Marakwet escarpment and flow to Kerio Valley. Oral traditions of the community state that the Marakwet settled in the valley in small clans at the beginning of 1800 and have been using the indigenous irrigation furrows for crop cultivation to enhance food security. The irrigation furrows therefore represent the tangible and intangible cultural heritage of the Marakwet community, passed down the generation. Until late 1990s, the river furrows were sufficient to irrigate adequate crops, thus most of the households in the area produced adequate food crops and surplus that were traded with the neighboring communities. However, following deterioration of some river furrows, production of food crops in the area declined. Presently, about 60% of the subsistence farmers receive insufficient water for crop irrigation and livestock consumption. This study sought to assess the threats and challenges to conservation of the indigenous irrigation system; analyze the government policies that support conservation and sustainable utilization of cultural heritage and recommend mitigation measures to address these threats and challenges. The study is particularly important because the Marakwet community largely depend on agriculture as a source of food and income. The findings will inform sustainable utilization of the irrigation system to enable the community to grow food throughout the year. The irrigation system is also an important tangible and intangible heritage that needs to be conserved. Secondary data was used in this study through a systematic review of literature from scholars of the traditional irrigation systems and also a review of government policies that support conservation of pertinent cultural heritage.

Keywords: Traditional Irrigation System, River Furrows, Food Sustainability, Marakwet Community

1. Introduction

One of the major determinants of food security especially in arid and semi arid areas is irrigation system. The skill of irrigation was developed long ago as an initiative for promoting food security. Irrigation has played a significant role in crop production around the globe since its inception. FAO projects that one third of the world food is produced through irrigation.

It has been estimated that traditional irrigation system accounts for about 35% of the total land under irrigation in sub Saharan Africa. Indigenous irrigation system thus plays a significant role in ensuring that a number of rural households have food especially in periods of famine. A major strength of traditional irrigation systems is that its maintenance is financially friendly, owing to the fact that it is mainly managed by the farmers themselves.

The significance of the Marakwet landscape, both for the community and for the diversity of human practice, is already recognized by the United Nations, Educational, Scientific and Cultural Organization (UNESCO). The Marakwet traditional irrigation system was listed as world heritage site in September 2018. According to UNESCO, the irrigation system and the entire landscape in which it operates together with the associated tangible and intangible heritage makes it of outstanding universal value and thus deserving recognition.

The indigenous irrigation system qualified as UNESCO world heritage site under the following criteria: The irrigation system is a testimony to a civilization that has withstood the test of time; the furrows are still in use to date: The use of furrows for irrigation is a demonstration of the community mastery of their harsh environment and harnessing water for irrigation is a survival technique adopted by these people. The furrows are under threat due to the introduction of modern agricultural techniques in certain parts of the escarpment.

The government of Kenya recognizes the contribution of the “orphan crops”, namely sorghum, millet, green grams, cow peas among other traditional crops in boosting food security especially in the arid and semi-arid land. These are the very foods that are grown by the Marakwet community through the traditional irrigation system.

2. A Profile of the Marakwet people

The Marakwet are Nilotic and agro pastoral community, the community rear livestock and practice subsistence farming. The Marakwet communities have upheld aspects of their traditional life, and are rich in tangible and intangible cultural heritage in their dress code, dancing styles, rhythm, tones, pottery, agricultural practices and bead work (Östberg, 2015).

3. The Marakwet Traditional Irrigation System

Oral traditions of the community state that the Marakwet settled in the valley in small clans in the beginning of 1800, and been using the indigenous irrigation furrows for crop cultivation to enhance food security for many years (Kipkorir& Kareithi, 2013). There are two permanent rivers in the area, the Arror in the south and the Embobut further north at Tot. Irrigation occurs along more than 40 kilometres of Marakwet Escarpment, streams descending the Marakwet escarpment supply water to the irrigation furrows. There are 91 irrigation furrows covering in total 315 Km. The expertise of furrow construction is complex; it involves the use of wood, stones and trunks laid on top of each other. According to the community, the furrows follow lower or weak points and pass through hills and valleys (Davies et.al 2014). The Marakwet have a distinctive water management system that puts into consideration the needs of each clan in order to reconcile the competing demands for water use. This water management system operates on non-bureaucratic principles that ensure the furrows not only provided water for human and animal consumption but also for irrigation.

4. Location of the Marakwet Irrigation Furrows

The Marakwet irrigation furrows are situated in Elgeyo Marakwet County in the Western part of Kenya along the Africa's Great Rift Valley. The county covers a total area of 3029.9 km² and had a total population of 370,712 in 2009 (National Population and Housing Census). Seventy two percent of the County's land area is arable and is used for crop production and livestock rearing (Ministry of Agriculture Livestock and Fisheries, 2017). The County has three distinctive agro ecological zones: The Highlands, the Escarpment, and the Valley. The Highlands (49% of the total land area), are suitable for livestock such as sheep and dairy cows as well as crops such as maize, beans, potatoes and wheat. In the escarpments (11 %), crops such as maize, beans, sorghum and millet are grown, despite the high risk of soil erosion, rock falls and landslides. While in the Valley which covers 40% and is semi arid, the farmers grow crops such as green grams, groundnuts, millet, sorghum and fruits. They also keep poultry, zebu cattle, sheep and goats (Government of Kenya, 2013). The important physical features and natural resources in the county include: Kerio Valley National Reserve, Lake Kamnarock National reserve, Rimoi game reserve, Torok water falls, Chebloch Gorge, Iten view point and the Marakwet Irrigation furrows (County Integrated Development plan, 2013)

5. Threats and Challenges

The irrigation furrows represent the tangible and intangible cultural heritage of the Marakwet community. The heritage has stood the test of time and continues to be used to irrigate crops in the semi-arid valley (Moore, 1986, Östberg, 2015). The furrows flow along rocky and steep escarpment and time to time get damaged by rockslides and mudslides. The major cause of damage is the heavy rains which trigger siltation, breakages and dislocation of the intakes at the Embobut River. Additionally, environmental degradation has triggered heavy runoff resulting into breakage of the furrows. The river furrows were adequate to irrigate crops before 1980s until late 1990s. Most of the households in the area produced adequate food crops and surplus that was traded with the neighboring communities (Olenja, 1982). Following deterioration of Embobut River furrows, production of food crops in the area declined gradually. In the years 2004-2007, production of food in particular cassava, maize, finger millet and sorghum decreased by an average of 2.8%, 15%, 21.3%, and 30.8% respectively (Marakwet District Agricultural Report, 2008). Presently, about 60% of the subsistence farmers receive insufficient water for crop irrigation.

- Kipkorir & Kareithi (2012) and Östberg (2015) identified the following challenges and threats in the traditional irrigation system:
- The traditional furrows are under threat due to the introduction of modern agricultural techniques in certain parts of the escarpment.
- Environmental degradation (Deforestation, soil erosion), transformed the areas into bare grounds, hence increased run-off and damage to the furrows
- Increased exploitation of stones in the area has caused blockage of the furrows. The rocks often roll down from the quarries and block the furrows.
- The increased use of the stones in the repair of the furrows is attributed to the exhaustion of the woodlands (Mainly acacia). This also threatens the savannah landscape.

- Trees were traditionally used in the repair of furrows and it was exhausted from overuse
- Some structures in the furrows are broken, leaking, silted, eroded and blocked by mud and rock debris and no longer efficient.

6. Opportunities for Conservation

There are numerous opportunities for conservation accruing to the national and county government policies on agriculture, tourism, environment and natural resources.

Sector	Government policies
Environment and natural resources	<ul style="list-style-type: none"> • Ensure sustainable exploitation, utilization, management and conservation of the environment and natural resources to ensure quality of life; • Work to achieve and maintain a tree cover of at least ten per cent of the land area of Kenya; • Protect and enhance intellectual property in and indigenous knowledge of, biodiversity and the genetic resources of the communities; • Encourage public participation in the management, protection and conservation of the environment; • Protect genetic resources and biological diversity; • Eliminate processes and activities that are likely to endanger the environment • Cooperation between the people with the government to protect and conserve the environment and ensure ecologically sustainable development and use of natural resources
Agriculture	<ul style="list-style-type: none"> • Increase agricultural productivity and incomes, especially for small-holder farmers. • Promote irrigation to reduce over-reliance on rain-fed agriculture in the face of limited high potential agricultural land. • Enhance food security and a reduction in the number of those suffering from hunger and hence the achievement of Sustainable Development Goals. • To promote sustainable land development and soil fertility management practices • Create public awareness on emerging issues opportunities and innovations and build farmers skills to adopt • Improve agricultural production through irrigation • To enhance effective flow and exchange of information between research organizations, the county government and the farmers
Tourism	<ul style="list-style-type: none"> • Advertize to attract more tourists; • Increase revenue from tourism • Participation of the government (National and County), private sector, development partners and the general community to realize the vision • The county government has been working to provide an enabling environment that facilitates tourism enhancement, for socio-economic growth. • Elgeyo Marakwet County aspires to be globally recognized as a tourism destination to enhance socio-economic development

Source: Ministry of agriculture livestock and fisheries, (2017), Constitution of Kenya, (2010), Kenya Vision 2030 development plan, Elgeyo Marakwet Integrated Development plan, (2013)

7. Recommendations

- a) Collaborative effort between the government and the community to ensure sustainable and appropriate use of the furrows. Because the furrows are not only important for agriculture but also serves as a valuable cultural heritage which should be safeguarded.
- b) The furrows need to be repaired in order to counter food insecurity in the area
- c) Measures should be put in place to curb over exploitation of woodlands, excessive quarrying in order to curb soil erosion;
- d) Stabilization of the escarpment to protect it from hydraulic risk such as mudslides;
- e) Elgeyo Marakwet county government should provide financial and technical support to the community to ensure rehabilitation and expansion of furrows so as to realize food security in the area;
- f) The county government should provide incentives to the youth to participate in agricultural activities. This will guarantee the transmission of the knowledge of traditional irrigation furrows to the future generations

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Assessment of Solid Waste Management Practices among Residents of Kiganjo Informal Settlement in Kiambu County, Kenya

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Abstract

Solid waste management has become a crucial topic for any urban authority in recent years. This is because of the rapidly growing amount of solid waste and the associated potential environmental hazards and the enormous cost of management. Even the best waste management systems in the world have shown that the future of waste management cannot avoid heavy financial costs to cater for the ever-growing quantities of waste. Unless a new paradigm of global cooperation and governance is adopted, the growing mounds of waste will be unmanageable in future. This study focused on solid waste management practices in Kiganjo informal settlement in Kiambu County, Kenya. This was accomplished by finding out the solid waste management practices among residents of Kiganjo Informal Settlement, assessing how knowledge relates with waste management practices and finding out the effect of attitudes on waste management practices. The study endeavoured to expose any gaps that exist in management options and how these gaps can be filled so as to reduce the enormous costs incurred by local authorities in waste management. The study combined integrated solid waste management and modernized mixed approach framework emphasizing sustainability and life cycle based assessment of a product. A cross-sectional analytical survey design was adopted involving qualitative and quantitative methods of data collection. The study used cluster random sampling technique to choose three hundred and eight four households from the three 'corners' of Kiganjo informal settlement, who were willing to participate and met the inclusion criteria. Observation, interviews and questionnaires were used to collect data. Quantitative data was analyzed by the usage of SPSS software whilst qualitative data was analyzed via synthesizing the facts received from numerous sources into a coherent description of what has been found or otherwise observed.

Keywords: Solid Waste Management, Informal Settlements, Kiambu County

1. Introduction

Managing solid waste effectively and affordably is one of the major challenges to many county governments. There are no perfect solutions, yet no absolute failures: the specific technical and economic approaches that work in other regions may not work in another country. The only sure winning strategy is to comprehend and build on the strengths of the methods in use by identifying and enhancing local processes that are already working. This may sometimes be outside the formal waste management framework (UNHABITAT, 2015).

As the world urbanizes, waste management circumstances are turning out to be more intense. More individuals mean more waste, especially in rapidly developing urban centres where the bulk of waste is produced. Current global solid waste generation levels are about 1.3 billion tonnes yearly and are projected to increase by about 70% to 2.2 billion tonnes yearly by 2025. Management of waste will be more costly and consumptions that today add up to \$205 billion will grow to \$375 billion. The cost effects will be most severe in poor countries that are currently struggling to meet basic social and framework needs, especially for their poorest population (AFDB, 2016).

The waste generation in East Asia and the Pacific Region is around 270 million tonnes yearly; in Eastern and Central Asia, about 93 million tonnes, with the per capita waste ranging from 0.29 to 2.1 kg daily. In South Asia, roughly 70 million tonnes of waste is produced yearly, with per capita values going from 0.12 to 5.1 kg daily and an average of 0.45 kg/capita/day. The measure of waste produced yearly in Latin America and the Caribbean is 160 million tonnes, with per capita values running from 0.1 to 14 kg/capita/day and a normal of 1.1 kg/capita/day (PAHO, 2014).

Waste generation in sub-Saharan Africa is around 62 million tonnes per year. Per capita waste generation range from 0.09 to 3.0 kg daily, with an average of 0.65 kg/capita/day . Overall waste generation rate for East African Countries urban centres is between 0.26 and 0.78 kg/capita/day (UNEP 2016).

In Nairobi, solid waste generation ranges from about 800-1000 tonnes per day. Nonetheless, the city has a limit of collecting 400 tonnes per day. This implies that a significant part of the-waste is left littered in boulevards and channels. This calls for viable efficient and culture friendly alternative management options. It can be accomplished by enhancing the indigenous procedures, (ADB, 2014).

2. Problem Statement

Urban ecological issues require long-term solutions. Among these is waste management, which is critical since it is directly connected with assurance of public health, safety and ecological security. It is often the case, that strategies for waste management are unsuccessful. Moreover, it has been observed that sectors dealing with waste management have often received little attention from the government. One reason for the long-time persistence of the problem is the weak financial structure and institutional insufficiency for waste management (UNIDO, 2016).

To cope with the present and future challenges of waste management, there is need to embrace strategic, participatory and sustainable methodology that can address social, financial, ecological, and technical issues, which are additionally upheld at the household level.

Many developing countries wake up to waste only after it winds up in dumps. At this stage, it requires enormous financial resources in labour, equipment and other logistics. Even then, only up to 30-60% of the urban solid waste is collected, and under half of the populace is served, (UNEP, 2016).

The private sector endeavours to fill the gap created by this inefficiency. However, even this contribution is not formally recognized (UNHABITAT, 2015).

This study sought to determine how the household can be incorporated in waste management. Reduction of house hold waste generation should be expected to reduce the waste that eventually ends up on the dump site.

3. Objectives of the Study

Broad Objective

To assess the factors affecting solid waste management practices in Kiganjo area, Thika.

Specific Objectives

- a) To determine household solid waste management practices among residents of Kiganjo Informal Settlement
- b) To assess knowledge of waste management practices among residents of Kiganjo Informal Settlement
- c) To determine the effect of attitudes on waste management practices among residents of Kiganjo Informal Settlement

4. Literature Review

4.1 Waste Management

Waste is more easily recognized than defined. Something can become waste when it is no longer useful to the first user. The overall goal of waste management is to cost-effectively collect, treat or dispose of waste in an environmentally and socially satisfactory manner, Solid waste management incorporates planning, administrative, monetary, engineering and legislative functions. (Kathryn, 2015).

4.2 Waste Management Hierarchy

No single waste management approach is suitable for coping with waste streams in all circumstances. This requires a hierarchy ranking the most environmentally sound strategies for solid waste locations emphasis on reducing, reusing, and recycling the majority of waste. The hierarchy establishes priorities primarily based on sustainability. To be sustainable, waste management cannot be solved simply with technical end-of-pipe answers but an inclusive approach is essential. Waste management hierarchy indicates the order of preference for action in reducing and managing waste. The hierarchy is presented diagrammatically in the form of a pyramid and captures the development of a product via successive stages of waste management (UNEP, 2016).

4.3 Solid Waste Management Practices

Solid waste management practices can vary for residential and industrial producers, for urban and rural areas, and for developed and developing countries. Management of non-hazardous waste in metropolitan areas is the responsibility of county governments. On the other hand, the management of hazardous waste materials is typically the obligation of the generator, subject to local, national and even international authorities, (UNEP, 2016).

In most developed countries, domestic waste disposal is funded from a national or local tax, which might be related to income, or property values. Commercial and industrial waste disposal is normally charged for as a business benefit, often as an integrated charge, which includes disposal costs. This practice may encourage disposal contractors to opt for cheaper disposal option rather than the environmentally best solutions, (Kathryn, 2015).

In some areas such as Taipei, the city governments charge its residents and industries for the volume of waste they produce. This policy has successfully reduced the amount of waste produced and increased the recycling rate, (Nyangechi, 2013). Before final disposal, pre-treatment can be essential to treat by physical, chemical, or biological processes the characteristics of the waste so as to minimize the quantity or harmfulness of the waste, (Kathryn,2015). There are numerous techniques of waste disposal that range from simple open dumping to complicated techniques like pyrolysis and deep well injections. The suitable technology to adopt depends on socio-economic and cultural elements. The chance of a technique meeting the needs of a positive disposal device depends on economics, form of input and output streams, and the expected time of development of the technique to a time where it is technically viable for massive-scale operations (USEPA, 2014).

4.4 Factors affecting solid waste management practices

The amounts of waste produced for the most part depend upon the income of a family, as higher pay class will, in general, generate a bigger amount of waste; contrasted with low-pay class. The amount ranges from about 0.25 to about 2.3 kg per individual every day, showing a relationship between waste generation and per capita pay.

The tropical climate varieties sharply from wet to dry season. This causes significant changes in the moisture content of solids, shifting from under half in the dry season to more than 65% in wet months. Collection and disposal of waste in the wet months is challenging. High temperatures and humidity cause solid waste to decompose more quickly than they do in colder atmospheres, (Kathryn, 2015).

Solid waste management consumes a sizeable proportion of the budget of county governments. This is dispensed for capital resources, which go toward purchasing equipment, vehicles, and fuel and labour costs. Ordinarily, 10% to 40% of the revenues of county governments is designated to solid waste management. The unfavourable financial situation threatens the harmony between the level of automation and the measure of the labour force and complicates choice of the most cost-effective solution. In some areas, customs block the waste collectors from accessing their compounds, and in this manner, affect the collection framework. In others, where the custom of caste persists, recruits to the labour force for street cleaning and handling of waste must be drawn from specific segments of the populace; while others won't agree to put storage bins in their immediate vicinity. Social norms of a community usually supersede rational solutions. Waste management should, thus be sensitive to such local patterns of living and consider these elements in planning, design and operation, (UNEP, 2016).

4.5 Challenges of Waste management

Human beings are responsible for more than 30% of the planet's total waste generation. We live in a time of throw-away consumerism; a time when companies are producing one-time use items. The waste stream grows in volume and toxicity because corporations continue to profit by producing seemingly useless products, and they are not compelled to prioritize recycling, reusing, or substituting less toxic alternatives in their ingredients. Regular products, which are used and thrown away, incorporate riskier chemical compounds than ever before. The unprecedented toxicity of garbage exacerbates the problem for which there is no nationally clear solution. The control of household and industrial waste comes at a financial and environmental cost. First, waste ought to be collected, sorted, and transported before being treated. This can prove expensive, (UNEP, 2016).

Monetary sustainability in solid waste management is a major issue all over the world. In developing countries, solid waste management represents a substantial share of the overall recurrent budget. Yet in spite of the surprisingly high cost, collection service coverage is frequently low and disposal standards continue to be worse. For many towns in low- and middle-income countries, the coming years will see multiplied waste, more humans, extra cars, extra labour needed for collection, more transfer stations and extra administration, (UNHABITAT, 2015).

As cities emerge and requirements improve, suitable sites for landfills could be scarcer, further from the city centres, and steeply priced. This may involve increasing the current prices for providing waste management service as much as 50 percent, and the creation of consumer fees. This increases the issues of fairness, affordability, and willingness to pay, (Svedberg, 2014).

Experience has shown that service users are prepared to pay for their waste to be removed when they agree with the service levels, the charging system is transparent and when services are provided at locally acceptable prices, (USEPA, 2014).

4.6 Residents' participation in solid waste management

The local government is responsible for solid waste management. However, this cannot be delivered in isolation. The high-quality-functioning solid waste structures need to involve all the stakeholders in planning, implementation, and tracking the modifications, (Ramesha, 2016).

Studies have shown that in low-income regions waste elimination is rarely a priority as people's lives are dictated by way of survival economics and so are their motives for taking any action. In those areas, emphasis needs to be on the monetary advantages that accrue from solid waste recycling and re-use. Inside the high-earnings regions, residents are even ready to pay more money for waste evacuation. Researchers on solid waste management in Kenya have overlooked the mindset of the citizens in the direction of the problem, which has been seen as a council's affair. Private sector involvement comes in where the existing service delivery is either too costly for the local authority or inadequate, (Ramesha, 2016).

5. Research Methodology

The study was conducted in Kiganjo informal settlement located on the outskirts of Thika sub-county, Kiambu County. The study adopted a cross-sectional analytical survey and utilized elements of qualitative and quantitative research methodologies.

In order to get a proportional representation of the targeted respondents, this study adopted a combination of Cluster, purposive and simple random sampling techniques. Kiganjo area was divided into three sections through cluster sampling. Simple random sampling was then used to select 141 households from each of the three clusters to get a sample of 422 households. The study also used purposive sampling method in identifying key informant interview respondents.

Quantitative data was collected by means of questionnaires and interview, while qualitative statistics was collected with the aid of observation, interviews, and Focus Group Discussions. The research findings were analyzed and interpreted both quantitatively and qualitatively in accordance with the nature of the data given by respondents. Inferential data analysis was done using Pearson correlation coefficient and regression analysis to establish the relations between the independent and dependent variables.

6. Results and Discussion

6.1 Social demographic characteristics

The study found that 84.5% of household heads were males. However, husbands preferred their wives to be interviewed on their behalf, claiming that they are the ones concerned with the handling of waste. A majority of the respondents (51.2%) were between 31-45 years, those between 46-60 years were 25.4%, 15-30 were 14.5% while 8.9% of were above 60 years. Married respondents were 64.8% , 23.9% were single, 2.7 % were divorced, and 8.6 % were either widowed or cohabiting. Unemployed respondents were 10.62% , 69.7 % were working in the informal sector and 13.5% had taken up white-collar jobs, 5.4% had not acquired any formal education; while 8.1 % had acquired Primary School Education, 71.2% of the respondents had Secondary School Education while 15.3% had gone through tertiary level education.

Households in Kiganjo were generally small; a mean of three (3) people per household. This could be associated with urban lifestyle where men leave their spouses in the rural areas to work in urban areas due to high cost of living. About 1.9 % of the respondents were living in their own private houses while 2.2 % were living in private rental houses at the time of survey. The rest, (3.2%), were living in private rental and 94.6 occupied public rental houses.

Respondents with less than one year of residence in Kiganjo were, 13.9%; 7.6% had lived in Kiganjo for more than 10 years. Those with 2-5 years and 5-10 years of residence represented 51.1% and 27.4%, respectively.

6.2 Household solid waste management practices

Waste disposal varied among residents: 53.7% used open dumping, followed by use of receptacle with 15.8%, and burning at 5.2%. The remaining 25.4% used other forms of disposal including composting, recycling and reuse among others. The data collected revealed that an overwhelming majority of the households, (94.3 %), do not sort out their solid waste before it is collected for disposal. The few who do so normally separate the financially valuable ones from the less valuable and do not base on other criteria used for waste sorting. This may be attributed to lack of space, time and commitment. The youth groups interviewed observed that Kiganjo residents are not aware of the value in solid wastes that they jumble together.

The groups usually collect the waste as generated and stored by the residents after which they sort it. The study indicated that 11.3 % of the respondents used dust bins, 5.2% used rubbish pits, 26.4 % used polythene papers while the remaining 57.1% used other methods like open dumping outside their house. The study revealed that 73.1 % households retained their solid waste for more than a day in their residents before disposal. A majority of these were the middle-class households whose income is generated from small business enterprises and informal jobs. The remaining, 21.2% and 5.7 %, retained the solid wastes for one day and 12 hours respectively. A majority of the respondents (66.3%), indicated that they used Local Government services while 5.7% of the respondents indicated that the Non-Governmental Organizations were responsible for waste collection. 6.2% of the respondents indicated that Religious Organizations, Youth Groups, Private garbage collectors or Self-Help Groups did waste collection, while 21.90% of the respondents indicated that nobody was involved in collecting waste in their area.

6.3 Attitudes about waste management practices

From the study, 37.2% and 55.2 % of the respondents strongly disagreed and disagreed respectively that the government has done enough in dealing with solid waste management in informal settlement. Only 2.2% and 0.7% agreed and strongly agreed respectively on the matter. From the study 36.5% and 54.9 % of the respondents were unsatisfied and unsatisfied respectively by the solid waste management services offered. Only 0.7 % and 2.2% were very satisfied and satisfied respectively about the matter.

6.4 Knowledge level on household solid waste management practices

The indicators for knowledge were: importance of waste management, who should be involved in solid waste management health; which should bear greater responsibility for solid waste management and where solid waste management should begin. From the study, (95.6%) were aware of the general importance of the practice and importance of waste management to the health of populace. 2.7% felt it is not important while 1.7 were not sure, 76.6% and 2.7 % of the respondents local government and non-governmental organization respectively to be involved in solid waste management, 18.7% felt everybody should be involved while 2% said other stakeholder s, like self-help groups, youth organization among others to be involved, while 78.6% felt that the greatest responsibility in waste management should be on the local authority. 2.7 % felt it should be the non-governmental organization ,while 18.2% felt it should not be anybody's responsibility.

The findings of this study are in agreement with works of Ayodeji (2012), Banga (2013) and Adeyemo and Gboyesola (2013) on the attitude, knowledge and practice of waste management.

6.5 Inferential data analysis

To establish the relationship between the independent and dependent variables, multiple regression was used because it is the procedure that uses two or more dependent variables to predict a dependent variable. The following coefficients were established.

Coefficients ^a						
Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.		
	B	Std. Error	Beta			
1	(Constant)	1.673	.137		12.175	.000
	DEMOGRAPHIC	.235	.046	.257	5.100	.000
	KNOWLEDGE	.014	.056	.013	.252	.801
	ATTITUDE	.111	.116	.046	.949	.343

a. Dependent Variable: PRACTICE

The results revealed that there was a slightly positive relationship between waste management practice and knowledge ($\beta=0.013$) as well as with attitude ($\beta=0.046$) though these relationships were not statistically significant ($\alpha > 0.05$). This result is in line with the findings of Adeyemo and Gboyesola (2013) and Adogu et al. (2015) on knowledge, attitude, and practices on waste management of people living respectively in the university area of Ogbomosho and Owerri Municipality in Nigeria, which indicated that the respondents were knowledgeable in waste management.

7. Conclusions and Recommendations

The ever increasing global concern about environmental health demands that waste be managed and disposed in an environmental friendly and acceptable manner. The problems of improper solid waste management need to be tackled at the household level, which requires individuals to develop positive attitudes which will increase their environmental consciousness and further guide them to adopt proper waste handling and disposal practices.

Although this research relied on data from Kiganjo, Thika, Kenya, the conclusions drawn from it have the potential for wider application. This is because despite the undeniably context-specifics of informal settlements, they broadly exhibit similar characteristics which can form the basis for adoption of the findings of this research.

The following factors were significantly associated with waste management practice: gender, age, household size, duration of stay at Kiganjo and with type of waste generated.

The waste practices adopted on waste disposal varied among residents with 55.4% using open dumping, while a majority of the households did not sort out their solid wastes before it is collected for disposal. Respondents stored their waste using dust bins, rubbish pits, polythene and other methods like open dumping outside their house. The study revealed that 72.5% retained their solid waste for more than

a day in their residents before disposal. A majority of the respondents indicated that they used Local Government services.

Based on the findings of this study, the following measures are important to overcome solid waste management problems in Kiganjo informal settlement and Kiambu County in general:

Kiambu County Government should enforce the by-laws set on waste management. For instance: the Anti-dumping by-law should be enforced by punishing those caught dumping waste in the non-designated places;

In order to minimize waste generation in Kiganjo area, there is need for the local authority to fully integrate the informal sector into the solid waste management system, and also prioritize the waste management strategies according to the waste management hierarchy; this would mean officially involving other stakeholders interested in improving waste management services in Kiganjo;

The county Government, could improve waste management practices by ensuring waste collection services are easily available and accessible for every household in Kiganjo. This would include providing means of waste collection from generation points to the final dumpsite. This would help to reduce the common practices of open dumping, road and drain dumping by individuals that causes environmental pollution.

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A Critical Review of the Effects of Women's Preconception Nutrition on Maternal and Infant Outcomes

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Abstract

Pre-conception nutrition is critical since several exposures and risk behaviours affect development of the foetus and subsequent outcomes. This study systematically reviewed published research trials on the impact of preconception nutrition on maternal, neonatal and child health outcomes. Literature was reviewed using Google scholar and PubMed engines to search evidence from clinical research literature published after January 2000. Intervention trials and observational studies show that periconceptional (<12 weeks gestation) folic acid supplementation significantly reduced the risk of neural tube defects. Observational studies suggest that preconceptional and periconceptional intake of vitamin and mineral supplements is associated with a reduced risk of delivering offspring who are low birthweight and/or small-for gestational age (SGA) and pre-term deliveries (PTD). Some studies report that indicators of maternal prepregnancy size, low stature, underweight and overweight are associated with increased risks of PTD and SGA. The available data indicate the importance of the mother's nutrition prior to, and during the first trimester of pregnancy, but there is a need for well-designed prospective studies and controlled trials in developing country's settings that examine relationships with low birthweight, SGA, PTD, stillbirth and maternal and neonatal mortality.

Keywords: Preconception Nutrition, Birth Outcomes, Expectant Mothers' Nutrition

1. Introduction

The nutrition status of women before and during pregnancy has been shown to be a significant determinant of pregnancy outcomes, (Bhutta, Makrides & Prentice, 2015). The amount of nutrients available and supplied to the fetus is dependent on maternal nutritional status, which is influenced by her nutrient stores, nutrient intake and obligatory requirements, (Xie, Madkour & Harville, 2015). Therefore, young girls and women should be in their optimal nutritional status in order to be prepared for future needs of pregnancy. Most nutrition studies on the determinants of pregnancy outcomes mostly focus on the importance of nutrition during the second and third trimester. This is the time when critical developments have already been completed. Maternal nutrition status before conception and during the first trimester may have an influence on pregnancy outcomes by affecting organogenesis which begins early in pregnancy. Several maternal nutrition factors such as fat stores, height, age at first pregnancy and micronutrient status are particularly relevant to the developing countries and may influence pregnancy outcomes (UNICEF, 2009).

The rapid changes in eating habits and lifestyles in the developing countries have resulted to the overweight/obesity transition. These countries are now faced with a triple burden of malnutrition characterized with undernutrition, overweight and obesity and micronutrient deficiencies, (Transform nutrition, 2011). Several studies have shown that preconception maternal overweight and obesity increases the risk of gestational diabetes, neonatal death, macrosomia, pre-eclampsia and pre-term delivery. Pre-conception underweight increases the risk for pre-term births, intrauterine growth retardation (IUGR) and low birth weight babies. It also increases the risk for maternal and infant morbidity and mortality. Folic acid deficiency before conception has been proved to increase the risk of neural tube defects such as spina bifida. Low haemoglobin and ferritin levels during the pre-conception period has been shown to increase the risk of poor fetal growth and low birth weight babies, (Dean et al., 2014, Twigt, 2013; Raatikainen, Heiskanen & Heinonen, 2006). The purpose of this review was to assess the impact of pre-conception nutrition on maternal and infants outcomes.

2. Methodology

Published studies were identified using Google scholar and PubMed search engines. The search was carried out using the following key terms: preconception nutrition, impact of preconception nutrition on maternal, neonatal and child health outcomes of interest (pre-eclampsia, pregnancy loss, birth defects, birth size). The studies included peer reviewed articles and research theses from 2000 to June 2019. The inclusion criteria involved observation and intervention studies including maternal, neonatal and child health outcomes (pre-eclampsia, pregnancy loss, birth defects, birth size) and studies involving nutrition exposure measured right before (within 1 year of conception) conception. The exclusion criteria involved animal studies, nutrition exposure beginning in pregnancy, review articles and non-nutritional studies. The eligible articles were reviewed by the author. Using these criteria, 30 articles (8 intervention trials and 22 observational studies) were accepted and included in this critical review.

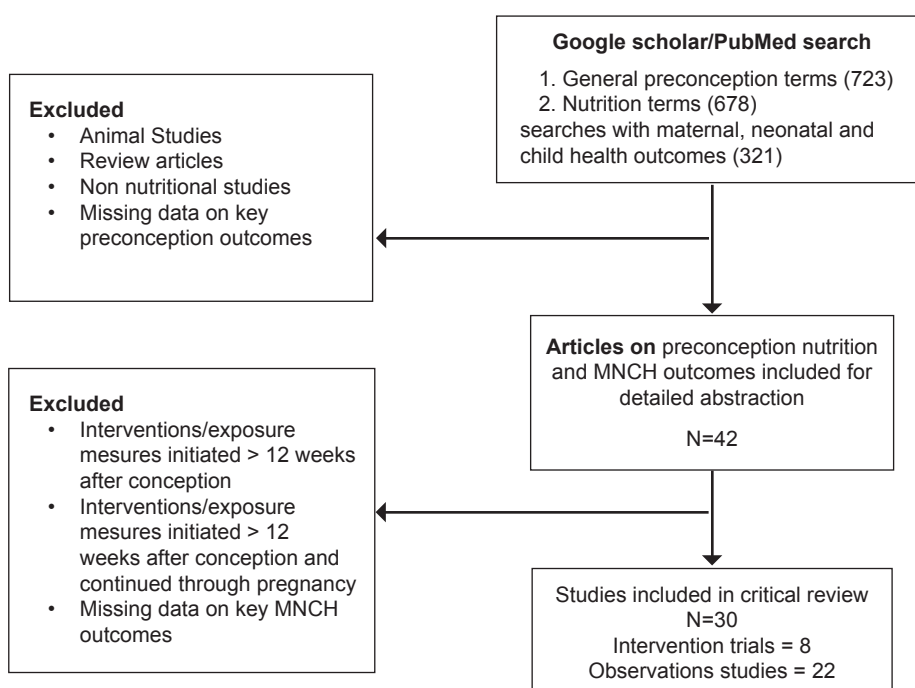


Figure 1: Sketch of studies included and excluded in the review of the effects of preconception nutrition on maternal and infant outcomes

3. Results and Discussions

3.1 Pre-eclampsia

A study by Phithakwatchara and Titapant (2007) reported that the risk of pre-eclampsia was significantly increased [odds ratio (OR): 3.87 [95% confidence interval (CI) 2.09, 7.25]] among overweight women in Thai as compared to normal weight women, after adjusting for the confounding factors. This study utilized retrospective data, where a review of medical records of pregnant women at risk of gestational diabetes was carried out. There were similar findings reported in a study of singleton nulliparous pregnancies delivered in three hospitals in Shenyang, China. This study also utilized data from medical records, (Liu et al 2011). Overweight (BMI 24 - 28 kg/m²) and obese women (BMI 28 kg/m²) had significantly increased risks [adjusted risk ratio (RR): 5.7 [95% CI 4.0–8.1] and 3.0 [95% CI 2.2–4.1]] of pre-eclampsia compared to normal weight women (BMI 18.5 - 24 kg/m²). Ehrental et al. (2011) also found that BMI before pregnancy was positively associated with the risk of pregnancy induced hypertension.

Another study reported pre-pregnancy BMI as an independent factor for adverse pregnancy outcomes, including gestational hypertension (Shin & Song, 2015). Maternal pre-pregnancy overweight and obesity were found to be positively associated with pre-eclampsia in a study by Papachatzi et al (2013). Similar results were found in a study by Thanoon, Gharaibeh & Mahmood (2015).

3.2 Pregnancy loss

A prospective study of 240 women in the Netherlands evaluated the relationship between maternal periconceptional biochemical and haematological parameters and early pregnancy loss. Women were recruited before pregnancy and body weight measurements and blood samples were taken at 6 and 10 weeks amenorrhea. Prepregnancy weight was significantly associated with the risk of early pregnancy loss ($P < 0.05$), but relationships with vitamin status were not significant in the well-nourished population (De Weerd et al., 2003). On the other hand, results from an observational study of Chinese women reported that micronutrient status before conception may be negatively associated with pregnancy loss (Ronnenberg et al., 2007). Liu et al. (2011) did not find any significant differences in the risk of stillbirth by categories of prepregnancy BMI. Results from five intervention trials found no significant differences on the effect of periconceptional folic acid on miscarriages and/or stillbirths. It is important to note that the trials were mainly conducted in developed countries among women with high risk of delivering a child with NTD. One of the trials conducted in Algeria, evaluated the effect of providing iodized oil in women either before pregnancy or during the first trimester of pregnancy and reported no significant reduction in occurrence of stillbirths when compared with women who did not receive the intervention, (Chaouki & Benmiloud, 2004).

3.3. Birth defects

Most of the studies in this area evaluated the relationship between maternal periconceptional nutrition and risk of developing NTD. Vujkovic et al. (2007) in a case control study, assessed maternal preconception nutrition intakes of 203 mothers with children with cleft lip or cleft palate and 178 mothers with non-malformed children and found that the Western diet, including, high amounts of meat, potatoes, pizza,

legumes and low in fruits, was significantly associated with a high risk of a cleft lip or cleft palate (OR: 1.9 [95% CI 1.2, 3.1]). In contrast, Bower et al. (2006) found that folic acid supplementation during the periconceptional period had no association with the risk of birth defects other than NTD. The study involved women whose infants had oral facial clefts (OFC) ($n = 62$), CHD, urinary tract defects ($n = 117$), limb reduction defects ($n = 26$) and other major birth defects ($n = 119$). The control mothers were 578. Similar results were found in Holland in a case-control study among women where no significant difference was observed among cases using periconceptional folic acid supplements and control women (Van Driel et al. 2008).

Additionally, a study in the Netherlands also showed a trend towards risk reduction for OFC among mothers who consumed folic acid supplements before conception. Yazdy, Honein & Xing (2007) reported a significant decline in the prevalence of OFC following a fortification program with folic acid. The study was a retrospective cohort analysis of US birth certificate data from 45 states in which births were compared before the fortification period (January 1990–December 1996) and after the fortification period (October 1998–December 2002).

Birth size

A retrospective study of Chinese women reported an increase in risk of delivering a SGA infant (adjusted RR: 1.7 [95% CI 1.1, 2.6]) among women who were underweight, (Liu et al. 2011). Ronnenberg et al. (2003), reported similar findings in a prospective cohort study that examined the relationship between pre-pregnancy BMI and birth outcomes among Chinese women ($n = 575$); infants born to underweight mothers before pregnancy were at increased risk for fetal growth deficits. Underweight was also associated with a smaller head circumference of the infants. In a prospective study of 240 women in the Netherlands, weight status before pregnancy was significantly associated with infant birth weight, (De Weerd, 2003). In Vietnam, a large prospective study (Ota et al. 2011), reported a higher risk of delivering a SGA infant among women whose BMI before conception was underweight (BMI < 18.5 kg/m²) compared with those with normal BMI (18.5 and 23.0 kg/m²).

Ronnenberg et al. (2007), assessed the association between iron status before conception and pregnancy outcome and infant growth and found that iron-deficiency anaemia, was positively associated with reduced lower birthweight. The risks of LBW were significantly higher among women with moderate anaemia compared with non-anaemic group (OR: 6.5 [95% CI 1.6, 26.7], $P = 0.009$). In a retrospective cohort study multivitamin use was associated with an increase in birthweight ($P = 0.001$) among African Americans but no association between multivitamin use and birthweight was found among the white subjects, (Burriss, Mitchell & Werler, 2010). In a population-based prospective cohort study, Timmermans et al. (2009) evaluated the effect of folic acid supplementation and found that folic acid supplementation before pregnancy was associated with a higher birthweight ([95% CI 37.2, 99.0]) and reduced risks for LBW (OR: 0.43 [95% CI 0.28, 0.69]). In a Danish National Cohort Study, the risk for a SGA birth was significantly reduced among women who used multivitamins regularly before conception regardless of their prepregnancy BMI as compared to non-users (Catoy et al. 2011).

4. Conclusions and Recommendations

In summary, there is strong evidence supporting the importance of pre-conception nutritional status to reduce the risk of adverse effects on pregnancy outcomes most notably birth defects especially the neural tube defects (NTD) and LBW. There is little evidence on outcomes such as stillbirths and maternal and infant mortality. The available evidence suggests improving maternal nutritional status before pregnancy will improve pregnancy and birth outcomes. More studies are required to evaluate the benefits of preconceptional nutritional interventions like preconception nutrition counseling to confirm observational studies findings. The dissemination of messages about the importance of a healthy diet and lifestyle before pregnancy has the potential to optimize pregnancy and birth outcomes in many settings. Innovative approaches such as counselling newlywed mothers can be evaluated to help guide programme implementation. There is also need to carry out studies in developing countries since most of the studies have been carried out in the developed countries.

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Analysis of Qualitative and Bacterial Culture Results on Urine Samples among Patients Attending Thika Level 5 Hospital, Kenya

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Abstract

Semi-quantitative urine cultures are done to conclusively diagnose urinary tract infections (UTIs) and to isolate, identify bacterial pathogens and perform antimicrobial susceptibility testing. The time and the cost involved in such processing is substantial and it is imperative that truly representative mid-stream urine samples are collected from clinically identifiable cases in order to lower the financial burden of diagnostic laboratories. UTIs are among the most common bacterial infections encountered in clinical practice and urine analysis are by far the commonest and the most frequently requested tests by clinicians, as an aid to diagnosis of UTI. Microbiology laboratories apply screening assays to identify urine samples that are suitable for culture. These screening methods are insensitive when the bacterial counts are less than 10⁵ CFU/ml and so are not used to screen out urine samples obtained by catheterization, suprapubic aspiration or by cystoscopy (Al-Daghistani *et al.*, 2002). In this research, results from microscopy with a combination of qualitative urine strip test were compared to the results of bacterial culture, with the broad objective of comparing rapid dipstick analysis and urine culture in detecting urinary tract infections. The specific objectives of the study were: to identify the most frequent pathogens responsible for UTI's; to compare culture results as the gold standard method and to obtain a predictive value between the urine analysis methods. The research was laboratory-based and samples of urine were analysed both qualitatively using dip stick method (cambre 10) and by culture. The bacteria were reported based on colonial morphology, staining and biochemical test. From the study, it was found out that the most common bacteria causing UTI is *Escherichia Coli* at 87.3% of the cases, and proteas having the least cases at 4.2%. No case of syphilis was noted. From the study, it was established that every sample which was positive for nitrite in the cambre 10 had bacteria pathogens. Urine samples with low PH, irrespective of other parameters, had no bacterial growth obtained. Sensitivity, specificity, PPV and NPV of the qualitative analysis (cambre 10) was 78.6%, 66.5%, 64.8% and 80.6% respectively. This study recommends that diagnostic rapid accuracy for urinalysis can be used conclusively in treatment of urinary tract infections.

1. Introduction

Urinary tract infections (UTI) are a group of diseases of the urinary system which affect the tissues and organs in the regions of the urinary system including the urethra, kidney, ureter, the bladder and other associated organs. UTI is a very common condition among all people globally. These infections may or may not show symptoms but can progress to death. Urine or swab cultures is the gold standard test for diagnosis while other tests used such as microscopy and biochemical techniques are preemptive in nature (Tazebew *et al.*, 2014). Microscopy and biochemical test are simply referred to as urinalysis

in general practice. Compared to urinalysis, culture process takes time and is therefore not rapid and less useful in the early diagnosis of UTI. Frequently used biochemical tests are urine strips commonly known as cambre 10 which are able to detect leukocyte esterase (LE) and nitrite as well the microscopic analysis for deposits in urine (Lane et al, 2011).

The manner in which urinary tract infections manifests clinically is dependent on factors such as: the patient's immune response; the portion of the urinary tract involved; gender of the patient; the severity of the infection and the etiologic organisms involved (Olowe et al 2014). The common factors associated with UTI include gender, circumcision, diabetes, age, race, pregnancy urinary catheter, abnormalities, and hospitalization status (Martin et al, 2018).

Globally, within a year, over 150 million people suffer from UTI which translates to over 6 billion dollars spent on direct health care (Stamm et al 2014). UTI is a global problem with varied prevalence in different countries. The prevalence of UTI in Algeria is 4.5% (Mirsoleymani et al 2014). In Senegal, the prevalence is 2.7%, with prevalence among women being higher than males as is the case globally, (Andabati et al 2015). In Nigeria, a study conducted among 12,458 urine samples reported a prevalence of 12.3%. The prevalence among the females and the males were 14.6% and 7.4% respectively (Kabugo et al 2016). In Uganda, the prevalence is about 13.3% (Tibyangye et al 2014).

The micro-organisms which cause UTI can reach the urinary tract by lymphatic spread or haematogenous, but there is abundant clinical and experimental evidence to show that the ascent of micro-organisms from the urethra is the most common pathway leading to a UTI, especially organisms of enteric origin (i.e. *Escherichia coli* and other *Enterobacteriaceae*). This explains why there is greater frequency of UTIs in women than in men (Ibadin et al 2015). The aims of this study were to compare culture results with qualitative results of urine samples among patients attending Thika level 5 laboratory and to obtain a predictive parameter (s) for rapid diagnostic test from culture results.

2. Methodology

The study was a validation analytical study carried out between June-July 2019 in the laboratory department of Thika Level 5 Hospital in Kiambu County. Sample size was calculated from a recent study using the Yamane (1967) formula for determining the sample size which is determined by $n = \frac{N}{1 + Ne^2}$.

Three hundred and nine samples were analysed which were picked by probability method of random method. Patients of any gender of suspected UTI were included in this study while duplicate samples from the same course of illness were excluded. Clean catch, Mid-Stream Urine (MSU) samples from patients sent for urinalysis to the laboratory was collected in sterile urine bottle and tested using the standard operating procedure. The samples were analysed microscopically and biochemically using (COMBI-10) strip. All important parameters of diagnosis were analysed and recorded. The change of colour of the dipstick on the parameter of Nitrite from colourless to pink within 60 seconds indicated positive result and for Leukocyte was considered positive from observable change in color from off-white to purple. Urine culture was done based the standard operating procedure ensuring quality of the

process. During inoculation, wire loops calibrated to deliver the recommended sample of 0.01 ul were used. Using the appropriate media, Cystin Lysin Electrolyte Deficient (CLED) agar for culture, delivery of the urine samples and streaking on the respective culture plates was done, appropriate labeling and subsequent transfer to incubator. Incubation was done at 37°C and results observed and recorded after 24 or 48 hours depending on rate of growth. Both positive and negative controls were included to ensure quality of the results. Diagnostic measures i.e. sensitivity, specificity, PPV and NPV were calculated by standard formulas using culture as gold standard.

3. Results and Discussions

Among 309 samples from patients with suspicion of UTI, 136 samples growth of single type of bacteria and 64 showed no growth on CLED agar. Out of the positive culture results, 73 were dipstick positive and 36 were negative.

The performance characteristics of culture and dipstick results are as shown below. Sensitivity, specificity, PPV and NPV of the qualitative analysis (cambre 10) was 78.6%, 66.5%, 64.8% and 80.60% respectively. Culture was considered as the gold standard.

Table 1: Culture results vs Urinalysis results

URINALYSIS	CULTURE RESULTS		TOTAL
	POSITIVE	NEGATIVE	
POSITIVE	136 (44.0%)	73 (23%)	209 (67.6%)
NEGATIVE	63 (20.4%)	36 (11%)	100 (32.4%)
TOTAL	199 (64.5 %)	110 (35.5%)	309 (100%)

The most common bacteria causing UTI is *Escherichia Coli* at 87.3% of the cases, and proteas having the least cases at 4.2%. No case of syphilis was noted.

Culture and biochemical results were compared where culture was considered as the gold standard in order to examine the presence or absence of urinary infection. From the results obtained on sensitivity and specificity quality results for urinalysis test are appropriate for diagnosis of UTI even in absence of culture. Sensitivity, Specificity, PPV and NPV of the qualitative analysis (urinalysis) was 78.6%, 66.5%, 64.8% and 80.6% respectively.

Use of dipstick test decrease patient's time and money, and may also help in earlier initiation of treatment. The urinalysis test also requires little investment cost and can be done in a simple laboratory.

A number of previous studies have shown a correlation between positive Leucocyte Esterase, nitrates and culture results. Laosu-angkoon (2013) as well as Perkins (et al 2014) determined the sensitivity and specificity of urine LE test in an outpatient clinic. In his study it was indicated that sensitivity of combined LE and NIT was 66.7% while that of Leucocyte alone was 63.6%. He concluded that dipstick should be added in ER department for quick diagnosis of UTI especially in children to prevent potential sequel like hypertension and renal scarring.

A study by Taneja *et al.* (2015) shows the combination of negative predictive value and sensitivity of nitrates and leucocytes was 90.9 and 79.6% respectively. Furthermore, the individual sensitivity, specificity, PPV and NPV of leucocytes were 73.5%, 58.5%, 33.0% and 88.8% respectively and those of nitrates were 57.1%, 78.7%, 42.7% and 86.8% respectively.

A study conducted by Sundvall and Gunnarsson indicated that in an instance where parameters of leucocytes and nitrates are both negative, there was a highly likely that culture results would be negative. Khasriya *et al.* (2017) showed that sensitivity of LE was 56% and NIT was 10%. Results of sensitivity of his study were less than this study while specificities were 66% and 99% respectively. For the specimen of catheterized patient, sensitivity of leukocyte esterase was 59% and nitrite was 20%, while specificities were 84% and 97% respectively.

From this study, it was found out that the most common bacteria causing UTI is *Escherichia Coli* at 87.3% of the cases, and proteas having the least cases at 4.2%. No case of syphilis was noted. From the study, it was established that every sample which was positive for nitrite in the cambre 10 had bacteria pathogens. Urine samples with low PH, irrespective of other parameters, had no bacterial growth obtained.

The findings of this study concur with previous studies. Therefore, urinalysis can be used as key determinant of diagnostic decisions for UTIs unless otherwise advised.

4. Recommendations

Based on the findings of this study, clinical treatment can be initiated among patients using urinalysis results even in the absence of urine culture results to ensure timely treatment. For patients who show symptoms with negative findings of urinalysis results, urine culture is recommended.

Although urine culture remains to be the gold standard test for diagnosis of UTI, urinalysis results on leucocytes and nitrates can be as basis for treatment of UTI associated with bacteria.

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Effects of Health Information Access on Cervical Cancer Services Utilization among Women aged over 30 Years Living in Informal Settlements in Thika Sub-County, Kenya

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Abstract

The study sought to determine the effects of health information access on Cervical Cancer services utilization among women aged over 30 years living in informal settlements in Thika Sub-county. A cross-sectional descriptive study design was adopted. A convenient sample of 125 women aged 30-69 years from informal settlements was used as study units. Data on social demographics and social-cultural factors, level of uptake, level of awareness and health care facility factors which influence cervical cancer screening variables were collected using structured questionnaires. Data were verified, coded, and analysed with SPSS version 25. Descriptive statistics were analysed and presented in tables. The use of screening facilities for cervical cancer was found to be low at 26% (33/125). The study showed a significant relationship between age [$p=0.05$], women with insurance cover [$p=0.00$] and income [$p=0.01$]. Cervical cancer screening is low in women in the study area. The study concludes that there is a significant possibility of improving women's participation in cervical screening if regular best practices are embraced. The study recommends that women enroll in health insurance schemes to ensure that they access screening services together with enhancing community awareness on cervical cancer.

Keywords: Health Information Access, Cervical Cancer Services, Informal Settlements

1. Background

Cervical Cancer (CC) is a major public health concern in Kenya. It is the leading cause of cancer morbidity and mortality among women (WHO 2018). It is the leading cause of cancer morbidity and mortality among women (WHO 2018). Cancer of the cervix is a potentially preventable cancer among women and is the second most common cancer among women worldwide. The cervical cancer burden is rising globally, with a recorded 640,000 new cancer cases per year, exerting significant strain on populations and health systems at all income levels (WHO 2018).

The WHO estimates that around 68,000 cervical cancer incidences occur every year in Africa. Cervical cancer is the growth of abnormal cells in the lining of the cervix, affects the neck of the womb. This disease ranks fourth worldwide, and is the most frequently diagnosed cancer and the fourth leading cause of cancer deaths among women, (WHO 2018). Cervical cancer ranks second behind breast cancer in low-income countries. Sexually transmitted Human Papilloma Virus (HPV) infection leads to the development of cervical intraepithelial neoplasia and cervical cancer. Women with many sexual partners and those whose partners have had many sexual consorts or have been previously exposed to the virus are most at risk of developing the disease.

All women are at risk of cervical cancer. The disease occurs most often in women of age over 30 years, (KDHS 2014). The human papillomavirus (HPV) is the main cause of cervical cancer. HPV is a common virus that is passed from one person to another during sex. Many factors can increase the risk of cervical cancer, including: intimacy at an early age, multiple sexual partners, sexually transmitted diseases and HIV. The different methods of cervical cancer screening include Papanicolaou (Pap) smear, visual inspection of the cervix with acetic acid (VIA), HPV DNA test, and colposcopy. Colposcopy is not used as a primary screening test but it is combined with other tests.

Over the past decade, the global health community has given increased attention to prevention of cervical cancer. Globally 300,000 women die annually from cervical cancer and related conditions (WHO 2018). Cervical cancer is the most common gynecological cancer and a leading cause of cancer death in women globally. An important strategy towards the reduction of the incidence and mortality associated with cervical cancer is increasing the screening rate of women. Over 80% of patients present with advanced CC stage. According to WHO (2018), 33 per 100,000 women in Kenya have cervical cancer and 22 per 100,000 die from the disease. CC Services Uptake is low among eligible women despite the increased efforts to fight CC.

Information access is perceived to be limited in the informal settlement (Kibicho 2017). CC screening stands at 3.5 among women aged between 30-60 years (HPV fact sheet, 2018). Role of access to health information, its nexus and effect on utilization of CC services in the informal settlements are not well articulated in literature. Strategies for introducing or strengthening cervical cancer prevention programs must focus on ensuring that appropriate, cost-effective services are available and that women who most need the services will, in fact, use them.

2. Objectives of the study

The objectives of this study were to:

- i) Determine access to health information by women over 30 years in Kiandutu slum in Thika
- ii) Determine the type of health information about cervical cancer available to women over 30 years old in Kiandutu slum in Thika;
- iii) Determine the CC services user perception towards screening practices among women over 30 years old in Kiandutu slum in Thika

3. Methodology

This was an exploratory research in which a convenient sample drawn from women aged >30 years living in Kiandutu slums in Thika constituted the study units. A structured questionnaire and interview schedule were used to collect the data. Data was analysed using measures of central tendency (mean), frequency distribution tables and percentages with tables and pie charts were used to present the findings. For review a search strategy for eligible studies targeted published studies from comprehensive electronic data bases comprising of Medline, Google Scholar, Pub-Med, Hinari & Cochrane Library. Screening and extraction of eligible studies was done independently and in duplicate.

4. Results and Discussions

4.1 Descriptive Characteristics of the Respondents

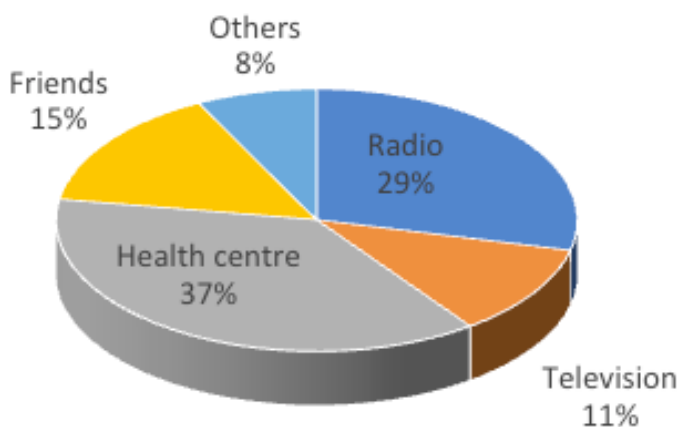
Table 1: Characteristics of study respondents

Variable		N=80	%
Age group	Mean	43.9	
	Std. Deviation	11.1	
	30-35	29	23.2%
	36-46	47	37.6%
	47-57	32	25.6%
	>58	17	13.6%
Education Level	Non-formal Education	14	11.2%
	Primary Level	67	53.6%
	Secondary Level	34	27.2%
	Tertiary Level	10	8.0%
Marital Status	Single	14	11.2%
	Married (monogamy)	69	55.2%
	Married (polygamy)	38	30.4%
	Divorced/separated	4	3.2%

4.2 History of cervical cancer in the respondents' families

A majority of the respondents (90.9%) did not have any history of CC in their family and only 9.1% had CC history.

Health information sources



Health educating at Kiandutu health Centre (37%), Community health Unit engagement (25%), Radio stations (29%), Television (11%), Medical camps and out-reach (9%), Friends and relatives (15%) respectively.

4.4 Knowledge of cervical cancer screening

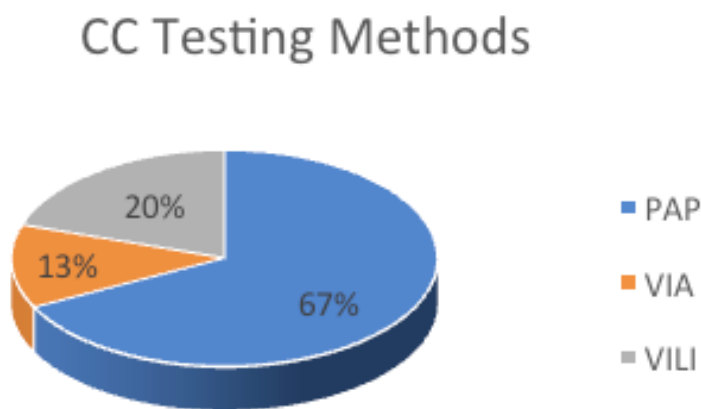
A majority of respondents, (57 or 71%) had heard of cervical testing as opposed to (23 or 29%) who never heard of it and understanding of risk factors.

Table 2. Proportion of women who had heard about cervical cancer

Heard about cervical cancer	Frequency	Per cent
No	23	29%
Yes	57	71%
Total	80	100.0%

For example, women interviewed in Kenya reported that it is often problematic for a woman to go to a health clinic to be screened if she is “feeling healthy,” Screening procedure known included; Pap smear test (papanicolauo test, 66.7%); Visual inspection using Acetic acid (VIA - 12.7%), Visual inspection using Lugol’s Iodine (VILI - 12.7%), Others (8.2%)

4.5 Cervical Cancer Testing Methods



Most participants (75.2%), were unaware of the predisposing factors linked to cervical cancer, others asserted that cervical cancer is associated with multiple sexual partners, (11.3%); to smoking or the use of tobacco, (5.30%); hereditary (3.8%).

4.6 User perception on cervical cancer screening

Cervical cancer screening is a procedure which involves opening the vagina using a speculum with the woman lying on lithotomic position and taking a sample of cells from the cervix. The procedure may be too invasive or privacy to some women. This study found that the screening procedure has been viewed negatively by the users with 70% (56) of the respondents confirming that they feel the screening procedures are a barrier to the utilization. In Kenya, for instance, women believe that a positive screening test means that they have AIDS. Cervical screening often is often confused with the “AIDS test” or with

STI testing because women have been told that cervical cancer is caused by human papillomavirus (HPV).

In Kenya, HIV/AIDS is heavily stigmatized and treatment is largely unavailable. The study found that some women refused Pap smear screening because they believed that it is a diagnostic tool for any vaginal/gynecological problem. The pelvic examination is referred to as “hanging the legs” and women refer to the experience as “surrendering oneself”. In this setting, a cervical examination is especially problematic because, unlike a pregnancy-related examination (which is viewed favorably by the community), a positive cervical screening test implies that she is somehow “dirty” or promiscuous. It also challenges the male partner’s “ownership” of and control over his wife. These fears may contribute to a woman’s reluctance to get screened.

4.7 Reasons for cervical cancer screening

Preventive measure (56.25%), Diagnostic purposes (6%), Health worker’s recommendation (18.75%).

Overall, screening rates for cervical cancer differ by socio-demographic variables; some of the social demographic variables that influence screening of cervical cancer produced significant results. Age and use of screening services for cervical cancer were found to have a statistical significance; women aged between 36 and 46 were more likely to be screened than their counterparts. Approximately 70.40% of the participants did not understand which age females were encouraged to seek screening services. This may explain why uptake is low. The government of Kenya argues that any woman who has ever had sexual intercourse is eligible for cervical cancer screening, but puts more emphasis for screening among women aged 25 to 49 years which is the target population.

Cervical cancer is largely a preventable disease. An important strategy towards the reduction of its burden in a developing country is by early diagnosis and management of the premalignant lesions of the disease. This would be achieved via screening of women at risk. The current study evaluated the perception and utilization of cervical cancer screening services. Those involved in planning and delivering cervical cancer prevention services must have a clear understanding of the needs, concerns, and beliefs of women and communities to ensure that services will be accessible, acceptable, and utilized. A key step to achieving optimal coverage is to gain broad community support.

Messages should reflect the real concerns that women have about services, how communities view preventive care in general, and local understanding of screening procedures and of cancer. Health care service delivery systems that provide cervical cancer prevention services need to be flexible in responding to the needs of the client population. Cervical screening programs in low- and middle income settings also face the challenge of reducing over-utilization of screening services by women in their teens and twenties, who are not as likely to develop cervical cancer as older women (aged 30-50). Eliminating the most critical barriers that affect women’s participation in cervical cancer prevention programs, as well as identifying and supporting conditions that encourage women’s use of services, should result in programs that are acceptable and accessible to women, thereby increasing participation rates and ultimately reducing the cervical cancer disease burden. Furthermore, adjusting services to better meet

women's needs will not only lead to improved cervical cancer services, but also to improve reproductive health services overall.

5. Conclusions and Recommendations

In conclusion, it is evident from this study that despite the high level of awareness of cervical cancer screening, utilization among nurses remains low. We, therefore, recommend that there is a need for the nurses to be actively involved in the cancer screening units and possibly undergo rotation through the unit to help remove the fear and uncertainties associated with the cervical cancer screening process. Cervical cancer screening education programmes need to be carried out among health care professionals at all levels, especially among nurses. The continuing education based programme provides an opportunity for doing this, especially as nurses constitute one of the most authoritative sources of information on health matters for the general populace, especially for women. As they become informed, they should be motivated to practice what they teach and lead by example. The adoption of cervical cancer screening as a preemployment test may also be considered.

The study concludes that cervical cancer screening is low among women in the study area. The low level of understanding could have precipitated this. Most of them cited the absence of appropriate information as the primary screening obstacle to the screening of cervical cancer. A significant proportion of the women in informal settlement were less educated, and they possessed less information and experiences about cervical malignant growth and the screening programs. This research has shown that the majority of women in the informal settlement had not heard of cancerous cervical growth, and neither had they thought about seeking screening services.

Age, level of education, occupation, awareness of cervical cancer services, perceived susceptibility to CC, the feeling of embarrassment of pap smear, fear of pap test results were associated with CC service utilization. Respondents who were aware of CC services were 4.5 times more likely to utilize CC services available. The fact that a majority of respondent (79.5%) were currently married or they were once married indicates that they were sexually active at one point in time, which could have exposed them to cervical Cancer.

Specific awareness and perception target programs to scale up the CC services utilization.

The study recommends that health workers increase their engagement with women on cervical cancer issues during their regular visits.

The Ministry of Health and county governments should work together and involve other stakeholders in enhancing the use of screening for cervical cancer. There is a need to strengthen policy and guidelines on cervical cancer screening among women living in informal settlements considering their social economic divide.

All stakeholders should give priority to the promotion and initiation of women to acquire good knowledge and behavior change and attitude on cervical cancer services practices.

The government should empower and strengthen Community Units in all forms of settlements with special emphasis on informal settlements like Kiandutu slum.

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Backward Bifurcation in a two-strain Influenza Mathematical Model.

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Abstract

Influenza is a major public health concern that leads to unacceptably high morbidity and mortality rates annually especially to immunocompromised persons world-wide. A major impediment in curbing the spread of this pandemic is the rise of drug resistance. In light of this, a deterministic model is formulated and used to analyze the transmission dynamics of Influenza having incorporated the aspect of antiviral resistance. A system of differential equations that models the transmission dynamics of Influenza is developed. The basic reproduction number R_0 is calculated and stability of the equilibrium points analyzed. The model is found to exhibit backward bifurcation and therefore for effective disease control, the R_0 should be lowered to a critical value R_0^ .*

Keywords: Basic reproduction number, backward bifurcation, endemic equilibrium.

1. Introduction

Influenza is a contagious respiratory illness caused by Influenza viruses which are classified into three major types; A, B and C. These Influenza viruses differ in host range and pathogenicity. The majority of human infections are caused by either type A or type B. Of major concern however, is type A which is clinically the most vicious, it is the fastest to evolve and causes more epidemics and pandemics [1]. The viruses infect the nose, throat, and lungs. They usually are spread through the air when the infected people cough, sneeze or talk making the surrounding air and surfaces to be temporarily contaminated with infected droplets [2,3]. A person gets infected when they inhale the infected droplets. A person might also get u by touching the surface or object that has u virus on it and then touching their own mouth, eyes or possibly their nose [3]. One of the strategies to prevent the spread of Influenza in a given population is annual vaccination. However, given that the viruses evolve rapidly, a vaccine made for one year may not be useful in the following year. In addition, antigenic drift in the virus may occur after the year's vaccine has been formulated, rendering the vaccine less protective, and hence outbreaks can easily occur especially among high-risk individuals [4]. According to [5] other preventive actions include social distancing, covering coughs and sneezes and frequent hand washing.

Influenza has afflicted the human population for centuries. For instance, the 1918 influenza pandemic infected nearly one quarter of the world's population and resulted in the deaths of about 100 million

people [6]. There have been four pandemics resulting from the emergence of a novel Influenza strain for which the human population possessed little or no immunity. Table 1 gives a brief summary of the four influenza pandemics.

Table 1: Summary of Influenza pandemics in the past one hundred years.

Pandemic Name	Year	Strain	Approximate Number of Deaths.
Spanish Flu	1918-1920	H1N1	40-100 million.
Asian Flu	1957-1958	H2N2	1-2 million.
Hong Kong Flu	1968-1970	H3N2	0.5-2 million.
Swine Flu	2009-2010	H1N1	Upto 575,000.

Source: [6]{8}

Studies also show that there is an outbreak of influenza every year around the world which results to about three to five million cases of severe illness and about 250,000 to 500,000 deaths [9]. According to [10], the mortality rates due to this respiratory disease are much higher in Africa than anywhere else in the world. Poor nutritional status, poor access to healthcare including vaccination and antibiotics and the presence of other, less measurable factors related to poverty in Africa may be additional risk factors for higher mortality rates. Studies show that this pandemic is specially responsible for the high morbidity and mortality among vulnerable groups such as children, the elderly and patients with underlying health conditions [11]. Immunosuppression especially in individuals with compromised immune systems contributes to lack of viral clearance often despite antiviral therapy leading to emergence of antiviral resistance [12]. The death toll from the disease is unacceptably high given that influenza is preventable. Efforts to combat it must therefore be accelerated.

In view of the catastrophic effects of influenza globally, several models have been proposed and analyzed with the aim of shedding more light in the transmission dynamics of influenza, for instance, [13]{20}. Among the pioneer mathematical models used to describe influenza dynamics is one developed by [17].

Drug resistance refers to reduction in the effectiveness of a drug in curing a disease. It occurs when microorganisms such as bacteria, viruses, fungi and parasites change in ways that render the medications used to cure the infections they cause ineffective [21, 22]. The micro-organisms are therefore able to survive the treatment. According to [23], epidemics with drug resistant strains and those with drug sensitive strains are fundamentally different in their growth and dynamics. Drug-sensitive epidemics are fuelled by only one process i.e. transmission, however, drug-resistant epidemics are fuelled by two processes: transmission and the conversion of treated drug sensitive infections to drug-resistant infections (acquired resistance). Therefore the rate of increase in drug-resistant infections can be much faster than the rate of increase in drug-sensitive infections. Studies from [24] show that drug resistance is a function of time and treatment rate. According to [25], Influenza viruses change constantly, either from one season to the next or within the course of one u season. As a u virus replicates, the genetic makeup may change rendering the virus resistant to one or more of the antiviral drugs used to treat or prevent Influenza. Antiviral resistance in Influenza may not only emerge during treatment but also sometimes transmit widely to replace wild type strains in the absence of drug pressure. The transmission

of resistant strains is evidenced by the global spread of adamantane-resistant A(H3N2) viruses since 2003, oseltamivir-resistant seasonal A(H1N1) viruses since 2007, and adamantane-resistant pandemic A(H1N1) viruses in 2009, leading to increased challenges in the management of Influenza [26]. With the development of drug resistant Influenza viruses, various models have also been formulated in order to understand this phenomena better. Among them are [27]{31]. In this paper, a mathematical model that illustrates the transmission dynamics of a wild type Influenza virus and the development and transmission of drug resistant influenza virus is formulated and analyzed.

2. Mathematical Model

2.1 Model formulation

The model subdivides the total population into five compartments; Susceptible(S), Vaccinated(V), Infected with Wild type strain (I_w), Infected with Resistant strain (I_r) and Re-covered (R). Individuals in a given compartment are assumed to have similar characteristics. Parameters vary from compartment to compartment but are identical for all individuals in a given compartment. Individuals enter the population at the rate of π , all recruited individuals are assumed to be susceptible. The susceptible get infected after effective contact with either the Infected with wild type strain or the Infected with resistant strain. The force of infection is given by either $\lambda_1 = \beta_w I_w$ (Infection by wild type strain) or $\lambda_2 = \beta_r I_r$

(Infection by resistant strain), where $\beta_r = f(\beta_w; b)$. Parameters β_w and β_r refer to the transmission rate of wild type strain and resistant strain, respectively. Parameter b is the rate of developing drug resistance. The susceptible can only be infected by one strain at a time. The rate of vaccination is ϕ . The vaccinated can also become infected with either the wild type strain or the resistant strain. This depends on the vaccine efficacy. When the vaccine efficacy is 100%, the vaccinated cannot become infected. Individuals who are infected with the wild type strain are treated and recover at the rate of γ_w while those who are infected with the resistant strain recover at the rate of γ_r . The wild type strain is assumed to mutate to resistant strain and hence those infected with the wild type join those infected with the resistant strain at the rate of b . Individuals with wild type strain and those with resistant strain suffer disease induced death at the rates α_w and α_r , respectively. The recovered lose immunity at the rate of ϑ and join the susceptible class. Individuals in all the epidemiological compartments suffer natural death at the rate of μ .

2.2 Model equations

Given the dynamics described in Section 2.1, the following system of non-linear ordinary differential equations, with non-negative initial conditions, describes the dynamics of Influenza.

$$\left. \begin{aligned} \frac{dS}{dt} &= \pi + \vartheta R - (\phi + \mu + \lambda_1 + \lambda_2) S(t), \\ \frac{dS}{dt} &= \phi S(t) - ((1 - \epsilon) \lambda_1 + (1 - \epsilon) \lambda_2 + \mu) V(t), \\ \frac{dS_w}{dt} &= \lambda_1 S(t) + (1 - \epsilon) \lambda_1 V(t) - (b + \mu + \alpha_w + \alpha_r) I_w(t); \\ \frac{dI_r}{dt} &= \lambda_2 S(t) + (1 - \epsilon) \lambda_2 V(t) + (b I_w - (\mu + \alpha_r + \alpha_r) I_r(t); \\ \frac{dR}{dt} &= \alpha_w I_w(t) + \alpha_r I_r(t) - (\vartheta + \mu) R(t) \end{aligned} \right\} (1)$$

We assume that all the model parameters are positive and the initial conditions of the model system (1) are given by

$$S(0) \geq 0, V(0) \geq 0, I_w(0) \geq 0, I_r(0) \geq 0, R(0) \geq 0.$$

3. Model analysis

3.1 Basic properties

3.1.1 Positivity of solutions

We now consider the positivity of system (1). We prove that all the state variables remain non-negative and the solutions of the system (1) with positive initial conditions will remain positive for all $t > 0$. Thus, we have the following.

Theorem 1. *Given that the initial conditions of system (1) are $S(0) \geq 0, V(0) \geq 0, I_w(0) \geq 0, I_r(0) \geq 0$ and $R_c(0) \geq 0$, the solutions $S(t), V(t), I_w(t), I_r(t)$ and $R(t)$ are non-negative for all $t > 0$.*

Proof. Assume that

$$\hat{t} = \sup \{t > 0: S(t) > 0, V(t) > 0, I_w(t) > 0, I_r(t) > 0, R(t) > 0\} \in [0, t].$$

Thus $\hat{t} > 0$, and it follows directly from the first equation of the system (1) that

$$\frac{dS}{dt} = \Pi - \lambda S + \mu S$$

which can be written as

$$\frac{dS}{dt} \left\{ S(t) \exp \left[\mu t + \int_0^t \lambda(\tau) d\tau \right] \right\} \geq \Pi \left\{ \exp \left[\mu t + \int_0^t \lambda(\tau) d\tau \right] \right\}.$$

Hence

$$S(t_1) \exp \left[\mu t_1 + \int_0^{t_1} \lambda(\tau) d\tau \right] - S(0) \geq \int_0^{t_1} \Pi \left\{ \exp \left[\mu x + \int_0^x \lambda(\tau) d\tau \right] \right\} dx,$$

so that

$$S(t_1) \geq S(0) \exp \left[-\mu t_1 - \int_0^{t_1} \lambda(\tau) d\tau \right] + \left\{ \exp \left[-\mu t_1 - \int_0^{t_1} \lambda(\tau) d\tau \right] \right\} \times \int_0^{t_1} \Pi \left\{ \exp \left[\mu x + \int_0^x \lambda(\tau) d\tau \right] \right\} dx > 0.$$

Similarly, it can be shown that $V(t) > 0$, $I_w(t) > 0$, $I_R(t) > 0$ and $R(t) > 0$ for all $t > 0$ and this completes the proof. \square

3.1.2 Invariant region

Since the model monitors changes in the human population, the variables and the parameters are assumed to be positive for all $t \geq 0$. The analysis of system (1) will therefore be analysed in a region of biological interest. Thus, we have the following theorem on the region that system (1) is restricted to.

Theorem 2. The feasible region Ω defined by

$$\left\{ \Omega = (S(t); V(t); I_w(t); I_R(t); R(t)) \mid R_5^+ \leq N \leq \frac{\pi}{\mu} \right\},$$

with initial conditions $S(0) \geq 0$, $V(0) \geq 0$, $I_w(0) \geq 0$, $I_R(0) \geq 0$ and $R(0) \geq 0$, is positively invariant and attracting with respect to system (1) for all $t > 0$.

Proof. The evolution equation change in the population is given by

$$\frac{dN}{dt} = \Pi - \mu N.$$

It can easily be seen that

$$N \leq \frac{\Pi}{\mu} + \left(N(0) - \frac{\Pi}{\mu} \right) \exp(-\mu t). \quad (2)$$

From (2), we observe that as $t \rightarrow \infty$, $N(t) \rightarrow \frac{\Pi}{\mu}$ so if $N(0) \leq \frac{\Pi}{\mu}$ then $\lim_{t \rightarrow \infty} N(t) = \frac{\Pi}{\mu}$. Clearly, $\frac{\Pi}{\mu}$ is the upper bound of N . On the other hand, if $N(0) > \frac{\Pi}{\mu}$, then N will decrease to $\frac{\Pi}{\mu}$ as $t \rightarrow \infty$. This means that if $N(0) > \frac{\Pi}{\mu}$, then the solution $(S(t), V(t), I_w(t), I_R(t), R(t))$ enters Ω or approach it asymptotically. Hence Ω is positively invariant under the flow induced by system (1). Thus in, the system (1) is well-posed. Hence, it is sufficient to study the dynamics of the system in Ω . \square

3.2 Existence of equilibrium points

System (1) has a disease-free equilibrium given by

$$E_0 = (S^0, V^0, 0, 0, 0) = \left(\frac{\Pi}{\phi + \mu}, \frac{\phi \Pi}{\mu(\phi + \mu)}, 0, 0, 0 \right). \quad (3)$$

3.2.1 The effective reproduction number

The effective reproduction number, R_e , is a key threshold that determines the behaviour of the system in the presence of vaccination. In order to analyze the stability of system 1, we obtain the threshold condition for the establishment of the disease. Thus, we employ next generation matrix operator method as explained in [32]. The matrices of new infections evaluated at the disease-free equilibrium are given by

$$\mathbf{F} = \begin{bmatrix} \frac{\Pi\beta_w(\phi(1-\epsilon)+\mu)}{\mu(\mu+\phi)} & 0 \\ 0 & \frac{\Pi\beta_r(\phi(1-\epsilon)+\mu)}{\mu(\mu+\phi)} \end{bmatrix} \text{ and } \mathbf{V} = \begin{bmatrix} b + \alpha + \mu + a_w & 0 \\ -b & \mu + a_r + \alpha_r \end{bmatrix}.$$

The dominant eigenvalue corresponding to the spectral radius (\mathbf{FV}^{-1}) of the matrix \mathbf{FV}^{-1} is the effective reproduction number given by

$$R_e = \max \{R_{ew}, R_{er}\}, \quad (4)$$

where

$$R_{ew} = \frac{\beta_w \pi (\mu + \phi(1 - \epsilon))}{\mu(\phi + \mu)(a + b + a_w + \mu)}, \quad R_{er} = \frac{\beta_r \pi (\mu + (1 - \epsilon)\phi)}{\mu(\phi + \mu)(\alpha_r + a_r + \mu)}.$$

R_{ew} is a measure of the average number of secondary wild type Influenza infections caused by a single infected individual introduced into the model population. On the other hand, R_{er} , gives the average number of secondary resistant-Influenza infections caused by one infected individual introduced into the model population.

The basic reproduction number can easily be obtained from the effective reproduction number obtained in 4. This is done by setting the vaccination rate ϕ to zero. Thus, we have

$$R_0 = \max \left\{ \frac{\beta_w \pi \mu}{\mu^2(\alpha + b + a_w + \mu)}, \frac{\beta_r \pi \mu}{\mu^2(\alpha_r + a_r + \mu)} \right\}. \quad (5)$$

3.2.2 Existence of an endemic state with wild type strain only

There exists an endemic state when the wild type strain persists and the resistant strain dies out. Solving (1) in terms of I_1 yields,

$$\left. \begin{aligned} S^* &= \frac{\pi + \vartheta R^*}{\mu + \phi + \lambda_1}, \\ V^* &= \frac{(\phi(\pi + \vartheta R^*))}{((\mu + \phi + \lambda_1)(\mu + \lambda_1 - \epsilon\lambda_1))}, \\ I_w^* &= \frac{-((\pi + R^*)\lambda_1(-\mu - \phi + \epsilon\phi - \lambda_1 + \epsilon\lambda_1))}{Q_1(\mu + \phi + \lambda_1)(\mu + \lambda_1 - \epsilon\lambda_1)}, \\ R^* &= \frac{\alpha\pi\lambda_1(\mu + \phi - \epsilon\phi - (-1 + \epsilon))}{(Q_1Q_3(\mu + \phi + \lambda_1)(\mu - (-1 + \epsilon)\lambda_1) + \alpha\vartheta\lambda_1(-\mu + (-1 + \epsilon)\phi + (-1 + \epsilon\lambda_1)))} \end{aligned} \right\} \quad (6)$$

Substituting I_w obtained in (6) into the expression of the force of infection λ_1 yields polynomial (7) given by,

$$\lambda_1(Q_1Q_3(\mu + \phi + \lambda_1)(\mu - (-1 + \epsilon)\lambda_1) - (\mu + \phi - \epsilon\phi - (-1 + \epsilon)\lambda_1)(\pi Q_3\beta_w + \alpha\vartheta\lambda_1)) \quad (7)$$

It is important to note that when $\lambda_1 = 0$, a wild type strain free equilibrium is obtained which is given by;

$$(S^0, V^0, 0, 0) = \left(\frac{\Pi}{\phi + \mu}, \frac{\phi\Pi}{\mu(\phi + \mu)}, 0, 0 \right). \quad (8)$$

The remaining part of polynomial (7) can be expressed as,

$$P(\lambda_1) = D_2\lambda_1^2 + D_1\lambda_1 + D_0. \quad (9)$$

where

$$D_2 = (1 - \epsilon)(Q_1Q_3 - \alpha\vartheta),$$

$$D_1 = Q_3((-(-1 + \epsilon)\mu + \phi - \epsilon\phi)Q_1 + (-1 + \epsilon)\pi\beta_w) - \alpha(\mu + \phi - \epsilon\phi)\vartheta,$$

$$D_0 = Q_3(\mu(\mu + \phi)Q_1(1 - R_{cw})).$$

The roots of the quadratic equation obtained when the polynomial in (9) is set to zero can be obtained by the quadratic formula given by

$$\lambda_1 = \frac{-D_1 \pm \sqrt{D_1^2 - 4D_2D_0}}{2D_2}. \quad (10)$$

Note that $D_0 > 0$ if $R_{cw} < 1$, $D_0 = 0$ if $R_{cw} = 1$ and $D_0 < 0$ if $R_{cw} > 1$. If $D_0 < 0$, the discriminant $=D_1^2 - 4D_2D_0 > 0$ and equation (9) has a unique positive solution hence the model system (1) has a unique wild type Influenza persistent equilibrium. If $R_{cw} < 1$ then $D_0 > 0$ and by adding the conditions $D_1 < 0$ and $D_2 > 0$, two positive real equilibria are obtained. If $R_{cw} = 1$, then $D_0 = 0$ and there is a unique non-zero solution of (9) which is positive if and only if $D_1 < 0$. The following theorem summarizes the existence of the wild type Influenza endemic equilibria.

Theorem 3. The model system (1) has:

- (i) a unique endemic equilibrium if $R_{cw} > 1$.
- (ii) two endemic equilibria if $R_{cw} < 1$, $D_1 < 0$ and $D_2 > 0$.
- (iii) one positive equilibrium for $R_{cw} = 1$ and $D_1 < 0$.
- (iv) no wild type Influenza endemic equilibrium otherwise.

Epidemiologically, Theorem 3 item (ii) implies that bringing R_{cw} below unity does not suffice for the eradication of wild type Influenza since the system (1) exhibits backward bifurcation when $R_{cw} < 1$. The existence of backward bifurcation indicates that in the neighbourhood of 1, for $R_{cw} < 1$, a stable wild type Influenza free equilibrium coexists with a stable wild type Influenza persistent equilibrium. In order to eradicate the disease, the control reproduction R_{cw} should be decreased below the critical value R_{cw}^* . To obtain R_{cw}^* , the discriminant in (9) is set to zero and R_{cw} made the subject of the relation. This yields

$$R_{cw}^* = 1 - \frac{D_1^2}{4\mu(\mu + \phi)Q_1Q_3D_2}.$$

It follows that backward bifurcation occurs for values of R_{cw} such that $R_{cw}^* < R_{cw} < 1$

This is illustrated by Figure 1.

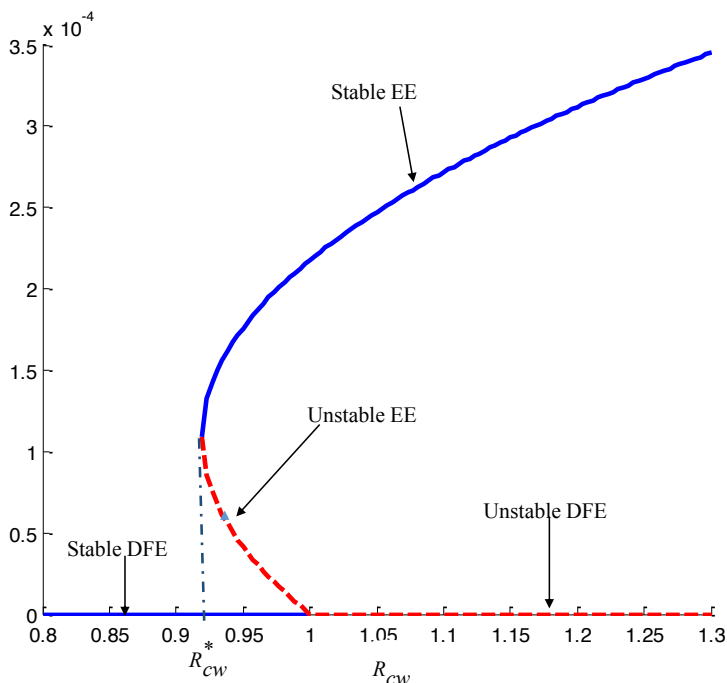


Figure 1: Force of infection, λ_p , versus control reproduction number, R_{cw} :

3.2.3 Existence of Influenza resistant strain only endemic state

There exists an endemic state when the resistant strain persists and the wild type dies out. Solving (1) in terms of λ_2 and substituting I_R^* into λ_2 yields equation (11) given by;

$$\lambda_2(-Q_2Q_3(\mu + \phi + \lambda_2)(\mu - (-1 + \epsilon)\lambda_2) + (\mu + \phi - \epsilon\phi - (-1 + \epsilon)\lambda_2)(\pi Q_3\bar{\beta}_r + \alpha_r\vartheta\lambda_2)) = 0 \quad (11)$$

When $\lambda_2 = 0$, an Influenza-resistant free equilibrium is obtained. The remaining part of polynomial (11) can be expressed as;

$$P(\lambda_2) = A_2\lambda_2^2 + A_1\lambda_2 + A_0. \quad (12)$$

where

$$A_2 = (-1 + \epsilon)(Q_2Q_3 - \alpha_r\vartheta),$$

$$A_1 = \alpha_r\phi\vartheta(\epsilon - 1) + Q_2Q_3\mu(1 - \epsilon) + Q_2Q_3\phi(1 - \epsilon) + Q_3\bar{\beta}_r\pi(\epsilon - 1) - \alpha_r\mu\vartheta,$$

$$A_0 = Q_3(\mu(\mu + \phi)Q_2(1 - R_{cr})).$$

The roots of the quadratic equation obtained when the polynomial in (12) is set to zero can be obtained by the quadratic formula given by

$$\lambda_2 = \frac{-A_1 \pm \sqrt{A_1^2 - 4A_2A_0}}{2A_2}. \quad (13)$$

The system exhibits a backward bifurcation when $R_{cr} < 1$. This is illustrated by Figure 2.

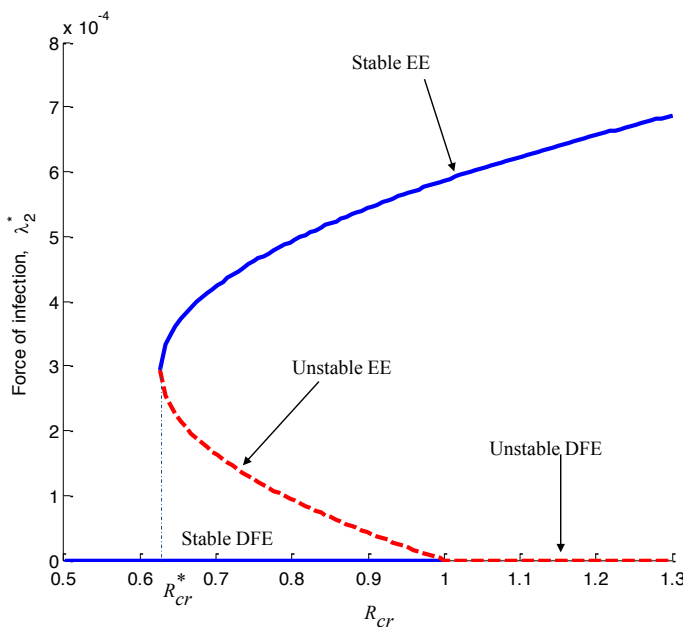


Figure 2: Force of infection, λ_p , versus control reproduction number, R_{cr} :

The existence of backward bifurcation when $R_{cr} < 1$ shows that eradicating Influenza resistant strain will require more than bringing R_{cr} below unity. This is because for $R_{cr} < 1$, a stable DFE coexists with a stable endemic equilibrium. Therefore R_{cr} must be further reduced to below a critical value R_{cr} to avoid the endemic state and guarantee the eradication. R_{cr} is obtained as

$$R_{cr}^* = 1 - \frac{A_1^2}{4\mu(\mu + \phi)Q_3Q_2A_2}.$$

4. Conclusion

A two strain Influenza mathematical model has been formulated and analyzed. The model exhibits backward bifurcation. Therefore, caution should be taken because Influenza can still persist in the population even when $R_0 < 1$. Hence, for effective Influenza control, the health sector and other stakeholders should apply strategies that will ensure that the reproduction number is lowered to a critical value R_0 .

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