

*Information and
Knowledge Management for
Social, Economic and Political Development*

Editors
Priti Jain,
Nathan Mnjama &
Olugbade Oladokun



Alternation African Scholarship Book Series #13

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Preface

Archives and libraries have become contested spaces in so far as the African archives have mostly been developed for colonial and colonising purposes. During the apartheid era, in South and Southern Africa, the archives were developed for use by the apartheid political and security apparatuses to colonise even better. And, for internationalisation, so-called ‘universal’ international, knowledge was imported into our libraries, to perpetuate the imposition of colonising knowledge and to legally exclude and marginalise indigenous thought, the language/s that intellectualised and gave expression to such thought, and repress any form of agency, innovation and initiative, to the contrary. Complex systems of censure coupled with security state apparatuses were used to suppress and exclude all forms of innovative knowledge that come from the people for the people, and which is supposed to be used by the people.

The African archive and library are all the poorer for it, since the thought, writing, and knowledge/s of our people have not had the opportunity to develop alongside and together with the rest of the modern world, interactively, and on an equal basis. Especially since the impact of the global transforming events of the late 1980s and early 1990s, this scenario has changed. Since then, and in the wake of the achieving of political independence of many countries in the global South, since the late 1950s, the field has opened for information and knowledge development agency. So, currently, there are innumerable initiatives from all over Africa and the global South to not only conceptualise and make formative contributions to current knowledge development processes, both locally and internationally. The freedom and opportunity have been created to also innovate and enrich modern knowledge systems that may be utilised for the generic and particular upscaling of the conceptually-relevant as well as contextually-relevant development and uses of knowledge. And, as colonisation targeted minds – to develop educational systems that would ensure black subjugated intellectual secondary-ness – so, freedom opened the space for the constructive generation of information for intellectualisation, epistemic enriching, and the innovative development of knowledge, for innovation and the forms and ideas for the improvement of the quality of modern life of people, equally.

It is as part of the current innovative and advanced African responses to the challenges of knowledge generation, that this volume, *Information and Knowledge Management for Social, Economic, and Political Development*, edit-

By Priti Jain, Nathan Mnjama, and Olugbade Oladokun, acquires prominence and significance. *Prominence* derives from the fact that seminal aspects of the topics of information and knowledge development are addressed from helpful perspectives and analyses from within the global South. It adds to global knowledge not only with regard to knowledge management challenges concerning the speed and continuous acceleration of information and knowledge development globally. It also adds to the epistemic and epistemological thinking about knowledge in so far as information and knowledge management itself, is a crucial disciplinary complex that needs to be mastered for efficient knowledge development and uses in local – both urban and rural – contexts.

The *significance* of the volume is that it systematically brings together inter-related thematisations and conceptualisations, seminal for information and knowledge in respect of the integrative internationalised development challenges central to the social – economical – political triangle, in context. Positioned within the 21st century world of the emergence of 4IR- and AI-related interventions and virtual learning, knowledge and resource sharing, and archival mapping and development, the main hope is that the volume constructively contributes to ‘development’, and the ‘boosting’ of economies. It also engages the ways in which we may upscale such effective information and knowledge and management not only within accountable frameworks of governance, transparency, and human rights, but also the gaining of competitive advantages, internationally, through enabling policies and their efficient implementation, as well as public services training, and the use of open and distance learning.

Information and Knowledge Management for Social, Economic, and Political Development, is timely, since it is a capacitating volume. It involves researchers, educators and practitioners, who may all benefit from it, equally.

Moreover, it has been brought together in a space, where, all pros and cons considered, African information and knowledge management scholars are best positioned for the constructive engagement of the intellectualization of data from within our own contexts. As such, it both provides helpful ways to engage *access* to information and relevant knowledge, as well as the rudiments of aspects of innovative *action plans* for archivists and librarians on our continent. It adds enriching significant insights, useful for solution-driven approaches to information and knowledge management.

Prof. Johannes A. Smit
Chair: Humanities Institute

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Chapter 1: Editorial

Information and Knowledge Management for Social, Economic and Political Development

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In the post that heralds the impending creation and delivery of this book, we echoed the fast pace of the globalized world and the pertinence of information and knowledge as vital ingredients to stay afloat in the knowledge-based economy, universally now in vogue. We observed that these two points, and related elements, command some inalienable impact on the development of all spheres of life. For instance, it is observed that in the 21st century, achieving sustainable development is crucial and relies upon access to information and knowledge. Information and knowledge provide opportunities in several ways: as eminent input for education, means to scientific research, advancement of knowledge, development of civilization, sustainable competitive advantage, knowledge serving as a catalyst for social change, and that it leads to social, economic and political development. Donna Scheeder, a former President of the International Federation of Library Associations and Institutions (IFLA) avows that there is no truly sustainable development without access to information. Conversely, knowledge is generally considered instrumental in overcoming and solving problems. The management of the two concepts join forces together to boost efficiency in carrying out tasks.

Recognising the importance of sustainable development, the United

Nations General Assembly on September 25, 2015, adopted the post-2015 development agenda termed *Transforming Our World: The 2030 Agenda for Sustainable Development* as a plan of action for the people, the planet and the prosperity of people. The agenda which vows not to leave anyone behind, comprises 17 sustainable development goals (SDGs) and 169 targets that span through three dimensions of sustainable development: the economic, social and environmental (UN 2015). Access to information and knowledge is perceived as fundamental to attaining the set SDGs and targets. Accurate, reliable and relevant information and knowledge are fundamental in all walks of life from daily chores to socio-economic and political development.



Against the above scenario, this book was conceived with the view to explore and deliberate on the role of information and knowledge management in socio-economic and political development; and discuss recent trends, challenges experienced and solutions proffered in both the developed and the emerging economies. The book provides a platform for researchers, educators and practitioners from various information and knowledge management establishments to share their knowledge and experience related to the social, economic, environmental, and political development in their respective countries.

Armed with the objectives of creating awareness of the significance of information and knowledge management for socio-economic and political development; exploring recent challenges encountered in ensuring continuity of social, economic, environmental, and political development and developing strategies aimed at enhancing the management of information and knowledge to boost the overall development of the global economy, the book presents recent trends towards information and knowledge management to support modern economies for development. Consequently, it is considered a valuable resource for students, lecturers and educators of information and knowledge management, administrators and policymakers, practising librarians, archivists, records and knowledge managers, media practitioners and other information professionals.

In Chapter One, **Olugbade Oladokun** explores the possibility of applying information and knowledge management to boost socio-economic and political development in sub-Saharan Africa. The chapter acknowledges the

socio-economic stratification of nations of the world into two, variously called ‘developed’ and ‘developing’ countries, ‘rich’ and ‘poor’, and ‘first’ and ‘third’ world. The chapter examines the indices and indicators of development in the world leading to the variety of classifications assigned to various countries, establishes the phenomenological symptoms that emanate from sub-Saharan Africa, and consigns the sub-region into the class of the poor and third-world or less developed nations of the earth.

Priti Jain follows in Chapter Two with a scrutiny of the development that heralds the Fourth Industrial Revolution (4IR) technologies in Botswana, especially with respect to digitally enabled libraries. The chapter identifies the opportunities and challenges that the 4IR technologies present to the librarians and concludes with some recommendations on technological infrastructure, school curriculum, and digital literacy policy framework, among others.

Advocating the sharpening of the digital platform for sustainable virtual learning in higher education in Ghana, **Ebenezer Ankrah** and **Florence Entsua-Mensah**, in Chapter Three, examine the technological tools for e-learning, virtual classrooms and Gamification. The chapter also examines the use of Virtual and Augmented Reality and Artificial Intelligence as learning tools made to help universities design and use modern technologies in the era of post-COVID-19.

In Chapter Four, **Olayinka Catherine Fatoki** and **Wole Michael Olatokun** investigate the attitudinal and motivational factors as correlates of digital resources knowledge-sharing behaviour among agricultural researchers in South-West Nigeria. Having established a significant relationship between attitude and digital resource knowledge sharing among agricultural researchers, and between extrinsic motivation and digital knowledge resource sharing (DKRS), the study made valid recommendations to motivate and propel the DKRS behaviour of agricultural researchers in their institutes.

Chapter Five, **Winifred Bentil** discusses the influence of contextual factors on electronic resource management in academic libraries in Ghana. Adopting a multiple case study approach, involving two apiece, of public and private universities in Ghana, the chapter revealed enabling and hindering factors present at governmental and institutional levels. The chapter proposes fitting recommendations arising from the findings.

The next chapter by **Alice A. Bamigbola** provides an investigation of knowledge-sharing patterns of postgraduate students of the School Library and Media Technology Department, University of Ibadan, Nigeria. The chapter,

among others, provides the general negative attitude of the students towards knowledge sharing, identifies the preferred channel of sharing knowledge and, at the same time discusses the inhibiting factors to knowledge sharing.

Akakandelwa Akakandelwa in Chapter Seven, opts for the memory lane of research output in the knowledge management (KM) domain in Africa covering the period 2001-2021, using the Scopus database. The bibliometric analysis uncovered three hundred and fifty-two publications. The chapter reveals the leading channels in which African scholars published KM research and the institutions that contributed most of KM research outputs.

In Chapter Eight, **Nathan Mnjama** articulates the critical role of archives and records management in promoting good governance, transparency, accountability and human rights in Africa. The chapter probes the diverse factors inhibiting the utilization of records for the attainment of good governance, transparency, accountability and the protection of rights and entitlements by citizens in Africa. In drawing conclusions, the study proposes measures, which are capable of enhancing the management and preservation of records in Africa.

Tshepho Mosweu and **Olefhile Mosweu** in Chapter Nine, attempt to measure records management (RM) and knowledge management (KM) as pathways to gaining competitive advantage towards the achievement of Sustainable Development Goals (SDGs). The chapter uncovers a symbiotic relationship between KM and RM which should be embraced as pathways for organizations to gain competitive advantage and the achievement of SDGs. The chapter also identifies some challenges in RM and KM capable of breeding negative impacts on the attainment of SDGs.

An empirical study on the E-readiness of the Botswana Examination Council (BEC) to implement an electronic document and records management system (EDRMS) by **Liah Shonhe** and **Gosego Ramotshabi** is considered in Chapter Ten. The study employed a mixed method approach with qualitative and quantitative data obtained online from 123 Action Officers of the Examination Council. Reasons that hamper the project, are a lack of top management support, absence of change management strategy implementation and the non-existence of international standards on digital records management, among others. The study concludes that BEC is not ready for EDRMS implementation. The chapter drops some hints on the way to attain success in EDRMS implementation in an organization.

In Chapter Eleven, **Mupanga Simukai** and **Dewah Peterson** investi-

gate knowledge acquisition for development in selected public service training centres in Zimbabwe. Anchored by the pragmatism approach, the chapter focuses on the role of training centres towards achieving knowledge for development purposes in Zimbabwe's public service sector. The chapter concludes that knowledge is generated and disseminated during socialisation, mentoring, training, education, workshops, seminars, refresher courses and through research, collaboration and, training of trainers and makes some related suggestions.

Gbolagade Adekanmbi, Chabuya Kadisa, Thaddeus Mahoso, and Bolupe Awe, in Chapter Twelve, explore the use of open and distance learning (ODL) for socio-economic development in sub-Saharan Africa, using multiple case studies of Nigeria, Kenya, Rwanda and South Africa. The chapter follows the trajectory of the growth of ODL in these countries and its increasing recognition as a parallel educational mode to address the problem of unsatisfied educational demands, the identification of attempts at the measuring of technological preparedness, and the need to grow the number of students using ODL. Considering the observed limitations of the ODL institutions, some vital recommendations are offered.

In preparing this book, the editors ensured that all papers submitted passed through the crucibles of the blind peer review process with each going through, at least, two or three reviewers. It thus implies that each author must have made corrections two or three times on their submissions before they were considered fit for publication. It is probably needless to state that in an exercise of this nature, some submissions could not scale through, but the authors were, nonetheless, provided adequate feedback on how to improve their work for future opportunities.

We appreciate all the authors for their contributions and understanding of our incessant demands. We also thank our reviewers and editorial board members.

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Chapter 2

Boosting Socio-Economic and Political Development in Sub-Saharan Africa through Information and Knowledge Management

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Abstract

Nations of the world have predominantly been socio-economically stratified into variously named categories. In many instances, they are categorized into developed and developing countries, rich and poor countries, or first and third-world countries. The categorization of countries into such clusters is usually based on differences in their socioeconomic and political situations. Most of the geographical regions considered for and classified as developing, poor, or third world, are countries in Africa, and East, South, and Western Asia, Latin America, and the Caribbean. Some of the developed, rich, and first-world countries include Norway, New Zealand, Switzerland, Canada, the USA, etc. Using literature review as research method, this chapter examined the global indices and indicators of development leading to the variety of classifications assigned to various countries, established the phenomenological symptoms of the sub-Sahara African countries specifically that consign them into the class of the poor, third world or less developed nations of the world, and also explored the literature in an attempt to gain an appreciation of the potential of effective information and knowledge management for boosting the socio-economic and political development in sub-Saharan Africa. The chapter also assessed various economic growth, poverty level, education level, and human development indicators as information and knowledge drivers. The paper takes a cursory look

at the adoption of the United Nations 2030 Agenda for Sustainable Development Goals (SDGs) among member States and establishes that the central and transformative promise that ‘no one will be left behind’ might not be realized with poverty and economic downturn pervading sub-Saharan Africa. The findings revealed some correlation of socio-economic and political developments with information management (IM) and knowledge management (KM). In order that sub-Saharan Africa would not be perpetually and economically debarred from the global socio-economic value chains, the paper asserts that IM and KM are two critical forces that can and should be systematically employed to boost the social and economic fortunes of, catalyze, or boost the upward trajectory of economic and socio-political developments in sub-Saharan Africa.

Keywords: Developing countries, Sub-Sahara Africa, Economic growth and development, Socio-political development, Information management, Knowledge management

1 Introduction

World Economic Situation and Prospects (WESP) (2014) classifies all countries of the world into three broad categories, namely: developed economies, economies in transition, and developing economies. Nevertheless, in many instances, they are categorized into developed and developing countries, or rich and poor countries, or first and third-world countries. Developed countries are generally known to have developed economies and cutting-edge technological infrastructures. This is as asserted by Cheprasov (2021) who described developed countries as high-income countries that have more advanced technological and industrial activities and infrastructure, characterized by comparatively high standards of living, where most people have enough money to buy the things they need. Thus, IGI-Global (2022) affirms that a developed country is highly industrialized, and has a mature and sophisticated economy, measured by size of gross domestic product (GDP) and/or average income per resident. IGI-Global further states that a developed country provides high quality of life to its residents because of already established advanced technological infrastructures, good management of natural resources and manpower. Among such developed, rich and first world countries include Norway, New Zealand, Switzerland, Canada, USA, etc.

Conversely, a developing country is perceived as one with less developed economy. Kuepper (2021) states that a developing country is one with comparatively low total economic output measured by gross domestic product (GDP) per person and tend to rely on agriculture as the prime industry, adding that such countries have not quite reached economic maturity. In an International Monetary Fund (IMF) Working Paper, on the Classifications of Countries Based on Their Level of Development, Nielsen (2011) affirms that developing countries are categorized as low-income (with Gross National Income (GNI) per capita of US\$250 or less). Gross national income (GNI), according to Organization for Economic Co-operation and Development (OECD) (2022), is defined as gross domestic product, plus net receipts from abroad of compensation of employees, property income and net taxes less subsidies on production. Educational Pathways International (EPI) (2022) appears to be more comprehensive in its description when, alluding to the United Nations, asserts that a developing country is a country with a relatively low standard of living, undeveloped industrial base, and moderate to low Human Development Index (HDI). EPI explains further that HDI is a comparative measure of poverty, literacy, education, life expectancy, and other factors for countries worldwide. In his attempt at differentiating between the two worlds, Cheprasov (2021) also observes that the economies of the developed countries tend to be more stable and prosperous, and well known for lots of technological innovations than developing nations which, in comparison, have less industrialization, higher population growth, and higher unemployment. Among the geographical regions considered and classified as developing, poor or third world are all the countries in Africa, and countries in East Asia, South Asia, Western Asia, Latin America and the Caribbean.

The notion that the concepts of socio-political development and economic development of a nation are intertwined has been extensively examined in the social and behavioural sciences. Filgueira and Filgueira (2002) observed that both concepts encompass at least three related connotations developed in the sociological literature. These authors observed that in its most basic form, it is defined as improvement in the standard of living of a population. The second connotation is associated with the economic variables and dynamics, thereby recognizing that the economic wealth creation and distribution are powerful factors in social development. The third less economic perspective identifies social development with the social differen-

tiation arising from the capitalist and industrial transformations that gave rise to the modern world.

In a release on social development, Government of the Province of New Brunswick of Canada (2009) report stated that the success of society is linked to the well-being of each and every citizen and therefore asserts that social development is about improving the well-being of every individual in society so they can reach their full potential. The report argues that social development means investing in people and requires the removal of barriers so that all citizens can journey toward their dreams with confidence and dignity. It is about refusing to accept that people who live in poverty will always be poor. It is about helping people so they can move forward on their path to self-sufficiency. Rahman (2009) also subscribes to the assertion when he states that the ultimate objective of social development is to bring about sustained improvement in the well-being of the individual, groups, family, community, and society at large. In the same vein as social development, the end result of the economic development of a nation points to the same direction. Government of British Columbia (2022) confirms that economic development deals with programs, policies or activities that seek to improve the economic well-being and quality of life for a community. Hill (2022) lends credence to the assertion when he also claims that economic development is usually the focus of governments to improve the standard of living through the creation of jobs, the support of innovation and new ideas, the creation of greater wealth, and the creation of an overall better quality of life of people. Hill expands on this by identifying three major areas for economic development. Firstly, governments working on big economic objectives such as creating jobs or growing an economy. Secondly, programs that provide infrastructure and services improvements such as more highways, community parks, new school programs and facilities, public libraries or swimming pools, new hospitals, and crime prevention initiatives. And thirdly, job creation and business retention through workforce development programs to help people get the needed skills and education they need, including small business development programs that are geared to help entrepreneurs get financing or network with other small businesses. Rahman (2009) submits that socio-economic development incorporates public concerns in developing and implementing both social policy and economic initiatives. He underscores his belief that the concept involves sustained increase in the economic standard of living of a country's population, normally accomplished by increasing its stocks of physical and human capital and improving its technology.

Thus, a number of authors have identified several factors as instrumental to socioeconomic development. Almuraqab (2021) affirms that M-government is essential for socio-economic development of a country, trusting that without such support a government cannot efficiently operate. Almuraqab observes that in many countries, mobile services such as m-payment and m-banking are available as determinants of the successful acceptance of M-government that expedites the successful establishment of smart cities. Irungu and Kimencu (2016) also identify higher education as an important part of any country's socio-economic development. They declare that in order for Kenya and the rest of Africa to advance their development agenda, higher education must be taken seriously, and barriers to access to higher education must be addressed. Oxford University Press (OUP) (2022) explains that political development enhances the state's capacity to mobilize and allocate resources to process policy inputs into implementable outputs; it also assists with problem-solving and adaptation to environmental changes and goal realization, and the contemporary notion of good governance dwells on efficient, effective and non-corrupt public administration.

2 Statement of the Problem

The main goal of the clamour for socio-economic and political development is to upgrade the welfare of populations. Nations are encouraged to operate in liberal democracy so that non-performing governments and leaders can be voted out of power and replaced with another. Chatham House (2021) argues that the importance of liberal democracy is two-fold: the right to free expression of political preference; and progress promotion through peaceful competition between different interests and ideas.

As if to remind the leaders of various nations, especially sub-Saharan Africa, on what they ought to do in government for the socio-economic and political developments of their nations, United Nations Organisation has over the years made a number of interventions. In the main, the goal of every intervention, among others, is to eradicate or reduce poverty and boost the economy of member countries. For instance, one notable intervention was the United Nations Millennium Declaration. The Millennium Development Goals (MDGs) launched in the year 2000, came to a close at the end of the year 2015, whilst 2016 ushered in the official launch of another transformative 2030 Agenda for Sustainable Development. The MDGs emphasized three

areas: human capital, infrastructure, and human rights (social, economic and political), with the intent of increasing living standards (Wagle 2019). The first of the eight MDGs was to eradicate extreme poverty and hunger. But in a review of the performance of the efforts made on MDGs, a World Bank blogger, Wadhwa (2018) raised an alarm that the number of people living in extreme poverty is on the rise in sub-Saharan Africa, comprising more than half of the extreme poor in 2015.

In its recognition that ending poverty must go hand-in-hand with strategies that build economic growth and address a range of social needs including education, health, social protection, and jobs, the United Nations inaugurated Sustainable Development Goals (SDGs) as a successor to the MDGs in 2016. The UN asserts that the SDGs are a call for action by all countries – poor, rich, and middle-income – to promote prosperity while protecting the planet (United Nations 2016). The SDG agenda incorporated quite a number of the MD goals with the determination to end poverty in all its forms everywhere, achieve zero hunger, ensure healthy lives and promote well-being for all at all ages (United Nations 2018), among others. In its ambitious and historic agenda for development and eradicating poverty, the UN pledged to leave no one behind in the ongoing SDG plan. Though the year 2030 when the SDG agenda is to close is not here yet, the signal being received is currently ominous. For instance, Wadhwa (2018) appeared to raise more depressing news when he hinted that forecasts indicate that by 2030, nearly 9 in 10 extremely poor people will live in sub-Saharan Africa. With about 7 years now before 2030, the terminal date of the UN's SDGs, whose first goal is to end poverty in all its forms everywhere, the fear is being expressed that poverty is still clearly visible and there is no end in sight. The problem appears exacerbated not only by the emergence of the Covid-19 pandemic but also the Russian-Ukraine war which brings about an economic downturn, heralds a new season of hunger and drives many more into poverty. African Development Bank (AfDB) (2015) observed with apprehension that eradicating extreme poverty for all people everywhere by 2030, measured by people living on \$1.25 a day was a laudable goal. However, in examining the feasibility of this goal for sub-Saharan Africa (SSA) and cross-checking several studies on eradicating poverty globally, the AfDB observed that under plausible assumptions extreme poverty will not be eradicated in SSA by 2030. Whilst some progress was recorded in some areas, improvements have been unevenly distributed between and within different regions (World Health Organization 2018). In a recent report jointly published

by the Food and Agriculture Organization (FAO) of the United Nations, the International Fund for Agricultural Development (IFAD), the United Nations Children's Fund (UNICEF), the UN World Food Programme (WFP) and the World Health Organization (WHO), a grim picture of the economy and poverty was further painted. For instance, WHO (2022), in the published report, highlights that as many as 828 million people were affected by hunger in 2021 – 46 million people more than a year earlier and 150 million more than in 2019. The report further notes that after remaining relatively unchanged since 2015, the proportion of people affected by hunger jumped in 2020 and continued to rise in 2021, to 9.8% of the world population. This compares with 8% in 2019 and 9.3% in 2020.

The foregoing shows that the clear universal conviction now is that all hands must be on deck to eliminate poverty, and hunger and increase the standards of living for populations, particularly the currently poor. But it is also evident that despite the commitment of the member states towards implementing policies to achieve the various United Nations development goals and the support and collaboration of various international organizations, there is still a fairly long way to go to achieve the goals. This study believes that one possible way of boosting socio-economic and political development and overcoming the poverty and underdevelopment malaise prevalent in sub-Saharan Africa is through effective information and knowledge management.

3 Objectives of the Study

The main objective of the study was to assess the possibility of boosting the socio-economic and political development of sub-Saharan Africa through effective information and knowledge management policies at national and sub-national levels in the region. The study aimed to:

- Determine the indices and indicators of development in the world, leading to the variety of classifications assigned to different countries;
- Establish the nature and global indices of development of information and knowledge management in the world and how they correlate with indices of development;
- Investigate the phenomenological symptoms depicting that sub-Saharan African countries are less-developed nations lagging behind other regions of the world; and

- Explore the possibility of improving information and knowledge management to boost the socio-economic and political development of nations in sub-Saharan Africa.

4 Indices and Indicators of Development

The term ‘development’ as a salient descriptor in this essay is believed to be complex and ambiguous, laden with a multitude of meanings and has consequently been associated with various other terms, words and phrases. Such related words or phrases as noted by the School of Oriental and African Studies (SOAS) (2022) include change, economic development, social development, economic growth, positive change, poverty reduction, production, progress, and reducing vulnerability, among others. Thus, over the years, as the agenda of the international bodies focused on development, many authors, professionals and researchers advanced a number of definitions for the term ‘development’. In attempting to simplify it, SOAS states that development can be defined as bringing about social change that allows people to achieve their human potential. Society for International Development (SID) (2021) defines development as a process that creates growth, progress, positive change or the addition of physical, economic, environmental, social and demographic components. SID claims the purpose of development is a rise in the level and quality of life of the population, and the creation or expansion of local regional income and employment opportunities, without damaging the resources of the environment. The SID organization further states that development is visible and useful, not necessarily immediately, but also includes an aspect of quality change and the creation of conditions for a continuation of that change. Rabie (2016) asserts that development is basically an economic concept that has positive connotations involving the application of certain economic and technical measures to utilize available resources to instigate economic growth and improve people’s quality of life. But in what appears to be a concept more relevant to developing countries than the developed ones, Rabie explains the essence of development as a comprehensive societal process to move the underdeveloped nations from their state of economic backwardness and slow socio-cultural change to a dynamic state characterized by sustained economic growth and socio-cultural and political transformation that improves the quality of life of all members of society. But the Center for Global Development (CGD) (2012) was of the view that defining development as an improvement in

people's well-being does not do justice to what the term means. The CGD therefore argues that development also carries a connotation of lasting change. This probably prompts Rabie to subscribe to the argument that development is about transforming the lives of people and not only transforming economies. In its analogy of the need for lasting change being advocated for, CGD maintains that providing people with a bed net or a water pump can often be an excellent, cost-effective way to improve their well-being, but if the improvement ends when we stop providing the bed net or pump, we would not normally describe that as development. According to the CGD, development should also convey something about the capacity of economic, political and social systems to provide the circumstances for that well-being on a sustainable, long-term basis.

The question of how to measure development brought about the issue of indicators and indices of development that economists and social scientists as well as non-government organizations (NGOs) and policy-makers have engaged in. Salami, Tilakasiri and Ahmed (2017) acknowledge that indicators and indices are both used in measuring the wealth and levels of economic growth and development. These authors declare that indicators are used to illustrate the progress of a country in meeting a range of economic, social and environmental goals. Santos and Santos (2014) identify three indices to measuring development which according to them emerged more or less sequentially over time but now co-exist. The first approach according to them considers that development can be measured with some specification of a monetary indicator: Gross National (or Domestic) Product (GNP and GDP, respectively), usually in per capita terms, and typically with special attention to its growth rate. The second approach considers GNP per capita as having too many deficiencies as an indicator of well-being and that it does not always correlate well with development goals; therefore, a portfolio or dashboard of social indicators (including but not limited to monetary indicators) should be used to measure development. The third approach, they argue, arises from the need for a summary measure that combines some of the indicators into a single number, which has given rise to the construction of composite indices of development. Santos and Santos contend that a composite index is a function of variables and weights that maps attainments in a variety of attributes into a single real number, which may have cardinal meaning or be merely ordinal.

In another discourse akin to the above postulation by Santos and Santos, Aziz *et al.* (2015) in their discourse of the subject, argue that historically, GNP has been thought of as a key indicator in measuring the development level of a

nation. They however insist that over the years, researchers have found that the single GNP indicator is not sufficient to be used to measure development. As such numerous efforts have been put in place to create other composite indicators that could serve as complements or alternatives to the traditional measure. In order to calculate and categorise countries' levels of social and economic development, the Centre for Global Development (2012) and Weir and Collins (2021) among other authors, affirm that the United Nations through one of its arms, United Nations Development Programme (UNDP), introduced Human Development Index as a composite statistic to provide an overall indication of quality of life and opportunity, incorporating human health (life expectancy), education level, and per capita income. Subsequently, the Multidimensional Poverty Index (MPI) was introduced, which together with the HDI aim to measure development in broader sense.

Human Development Index, or HDI, is a metric compiled by the United Nations and used to quantify a country's average achievement in three basic dimensions of human development namely: a long and healthy life, knowledge and a decent standard of living (World Population Review 2022). Economic Times (2022) states that the HDI is a statistical tool used to measure a country's overall achievement in its social and economic dimensions. The Economic Times further adds that social and economic dimensions of a country are based on the health of people, their level of education attainment and their standard of living. It notes that HDI is one of the best tools to keep track of the level of development of a country, as it combines all major social and economic indicators that are responsible for economic development. Tutor2U (2021) also perceives the Human Development Index as a tool with more than two or three measuring indices. Specifically, Tutor2U asserts that HDI is a composite statistic calculated from five indices from countries, which are iterated as Life expectancy index, Education index, Mean years of schooling index, Expected years of schooling index and Income index. World Population Review (WPR) (2022) apportions figures and confirms that the indicators are compiled into a single number between 0 and 1.0, with 1.0 being the highest possible human development. WPR proclaims that HDI is divided into four tiers: very high human development (0.8-1.0), high human development (0.7-0.79), medium human development (0.55-0.7), and low human development (below 0.55). It also affirms that countries are ranked based on their score and split into categories that suggest how well-developed they are. But the whole arguments and postulations appeared to have been laid to rest by the United Nations

Development Programme (2022) in a post where it clearly indicates that the HDI was created to emphasize that people and their capabilities should be the ultimate criteria for assessing the development of a country, not economic growth alone. Thus, every year UNDP ranks countries based on the HDI report released in their annual report.

In reflection on the other hand over the counterpart of HDI, the national Multidimensional Poverty Index (MPI), Oxford Poverty and Human Development Initiative (OPHI) (2022) indicates that it is a country-specific poverty measure tailored to each country's unique situation. OPHI further observes that such measures generally take the dimensions of health, education, and living standards as their starting point, and supplement with different dimensions measured by locally appropriate indicators. At the global level, the MPI measures the complexities of poor people's lives, individually and collectively, each year. The World Bank (2022) in a briefing on the multidimensional poverty index appears probably more specific when it defines it as a measure of poverty that captures deprivations in education and access to basic infrastructure in addition to income or consumption at the \$1.90 international poverty line.

5 Global HDI at the End of 15 Years of the Millennium Development Declaration in 2015

Table 1 presented below, is the excerpt of the highest rankings in the Human Development Index by Tutor2U (2021) at the close of the Millennium Development Agenda in 2015 and before the commencement of the Sustainable Development Agenda in 2016. It will be recalled the United Nations' Millennium Development Goals for member countries commenced in the year 1999/2000. The table shows that with five indices comprising: Life expectancy index, Education index, Mean years of schooling index, Expected years of schooling index and Income index considered, the seventeen listed countries were at the top of the 'Very High Human Development' category. The HDI for the seventeen countries ranges from 0.89 – 0.94 out of 1.0. The countries are classified as developed countries and no sub-Saharan African country could make the list in the computation of the indices.

Table 2 is also part of the compilation of the UNDP 2015 Human Development Index sourced from Tutor2U (2021). All the seventeen listed countries had the lowest rankings (below 0.55) out of all the countries that are members of the UN and they are all sub-Saharan African countries. Despite the various interventions of

the United Nations and other agencies around the world to float programmes that would prop up socio-economic and political developments, sub-Saharan Africa is still regrettably retaining its back seat. The Agency for Technical Cooperation and Development (ACTED) (2022) affirms that the United Nations Development Programme (UNDP) works in about 170 countries and territories, helping to achieve the eradication of poverty, and the reduction of inequalities and exclusion. ACTED further claims that UNDP helps (needy) countries to develop policies, leadership skills, partnering abilities, and institutional capabilities and build resilience in order to sustain development results.

Table 1: 2015 Human Development Index – Highest Ranking Countries

2015 Human Development Index – Highest Rankings

Country	Human Development Index (HDI)	Life expectancy at birth	Expected years of schooling	Mean years of schooling	Gross national income (GNI) per capita	GNI per capita rank minus HDI rank
	Value	(years)	(years)	(years)	(2011 PPP \$)	
	2014	2014	2014	2014	2014	2014
Norway	0.944	81.6	17.5	12.6	64,992	5
Australia	0.935	82.4	20.2	13.0	42,261	17
Switzerland	0.930	83.0	15.8	12.8	56,431	6
Denmark	0.923	80.2	18.7	12.7	44,025	11
Netherlands	0.922	81.6	17.9	11.9	45,435	9
Germany	0.916	80.9	16.5	13.1	43,919	11
Ireland	0.916	80.9	18.6	12.2	39,568	16
United States	0.915	79.1	16.5	12.9	52,947	3
Canada	0.913	82.0	15.9	13.0	42,155	11
New Zealand	0.913	81.8	19.2	12.5	32,689	23
Singapore	0.912	83.0	15.4	10.6	76,628	-7
Hong Kong, China (SAR)	0.910	84.0	15.6	11.2	53,959	-2
Liechtenstein	0.908	80.0	15.0	11.8	79,851	-10
Sweden	0.907	82.2	15.8	12.1	45,636	-1
United Kingdom	0.907	80.7	16.2	13.1	39,267	9
Iceland	0.899	82.6	19.0	10.6	35,182	12
Korea (Republic of)	0.898	81.9	16.9	11.9	33,890	13

Source: Tutor2U (2021).

Apart from encouraging the protection of human rights and the empowerment of women, minorities, the poorest and most vulnerable, UNDP also focuses on helping countries to build and share solutions in three main areas, namely:

sustainable development, democratic governance and peace building and climate and disaster resilience (UNDP 2022). UNDP further draws attention to its mandate that includes administering the UN Capital Development Fund, which helps developing countries grow their economies by supplementing existing sources of capital assistance by means of grants and loans, and UN Volunteers.

Table 2: 2015 Human Development Index – Lowest Ranking Countries

2015 Human Development Index – Lowest Rankings

Country	Human Development Index (HDI)	Life expectancy at birth	Expected years of schooling	Mean years of schooling	Gross national income (GNI) per capita	GNI per capita rank minus HDI rank
	Value	(years)	(years)	(years)	(2011 PPP \$)	
Côte d'Ivoire	0.462	51.5	8.9	4.3	3,171	-24
Malawi	0.445	62.8	10.8	4.3	747	13
Ethiopia	0.442	64.1	8.5	2.4	1,428	2
Gambia	0.441	60.2	8.8	2.8	1,507	-2
DRC	0.433	58.7	9.8	6.0	680	11
Liberia	0.430	60.9	9.5	4.1	805	7
Guinea-Bissau	0.420	55.2	9.0	2.8	1,362	-1
Mali	0.419	58.0	8.4	2.0	1,583	-8
Mozambique	0.416	55.1	9.3	3.2	1,123	1
Sierra Leone	0.413	50.9	8.6	3.1	1,780	-16
Guinea	0.411	58.8	8.7	2.4	1,096	0
Burkina Faso	0.402	58.7	7.8	1.4	1,591	-13
Burundi	0.400	56.7	10.1	2.7	758	1
Chad	0.392	51.6	7.4	1.9	2,085	-22
Eritrea	0.391	63.7	4.1	3.9	1,130	-6
Central African Republic	0.350	50.7	7.2	4.2	581	1
Niger	0.348	61.4	5.4	1.5	908	-5

Source: Tutor2U (2021).

6 Global HDI in the Middle of the Sustainable Development Agenda in 2022

Table 3 presents the list of top ten countries of the UNDP 2022 Human Development Index about the middle of SDG agenda that started in 2016. Virtually all of the countries in the table scored more than 0.9 HDI, which falls

in the category of Very High Human Development. When the entire list of countries is considered, the observation is that most developed countries have an HDI score of more than 0.9 when the five indices namely, Life expectancy index, Education index, Mean years of schooling index, Expected years of schooling index and Income index, are considered. Most of the countries with 0.8 HDI score could not be shown in the table because the list is long. For the year 2022, there are 62 countries in the group. It should also be noted that most, if not all, countries in this category have stable governments, widespread affordable education and healthcare, high life expectancies and growing, powerful economies. In contrast to this are the world's least developed countries (LDC), which tend to have HDI scores below 0.55, in the 'low human development' category. LDCs are characterized by unstable governments, widespread poverty, lack of access to healthcare, and poor education. Additionally, these countries have low income and low life expectancies, coupled with high birth rates (World Population Review 2022). Standing conspicuously in the rear of the LDCs in Table 4 are ten countries listed – all of them in sub-Saharan Africa. Beyond this, there are 36 countries with less than 0.55 HDI score listed in the World Population Review table and categorized as 'low human development'. A scrutiny of the list reveals that this low human development group is largely dominated by countries in sub-Saharan Africa with thirty-three out of 36. Only Haiti, as well as war-torn Afghanistan and Yemen are the three non-sub-Saharan countries found in the list.

As earlier noted, the indicators are compiled into a single number between 0 and 1.0, with 1.0 being the highest possible human development. As the HDI is divided into four tiers, the very high human development (shown in Table 1 for 2015 and Table 3 for 2022) is between 0.8 and 1.0. Occupying the first ten positions in the 2022 HDI are the countries listed in Table 3 with their respective HDI and corresponding size of population. Altogether there are 62 countries in this category and Seychelles is the only sub-Saharan African country that managed to 'encroach' into the group carrying the last, sixty-second, position with 8.01 HDI score in 2022. The second tier in the categorization of HDI is High human development rated 0.7 – 0.79. There are 53 countries in this category as observed in the 2022 HDI review, and only four sub-Saharan Africa countries namely Mauritius, Botswana, South Africa and Garbon, made the group. Sadly, virtually all the ten lowest ranking countries found in the 2015 Human Development Index list are still unenviably occupying the lowest ranking list of the 2022 HDI.

Table 3: Human Development Index (HDI) by Country 2022 – Highest Rankings

Country	Human Development Index	Population
Norway	0.954	5,511,370
Switzerland	0.946	8,773,637
Ireland	0.942	5,020,199
Germany	0.939	83,883,596
Hong Kong	0.939	7,604,299
Australia	0.938	26,068,792
Iceland	0.938	345,393
Sweden	0.937	10,218,971
Singapore	0.935	5,943,546
Netherlands	0.933	17,211,447

Source: World Population Review (2022).

Table 4: Human Development Index (HDI) by Country 2022 – Lowest Rankings

Country	Human Development Index	Population
Mozambique	0.446	33,089,461
Sierra Leone	0.438	8,306,436
Burkina Faso	0.434	22,102,838
Eritrea	0.434	3,662,244
Mali	0.427	21,473,764
Burundi	0.423	12,624,840
South Sudan	0.413	11,618,511

Chad	0.401	17,413,580
Central African Republic	0.381	5,016,678
Niger	0.377	26,083,660

Source: World Population Review (2022).

7 Multidimensional Poverty Index

Multidimensional Poverty Index, otherwise known by its acronym MPI, join forces together with the HDI to measure development of nations in broader sense. In its appraisal of poverty rate by Country in 2022, World Population Review (WPR) (2022) declares that poverty is a state of being in which a person lacks the income (or other means of support) to reliably meet their basic personal needs, such as food, shelter, and clothing. The WPR observes that whilst poverty exists in every country in the world, it is a more pressing issue in some countries than in others. On determining how it is calculated the WPR affirms that the poverty rate is the number of people (usually expressed as a percentage) in a given demographic group whose income falls below the poverty line. According to OPHI (2022), multidimensional poverty encompasses the various deprivations experienced by poor people in their daily lives – such as poor health, lack of education, inadequate living standards, disempowerment, poor quality of work, the threat of violence, and living in areas that are environmentally hazardous, among others. As the world seeks to fight and end poverty, leaving no one behind, multidimensional poverty level is measured globally by world bodies and various national or country governments. According to World Bank (2022), ten countries with the highest poverty rates in the world are as shown in Table 5. As noticed in the table, all the countries in the list except Guatemala (a Central American country), are in sub-Saharan Africa. This displays the extent to which no effort should be spared to boost the socio-economic development of Africa.

Table 5: Countries with Highest Poverty Rates in the World

Serial No.	Country	Poverty Rates %
1.	South Sudan	82.3

2.	Equatorial Guinea	76.8
3.	Madagascar	70.7
4.	Guinea Bissau	69.3
5.	Eritrea	69.0
6.	Sao Tome and Principe	66.7
7.	Burundi	64.9
8.	Democratic Republic of Congo	63.9
9.	Central African Republic	62.0
10.	Guatemala	59.3

Source: World Bank 2022

Apart from the countries in Africa that are lagging behind other countries of the world in socio-economic development, the regional computation of the multidimensional poverty headcount and monetary poverty headcount were not performing any better when compared with other regions in the world. The World Bank (WB) (2022) observes with regret that in sub-Saharan Africa, more than in any other region, shortfalls in one dimension go hand-in-hand with other deficiencies.

As noted in Table 6 of the Global Monitoring Database updated in April 2022, the monetary poverty and multidimensional poverty of sub-Saharan Africa were the highest of all the regions of the world. The WB however admonished that the figures in the table do not yet fully account for the impact of COVID-19 on the world's poor. The WB hints that the monetary headcount is based on the international poverty line \$1.90, whilst the multidimensional poverty measure headcount indicates the share of the population in each region defined as multi-dimensionally poor.

The number of economies in table (6) is the number of economies in each region for which information is available in the window between 2015 and 2021, for a circa 2018 reporting year. It is to be noted that the data covers as much as 73 percent of the population in sub-Saharan Africa and as little as 22 percent of the population in South Asia.

Table 6: Monetary and Multidimensional Poverty Headcount, by Region and the World, circa 2018

Region	Monetary poverty, headcount ratio (%)	Multidimensional poverty, headcount ratio (%)	Number of economies	Population coverage (%)^a
East Asia and Pacific	2.5	4.4	14	30
Europe and Central Asia	0.3	2.2	25	89
Latin America and the Caribbean	4.0	4.7	14	87
Middle East and North Africa	2.3	2.9	5	51
South Asia	7.8	17.3	5	22
Sub-Saharan Africa	37.2	55.2	35	73
Rest of the World	0.7	1.3	25	78
All regions	9.6	15.0	123	51^b

Source: Global Monitoring Database (April 2022).

8 Information and Knowledge Management

Thus far, sub-Saharan African countries have remained stagnant or worse in HDI, MDI, and Poverty Index measures compared to most other countries of the world despite several attempts from within and without the sub-region to boost its social, economic, and political developments. The question remains whether there is the possibility of information and knowledge management assisting to boost the socio-economic and political development in the sub-region as noted in the third objective of the study.

Whilst tracing the development of information and knowledge management, Virkus (2010), cites Wilson (2002) acknowledging that the phrase ‘knowledge management’ is either used as a synonym for ‘information management’ or the ‘management of work practices’ which are to improve the sharing of knowledge in an organization. On the other hand, Virkus maintains that some authors see information management as a subset of knowledge

management, adding that knowledge management is also often positioned underneath information management. Virkus argues that since the mid-nineties the label knowledge management (KM) has attracted much attention while information management (IM) has been used much less. She claims that the phrase knowledge management came into popular usage in the late 1980s with conferences organized, business/oriented journals, and books published on KM.

Though related and often used interchangeably, the twin concept of information management (IM) and knowledge management (KM) have their peculiarities. An information management consultant, SSL2Buy (2021), in an attempt to explain what information management is states that for every organization, information is an important asset that includes both physical and digital forms. SSL2Buy indicates it is indispensable to create a process to collect, protect, store, and distribute the information within the organization in order to utilize the information. This process, according to the organization, is known as information management. Similarly, another organization, IBM Cloud Education (2020) in defining knowledge management and linking information to the concept states that knowledge management (KM) is the process of identifying, organizing, storing and disseminating information within an organization. The organization observes that when knowledge is not easily accessible within an organization, it can be incredibly costly to a business as valuable time is spent seeking out relevant information versus completing outcome-focused tasks.

Some other attempts have been made to separate the two concepts. For instance, Amsler (2020) describes IM as combining business processes, procedures, and technology to organize, secure and access an organization's data regardless of format, including digital data, paper documents, and audio and video files, whilst KM involves gathering, organizing, and sharing knowledge, adding that KM uses processes and tools to pass on wisdom and understanding of different subject matters. She further elucidates the connection between the two by noting that when information is put into the context of being used for greater understanding of a subject, it becomes knowledge, adding that knowledge assists employees in doing their jobs – making them more efficient.

Further drawing a comparison between the two, Unitonomy (2022) argues that IM ensures information is stored securely and transfers efficiently, whilst KM is the strategy and system behind capturing, sharing and understanding an organization's knowledge. Explaining the variance between the two further, Unitonomy avers that knowledge is one's output from ingesting information and that information transfer is about moving factual assets

between people, whilst knowledge transfer is about moving the collected output of knowledge between people. Hlatshwayo (2019) in a review of IM and KM claims that both notions denote managing (supervision, guiding, leading, governing, planning, organizing) methods and products of those methods. He affirms that knowledge is a method of information and KM is a method of 'IM' adding that KM is a more vital method of IM that delivers the administration of events not normally obtainable in 'IM'.

With the thin line separating them, the expediency or benefits of both information and knowledge management in an organization is overwhelming and has been well documented by authors including SSL2Buy (2021), Amsler (2020), IBM Cloud Education (2020), Hlatshwayo (2019). The benefits listed among others include: shrinking operational costs, raised returns, risk mitigation, enhanced productivity, sustained growth, and innovation in business. Other benefits iterated by authors include the identification of skills gaps, making better-informed decisions, maintenance of enterprise knowledge, operational efficiencies, increased collaboration and communication, and data security.

Extant literature suggests the definition of knowledge management would not be complete without identifying and categorizing the various knowledge types that need to be managed and their relative importance in various contexts. Whilst some authors claim there are only two types, others hinted there are three of them, yet other authors itemized any number between four and seven. It is however obvious that there are two broad types of knowledge that stand out and are common to all postulations of the authors. These are tacit and explicit knowledge. Tacit knowledge according to IBM Cloud Education (2020) is typically acquired through experience, and intuitively acquired and used practically over time by an individual, thus making it difficult to transfer it to other individuals or the rest of an organization. Alexander (2018) and IBM Cloud Education (2020) describe explicit knowledge as the type which can be easily articulated, recorded or codified, communicated and, most importantly in the context of knowledge management, stored and accessed. IBM Cloud Education declares that this form of knowledge is important to manage as intellectual capital within an organization to facilitate successful knowledge transfer to new employees.

9 Effective Management of Information and Knowledge

In the words of Document360 (2022), a good system ensures that information

is available to those who need it when they need it and knowledge management is important because it can capture valuable information. The types of information and knowledge that can be included in a knowledge management system as Document360 suggests include standard operating procedure, comprising a set of instructions explaining how to complete a particular task, process and procedure, Human resources policies, training programmes and Webinars consisting recorded video sessions on a given topic. Beyond these, in this age of the UN Sustainable Development Agenda, with the scope of leaving no one behind, all institutions and organisations should assist and deploy information and knowledge management to accomplish the 17 Sustainable Development Goals (SDGs) aimed to transform the world. According to UNDP (2022) the SDGs, also known as the Global Goals, were a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity.

Further, in the new digital and big data age, the place and involvement of IM and KM is assured. For instance, Jacobson (2021), in establishing the benefits, declares that processing big data and disseminating it via a KM solution gives stakeholders fast and easy access to critical information. It helps to uncover and share insights that can improve nearly every facet.

10 Information and Knowledge Management and Socio-Economic Development

In view of the nature and importance of information and knowledge management, types, sources, systems, institutions, and tools discussed above, how can more effective and robust IM and KM be applied to catalyze and sustain social and economic development in sub-Sahara Africa?

The world has already evolved and progressed through an information society, knowledge economy, and digital society and now increasing to big data and artificial intelligence-based society. Indisputably, information and knowledge change the nature of the economy and indeed the practice of local economic development. Jarboe and Alliance (2001) in a report to the US Economic Development Administration, admit that companies are changing how they operate and what drives their location decisions. They advocate that local economic development strategies must adapt to these changes. Jarboe and Alliance adhere to the view that the world is gaining a better understanding of how information and knowledge affect both the economy in general and the

economic success of specific localities. They therefore acknowledge that there is a rise in new theories of economic development, such as economic clusters, that can be useful in guiding local economic development activities. Oliinyk, Bilan, and Mishchuk (2021) argue that obtaining and using relevant knowledge today is a competitive advantage for organizations, industries, and economies in general. They acknowledge that currently, knowledge acts both as a necessary factor of production and as an independent product, but at the same time, effective knowledge management is a powerful factor in the high level of economic development of the world. In order to take full advantage of this opportunity, Oliinyk, Bilan, and Mishchuk (2021) subscribe to the advocacy of UNDP (2019) report that country leaders should focus on five main facets in their countries. These include: education (focus on curriculum quality, orientation on new technologies); research, development, innovation, and science (skills/ knowledge of researchers and organizations to stimulate the development of new technologies and the formation of necessary skills in the future); technologies (providing a high level of technological infrastructure and ICT needed to share knowledge, promoting the development of new technologies and teaching methods); economy (as a source of financial resources for the introduction of new technologies); and favourable environment (organisational support for entrepreneurship development and innovation).

Information, information management, knowledge, and knowledge management have jointly taken the centre stage and effected a great deal of alteration in virtually all areas of the undertaking of humanity. In their description of the proceedings book of the 2015 International Congress on Economics, Social Sciences and Information Management, Gaol and Hutagalung (2015) stress that information technology, in particular, has changed many aspects of our life, including how we communicate, work, socialize, education, and business. Extending the treatise to knowledge management and socio-economic development, Gaol and Hutagalung maintain that along with the improvement of the internet, KM is very important to keep the economy moving in a positive direction and to monitor social change in society.

Explaining the significance of knowledge in the scheme of development, Userhub (2022) confirms that knowledge is known to be the driving force for the development and definition of every organization's strategy, and for this reason it is a key determinant in the organizations competitiveness. They maintain that countries that do not support knowledge sharing and openness cannot realize the benefits of increased performance and productivity. Today

developing countries base their development approaches on expanding their knowledge base. In confirming that knowledge management has become a primary source of meeting the dynamically growing demands, Userhub (2022) acknowledges that the benefits of knowledge management have been growing constantly, over the years with the result that its effect is important for creating economic growth, development and competitive advantage. In view of the shift to knowledge-based economy in developing economy, Userhub believes that the transition to the knowledge economy and knowledge society will assume a controlled modernization of political, educational, cultural and economic development, cautioning that delay in dissemination of knowledge halts the performance of all government sectors because the only thing that connects all these sectors is the knowledge they share.

The World Bank (2007) in a report on ‘Building knowledge economies: advanced strategies for development’, highlights the view that knowledge has always been an essential force in economic development and describes the knowledge revolution, which is leading us into a post-industrial age in which brains, not brawn, are the best means of coping with intensified competition and new challenges, including those related to human development and the global environment. In the same vein, Economic Commission for Latin America and the Caribbean (ECLAC) (2010) expresses the view that knowledge could act as the driver of competitiveness and productivity, as a facilitator of welfare and environment, and as an enabler of institutions and governance, hence contributing to economic and social development. ECLAC buttresses its argument on *Knowledge as the enabler of institutions and governance*, by stating that knowledge is crucial in the policymaking process and that it can be transformed into effective decisions and actions to solve development problems both in the short and long term. The Economic Commission avows that most development policies are based on the identification and dissemination of good policy practices to all aspects of public administration. In its argument on *Knowledge as the driver of competitiveness and productivity*, the Economic Commission states that an econometric study conducted by the World Bank concluded that close to two-thirds of the differences between the GDP of two countries (Ghana and the Republic of Korea), over a half-century, were explained not much by the accumulation of physical capital and labour but by other sources of growth and productivity in which knowledge was crucial. Concluding on *Knowledge as the facilitator of welfare and environment*, the Commission confirms that knowledge improves nutrition, cures epidemics, and protects against natural dangers.

Wickramasinghe (2019) acknowledges that in the developing world, the creation, accumulation, and strategic use of knowledge will play a big role in the survival, development, and advancement of any nation's economy, stressing that knowledge is very important for the economic growth of a country.

11 Information and Knowledge Management and Political Development

Politics is about policies and policy making, legislation and governance. Whilst exploring the nature of 'governance' and the importance of information management to 'good governance', CEPAL (2001) alludes to the explanation of the concept of 'Governance' by Strassman (2000) in his observation that: Governance is what information management is mostly all about. The explanation further adds that information management is the process by which those who set policy guide those who follow policy. Governance concerns power, and applying an understanding of the distribution and sharing of power to the management of information technologies. Earlier, it was established that one good trait perceived of countries with high HDI is stable government, which comes with good governance. CEPAL alludes to the statement credited to Kofi Annan, the erstwhile Secretary General of the United Nations, who proffers the view that good governance entails a vast set of democratic processes and institutions at every level of society, from the local council to regional, national and international institutions, that allow the voices of the people to be heard, conflicting interests to be peacefully resolved, and a forging of consensus towards greater social progress.

In their exploration of the influence of knowledge management practices on e-government success, Abu-Shanab and Shehabat (2018) claim that KM practices and systems are necessary for the success of this process and the success of e-government projects. These authors hold to the belief that the KM practices (e.g. acquisition, sharing, creation, codification and retention) in public institutions will open opportunities for the success of e-government. Abu-Shanab and Shehabat (2018) further corroborate the view that managing knowledge in public sector is considered a challenging task because governmental departments actually create, capture, organize and manage huge knowledge resources. They acknowledge that the pressures related to the effective implementation of KM practices on government are related to some factors, namely: the way government manages and uses knowledge resources,

how the effective use of knowledge assets may affect decentralization, policy development, service delivery and other good governance practices.

CEPAL (2001) among others, had earlier indicated the view that information management is crucial to ‘good governance’ as it (IM) seeks to provide answers to the developmental areas as perceived by policy. CEPAL argues that policy makers, on the basis of their social and political orientation, develop a view of the world or an appreciation of what the society is as opposed to what it should be, giving rise to the identification of ‘problems’ and ‘development objectives’. They note that an information management system is then created to do the following, inter alia: (a) gather and process data on the strengths and weaknesses of the society through the examination of social and economic variables; (b) analyse the development over time of these variables to ascertain the direction of their evolution; (c) benchmark progress in the society against developments in one or more comparator societies; (d) inform the political directorate and civil society of the local situation so that consensus could be built as to what changes, if any, should be engineered; (e) identify a mechanism for digestion and filtration of the data collected to produce information to be considered by the administration and its planning structure; (f) receive feedback from top down and bottom up for modification of the next round of data gathering.

In what seems to be an advocacy to its treatise, CEPAL counsels that governance needs to be informed continually by information flows that are examined, digested, and evaluated against the intended direction of government policy.

12 Conclusion

It is evidently clear with all the available indices and indicators that there is an existence of yawning gap between the two worlds of the rich and the poor, between the developed and developing nations, and between the first and the third world. Though international bodies and other government and non-governmental organizations have been making frantic efforts to bridge the gap or at least combat the inadequacies serving as hindrances to development in third world countries, especially, sub-Saharan Africa, it does not look like a lot has been achieved thus far. Rather, it appears that the gap does not relent in widening. The launching of eight goals of millennium development by the United Nations in September 2000, which committed world leaders to combat

poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women, though assisted, it could not go far enough after 15 years. As such, a more ambitious sustainable development agenda was launched in 2016 from the ashes of the MDGs with the promise to ensure no one is left behind. Unfortunately, the ominous signals currently being received thus far is that the SDGs and promises entailed would still be very much here with us unaccomplished when the tenure of the agenda ends on schedule in 2030.

Whilst developed countries are known to enjoy mature and sophisticated economies and high standards of living where many people have enough money to buy the things they need, the tragedy is that such benefits and opportunities are considered a luxury and beyond the reach of an average person in sub-Saharan Africa. As earlier mentioned, the Government of New Brunswick (2009) indicated that the success of society is linked to the well-being of each and every citizen and that social development is about improving the well-being of every individual in society so they can reach their full potential. One observable phenomenon perceived in the socioeconomic prosperity of the developed countries is, in most cases, the matured liberal democracy culminating in stability of government. At variance with this, in recent years, a wave of military coups has plagued Africa and occurred in at least six countries in sub-Saharan Africa namely, Burkina Faso (2022), two in Mali (2020 and 2021), Guinea (2021), Chad (2021) and Sudan (2019 and 2021). These coups contribute in no small measure to instability of government and bear direct impact on socio-economic development of those nations.

How long will the movement in sub-Saharan Africa to socio-economic emancipation and political maturity continue to be stagnated or at a snail speed? This study has shown that several world bodies and organizations are making frantic efforts which are yielding some dividends, though not as substantial as desired. This chapter has also demonstrated some correlation between information/ knowledge management and socio-economic and political development. For instance, as the driving force for development, information and knowledge can change the nature of the economy and indeed the practice of local economic development, that knowledge is the enabler of institutions and governance, that knowledge is the driver of competitiveness and productivity, and that governance is what information management is mostly all about, etc. In light of this and the ongoing sustainable development agenda of the United Nations and other world bodies' developmental programmes that may be introduced, the message should spread from companies and organizations at

national level, to state and local levels. Appropriate information and sharing of knowledge should blow out and be cascaded from urban (cities and towns) to rural (villages and hamlets) areas, ensuring that no one is indeed left behind in skilling and retooling all for an upgrade. It is submitted that while knowledge management solutions can be helpful indeed in facilitating knowledge transfer across teams and individuals, they also depend on user adoption to generate positive outcomes.

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Boosting Socio-Economic and Political Development

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Chapter 3

Towards Digitally Enabled Libraries: The Fourth Industrial Revolution (4IR) in Libraries for Development in Botswana

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Abstract

The COVID-19 pandemic has significantly accelerated the adoption of the fourth industrial revolution (4IR) technologies worldwide in most industries. Libraries and information centers are no exception, considering their aims of meeting the diverse needs of users. Achieving social, economic, and political development is dependent on access to information for research, development, and decision-making. All types of libraries are forced to re-examine their roles to conform to the ever-changing information environment. Despite the promising benefits of employing 4IR technologies towards transformation and development, no empirical study has been carried out in Botswana libraries. The purpose of this study was to assess the current digital transformation practices, prospects, and challenges faced in the adoption of 4IR technologies in libraries in Botswana to leverage the economic benefits of the technologies driven by 4IR. The data for this study was collected through an online survey tool (Google Forms) using a snowball sampling technique among academic librarians. The study revealed that Botswana libraries are not yet ready for 4IR technology implementation as they are not using AI, Blockchain, robotics, big data, and 3D-technology. However, the study identified the major opportunities as: access to digital information without any geographical barriers, knowledge sharing, and skill transfer, increased collaboration with peers and customers, economic/national development through increased access to information, opportunity to promote literate, informed and participative societies and knowledge and

augmentation of robots as humans for improved library services. The main challenges were found to include: financial constraints, lack of technological infrastructure and skills. The majority of the participants had soft skills and were aware of the opportunities offered by 4IR technologies, but were not able to use them. The study recommends adequate funding for building suitable technological infrastructure, implementation of 4IR in Library School curriculum, formulation of technology and digital literacy policy framework and Government support.

Keywords: Digital technologies, 4IR technology, coronavirus disease (COVID-19), libraries, Internet of Things, Big Data, Botswana.

1 Introduction

Transformation in all sectors is the key to development and ranks high in most government agendas. The fourth industrial revolution (4IR) has transformed the traditional methods of producing goods and providing services. It is also changing the day-to-day activities at workplaces with the use of disruptive technologies such as robotics, virtual reality, artificial intelligence and Internet of Things (Holland 2020). Today, the only organisations that flourish are the ones that re-design their production processes through cyber-physical technologies from mass production to customized products and services (Mamphiswana & Bekele 2020). The 4IR technologies have also transformed the education system, information access and dissemination of information and knowledge system and research. All of these are indicators of 4IR contribution towards development. According to World Economic Forum (2016) reports access to information is the key to development. So, libraries can play a key role in economic development if they are encouraged to adopt 4IR technologies. The 4IR era has affected the way library and information centers conduct their business leading to transformation and development. Both digitisation and the 4IR are a solution for libraries to continue service delivery uninterrupted even during times of disruption (Botha 2021). Within libraries and other information management centers, the major changes brought about by 4IR are library automation and Artificial Intelligence (AI), open science, the use of social media platforms, and the changing roles of librarians. At Connecticut West Port Library, librarians teach AI to library users and libraries are collecting data using social media tools, drones, cameras, and other Industry 4.0 devices to

analyze and use it intelligently. The University of Pretoria employed Africa's first client service Robot employee Libby, to evolve with the 4IR. Libby's three key responsibilities are answering clients' basic queries regarding the library, marketing library resources and activities and conducting student surveys about the library's service delivery (Doyle 2019). However, Libby had to be removed from service during the Corona -19 pandemic, because the method to invoke a response is based on the physical touch of the robot's head, something that had to be avoided during the pandemic. The library's IT unit is in the process of introducing a Libby chat box to the library website (Matizamhuka 2022).

Despite the promising benefits of employing 4IR technologies, no empirical study has been carried out in Botswana; specifically, to determine the influence of 4IR technologies in motivating digital transformation. Hence this study sought to assess the current digital transformation practices in libraries in Botswana.

2 Purpose and Objectives of the Study

The purpose of this study was to assess the current digital transformation practices, prospects, and challenges faced in the adoption of 4IR technologies in libraries in Botswana. Specifically, the study sought to address the following objectives:

1. Examine the various 4IR technologies, that libraries in Botswana are using to manage information and knowledge.
2. Establish the 4IR skills that librarians already possess in libraries in Botswana.
3. Identify the opportunities the 4IR technologies offer to librarians.
4. Determine the challenges, librarians face in using 4IR technologies.
5. Recommend the strategies to enhance use of 4IR technologies in libraries in Botswana.

3 Literature Review

This section reviews relevant literature on the research topic.

3.1 Fourth Industrial Revolution

The term 4IR was first coined in 2016 by Klaus Schwab, the Executive Chair-person of the World Economic Forum. He referred to the 4th Industrial Revolu-

tion as building on the third Industrial revolution, and which is characterized by a fusion of technologies that is blurring the lines between the physical, digital, and biological spheres (Schwab 2016). The emerging 4IR technologies comprise robotics, 3D printing, Artificial Intelligence, Big data, Biotechnology, Blockchain, Cloud computing, Extended reality, Gamification, Internet of Things, Interoperability, Learning factories, Nano-technology, Quantum computing, Smart factories, Smart sensors, drones, Virtual Reality (VR), Augmented Reality (AR) and Teaching factories (Hawthorne 2018; Romanovs *et al.* 2019; Ally & Wark 2020). These tools and applications have the potential to boost productivity in libraries and can reduce costs as well as improve the quality of products and services (Chigwada & Chisita 2021). The surveyed literature revealed that the major drivers of the 4IR are: (1) Information communication infrastructure and emerging technologies; (2) Education and training; (3) Innovation; (4) Policy innovation; and (5) Responsive and context-specific strategies (Chigwada & Chisita 2021; Manda & Dhaou 2019).

3.2 Major 4IR Technologies in Libraries and the Opportunities they Offer

The following section discusses the major 4IR technologies that are used in libraries.

3.2.1 Internet of Things (IoT)

IoT refers to any device which can be linked to the internet. This includes mobile devices, wearable devices, washing machines etc. (Moos 2021). IoT can be used for self-checkout, inventory control, stock taking of information resources, access control in the physical building, tracking assets, monitoring the library network (Massis 2016; Wojcik 2016). IoT maintains collection management, facilitates access to library and its resources, tells the customers about overdue books and any fines they owe to the library (Pujar & Satyanarayana 2015). It also enables innovative approaches such as a virtual library card, small digital shelf, cloud services, embedding of RFID tags into users' card for easy access to resources, fine collection management and improved inventory services (Pujar & Satyanarayana 2015). Other researchers that stressed the importance of IoT in libraries include Hahn (2017), and (Mohideen *et al.* 2017), who focused on library mobile applications, library automation, and mobility technology in Libraries. Kamalrudin *et al.* (2018) emphasized IoT being applicable in business applications and security concerns

in libraries. However, despite these benefits, IoT suffers from the following drawbacks; technological challenges, standardization challenges, financial challenges, and security challenges (Liang & Chen 2018).

3.2.2 Artificial Intelligence (AI)

AI is a programmable computer used to perform tasks usually undertaken by a human (Ayinde & Kirkwood 2020). With the emergence of 4IR technologies, robots are the recent trend in the application of artificial intelligence in libraries. Nwakunor (2021) views AI as the computer-controlled robots that think intelligently like human beings. These robots are controlled electronically with the aid of a computer that mimicks the competences of the human mind. For example; the University of Pretoria engaged Africa's first Robot librarian Libby, who is performing human duties to improve library services such as, answering clients' basic queries, marketing and conducting student surveys (Doyle 2019; Mafumana 2019). AI application has a long history in libraries and information services such as, subject indexing, abstracting, information discovery and retrieval, user voice interface and chatbots (Ayinde & Kirkwood 2020). AI is used in library management system to process digital information and to automate library information systems. Library management systems include: Natural Language Processing (NLP), Expert Systems, Pattern Recognition, Reference Service and Robotics (Sridevi & Shanmugam 2017). Libraries can use NLP 'to design intelligent expert reference system or information retrieval system, where users can interact directly with the system using natural languages' (Oname & Alex-Nmecha 2020: 127). An Expert System can be designed to handle subject indexing or reference services. These Expert Systems serve in several ways for example, in reference assistance, decision making, applying cataloguing rules, and, determine vendor assignments in acquiring library materials (Oname & Alex-Nmecha 2020). AI is used in automatic cataloguing and classification using optical character recognition, automatic indexing using Expert Systems, retrieval of audio-visual materials, Optical Character Recognition and Speech Recognition. AI is also used in interactive bibliographic instruction using various media.

3.2.3 Drones

Modern libraries particularly in developed countries have introduced drones. For example, Santa Clara Library in California provides tech clubs, a drone-flying club, and 3-D printing for youths. The library has also developed

programme that is used for drone movie making; whereby youths are taught how to fly drones with cameras and edit the footage to make a movie (Ayinde & Kirkwood 2020). Users are able to order books online, which a drone delivers within a few hours, saving the time of the users and the information professionals. The use of drone also bridges the gap between rural and urban literacies by providing information resources to remote areas with no access to education and electricity (Ayinde & Kirkwood 2020). Many libraries such as, in Dubai Rose Memorial Library, in New York Public Library and Florida Library are using drones for various services ranging from service delivery to security to deliver books from library to patrons and vice versa. For example, the ‘flying book’ system delivers ordered books to the customers at their door steps and save their time. Drones are very helpful in moving library books, furniture and other equipment with the help of technology equipped modern flying robots. It can also be used as a security tool within and outside library; the high pixel camera of modern drones helps in 24 hours’ library surveillance (Vysakh & Babu 2019). Library drone delivery service can provide the circulation service to its patrons during times of epidemic such as the COVID Pandemic (Saloi 2021). In Canada, Edmonton Public Library launched four epl2go drones in 2019 to deliver the library materials to the cardholders (Saloi 2021).

3.2.4 Blockchain

Blockchain is one of the trending technologies with potential application to the library (Sanjay & Hasan 2020). Blockchain is like a ledger keeping a record of all transactions. An example is LibChain, which leverages on Blockchain technology in charging and discharging, where patrons do not have to return the book to the library to be issued to the next user. In LibChain’s system, the user exchanges information via Blockchain and libraries can know who is holding the book at any time. Anyone desiring to borrow a book can find out in whose possession the book is at any time and can alert that person to pass it on to them after using it. (Ayinde & Kirkwood 2020). According to Meth (2019) to date, most of Blockchain applications are still in the conceptual stage. Since Blockchains are a type of informational ledger and do not require a centralized gatekeeping organisation, they can be used to build a truly distributed metadata system for libraries and other information centers. A Blockchain Online Computer Library Center (OCLC) can be accessed by any organisation at no additional costs. This is an application for increased information access. Using

a Blockchain framework, libraries can partner with museums, universities and government agencies to share MACHine-Readable Cataloging (MARC) records, authority control, and user-generated content (San Jose State University iSchool 2020-2021). Potential uses for Blockchain includes creating time-stamped, verifiable versions of journal articles and digital rights management (Hoy 2017). Blockchain technology can also be used in library overdue payment, interlibrary loans, user to user loan, scholarly publications, library card, corporate library records keeping and archives/ special collections management.

In summary, as seen from the above discussion 4IR technologies offer the following opportunities to libraries: (1) Robots (machines) augments humans for better service; (2) business continuity during times of disruption; (3) increased access to the digital world; due to advent of technologies, library users can now have access to the digital world on a 24/7 basis as most libraries offer off and on campus services (Chigwada & Chisita 2021); (4) enhanced uses of e-resources. COVID-19 accelerated the speedy adoption of the 4IR with libraries shifting from physical information resources to online platforms. This resulted in increased use of, and reliance on, digital collections, and more interest in self-service and online programming (Cox & Felix 2021); (5) introduction of new products and services: libraries have introduced new products and services for efficient library services, including social media platforms to communicate with clients around the clock, online reference services, online renewal of library materials, and self-services at circulation points (Chigwada & Chisita 2021); (6) libraries become 4IR advocates: by virtue of their inherent skills and expertise librarians can be good advocates and facilitators of the 4IR technologies (Chigwada & Chisita 2021); (7) More opportunities for knowledge sharing and skills transfer

3.3 Skills Required by Information Professionals in the 4IR Era

Skills are methods of doing a job in the best way by using limited resources to achieve the organisational goals. Skills are indispensable in the information profession. The reviewed literature revealed several skills that are critical for 4IR. Ayinde and Kirkwood (2020) mentioned customers need skills such as, retrieving and searching skills, managerial and leadership skills, reference services skills, information technology skills necessary to survive in 4IR era. Marr and Ward (2019) published a book on ‘Artificial Intelligence in Practice: How 50 Successful Companies Used AI and Machine Learning to Solve

Problems’. In this book the following skills were deemed necessary for the 4IR revolution era; Creativity, Emotional intelligence (EQ), Analytical (critical) thinking, Active learning with a growth mind-set, Judgment and decision making, Interpersonal communication skills, Leadership skills, Diversity and cultural intelligence, Technology skills, and ability to embrace change. All these skills will prepare people to find rewarding jobs in future such as, advanced statistician, smart software developer, smart engineer, smart robotics expert, and scientific researcher (Ayinde & Kirkwood 2020). Basically, employees in the 4IR era will need to have basic 21st century competencies as skills in different categories; core skills, basic skills, transferable skills, generic skills, key skills, soft skills, behavioural competencies skills and cross-curricular skills (Bikse *et al.* 2022). Moreover, human creativity and innovation are the driving force behind 4IR Technologies (Jacobs 2021).

Tella (2020) asserts that LIS professionals need to acquire several new skills to fit into 4IR era including: information curation; big data management, research skills, digital scanning/ preservation, cloud data expansion, collaboration, teaching and facilitation, analytical thinking and innovation, active learning and learning strategies, creativity, originality and initiative; technology design and programming, critical thinking and analysis, problem solving, leadership, emotional intelligence, system analysis and evaluation. Building quality intellectual capital is at the core of 4IR, that would equip more people with learning, ideas and abilities for innovativeness (Osuigwe 2019).

3.4 Challenges Librarians Face in Using 4IR Technologies

Industry 4.0 has brought economic and social opportunities as well as challenges (Manda & Dhaou 2019). A review of available literature indicates that there are several challenges related to 4IR implementation. The major challenges identified in the reviewed literature are shown in Table 1 below.

Table 1: Challenges Posed by 4IR Technologies

Challenge	Description
Inadequate technological infrastructure	Poor ICT infrastructure in developing countries is one of the major challenges (Odeyemi 2019).

Job loses	According to World Economic Forum (2016:2), ‘many of the major drivers of transformation currently affecting global industries are expected to have a significant impact on jobs, ranging from significant job creation to job displacement, and from heightened labour productivity to widening skills gaps’. As some of the tasks will be done by the new technologies and fewer librarians will be required to perform library work leading to higher unemployment rate and even poverty (Moos 2021).
Financial constraints	Most libraries face lack of funds to procure and manage 4IR technologies and train personnel (Tella <i>et al.</i> 2022a; Odeyemi 2019). Odeyemi (2019) further noted that due to inadequate finance Nigerian academic libraries may not catch up easily with their counterparts in developed countries.
Inadequate expertise	This refers to skills gap challenge for functionality in the 4IR era (Tella <i>et al.</i> 2022; Manda & Dhaou 2019). World Economic Forum (2016) identified skill challenges as: skills mismatches and skills redundancy due to the changing nature of jobs owing to advanced technologies. Human resources and requisite skills were found inadequate in academic libraries in Nigeria to provide effective library and information services using advanced digital technologies and automation (Odeyemi 2019; Mafumana 2019). There is a need for training and retraining of librarians and other information professionals with appropriate skills to enable them to adapt to the 4IR is a big challenge in most libraries in developing countries (Moos 2021).
Librarians’ poor attitude toward new technologies	Often librarians have poor attitude to adopting new technologies. For example, refusal/reluctance to adopt the technology by technophobic personnel and adjusting to the new 4IR environment are challenges in Nigerian libraries (Tella <i>et al.</i> 2022). Moreover, Manda and Dhaou (2019) and

	Schwab (2016), echoed that technological tools and applications of Industry 4.0 can also disrupt society, business and government through its innovations.
Changing business model	The European Parliament (2016) identified the challenges experienced in Europe as: changing business models, skills mismatch, intellectual property issues, and the need for investment, data issues, standards, and legal questions of liability.
Societal challenge	4IR era also poses societal challenges including job loss, disqualification, new kinds of stress, and increased social insecurity (Dregger <i>et al.</i> 2016). The increased automation requires greater investment and changing business models. ‘Data management, legal questions of liability and intellectual property, standards, and skills mismatches are other significant issues’ (Tella <i>et al.</i> 2022: 548).

4 Methodology

Data for this study was collected through an online survey tool ‘Google forms’. The survey questionnaire comprised largely close-ended questions with only two questions that were open-ended. So the data collected was both quantitative and qualitative. Qualitative questions were used to provide opportunity to the respondents to express their views openly and to supplement quantitative data. For the sake of convenience and because the targeted population was spread out, the survey link was distributed via email and WhatsApp to enable remote access. Accessibility of the link was only limited to individuals within the researcher’s digital circles and/ online community (thus convenient sampling was used to access librarians within the researcher’s online connections). This survey also depended on snowball sampling (that is participants to whom the link was sent to, were requested to share it with their friends). The survey link was made available 2nd May to 29th May 2022 to all librarians working in any type of library in Botswana and who had library qualifications. A total of 112 responses were retrieved as shown in Figure 1. Quantitative data was analyzed using Microsoft Excel while qualitative data was analyzed manually. For anonymity purposes, qualitative responses were presented through alpha-

numeric coding. The participants were represented by the systematic number given to each questionnaire (e.g. questionnaire 80). Thus, each questionnaire was numbered by participants’ number (e.g., Participant 80).

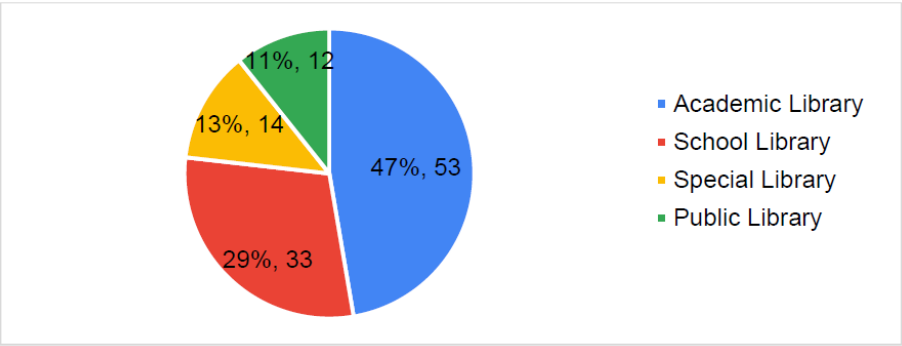
5 Findings

The findings of the study are presented in two parts: Part (A) provides background information of the respondents and Part (B) presents the major findings of the study.

Part A: Respondents Background Information

As shown on Figure 1, a total of 112 respondents working in different types of libraries in Botswana participated in the survey. The majority (n=53, 47%) of the participants were from academic libraries, followed by school libraries (n=33, 29%). Fourteen (n=14, 13%) respondents were from special libraries while twelve (n=12, 11%) were from public libraries.

Figure 1: Respondents’ Distribution According to Type of Library (n=112)

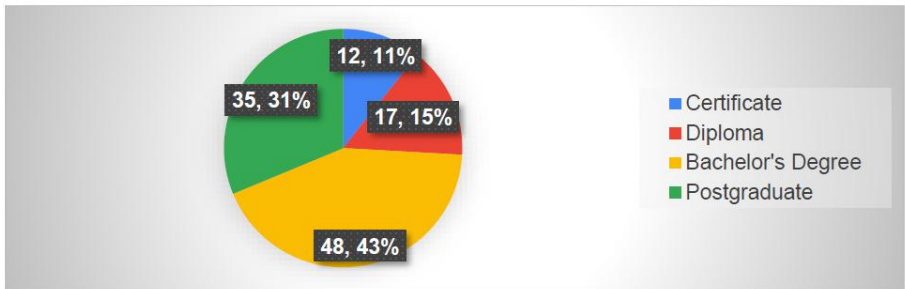


Source: Field data (2022)

Qualification: As presented in Figure (2), a majority (n=48, 43%) of the respondents had a bachelor’s degree, followed by those who held postgraduate degrees (n=35, 17%). Of 112 participants, (n=17, 15%) had diplomas, and 12

(11%) librarians had certificates while one respondent specified that he/she had a teaching certification.

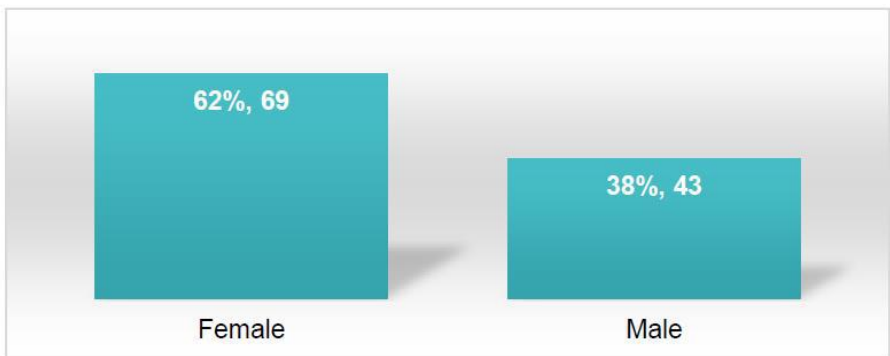
Figure 2: Respondents Qualification (n=112)



Source: Field data (2022)

Gender: Of 112 participants, the majority of (n=69, 62%) were female and (n=43, 38%) were male participants.

Figure 3: Gender Distribution (n=112)

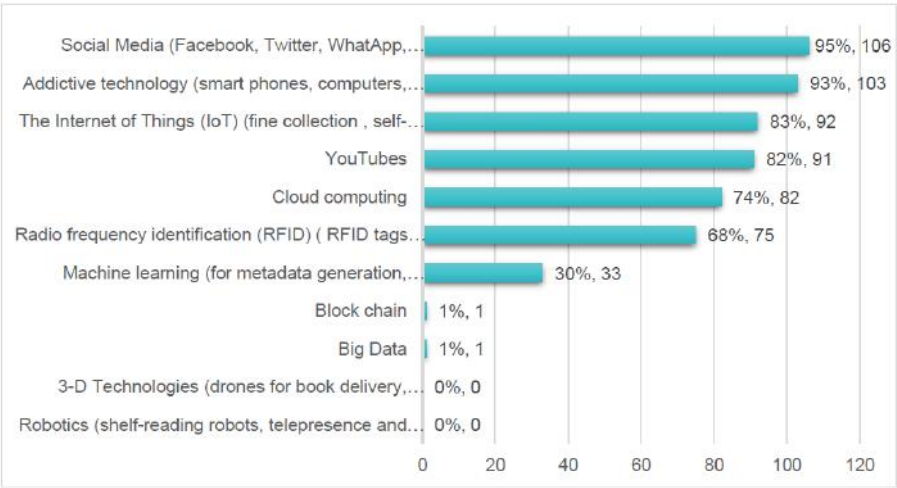


Source: Field data (2022)

Part B: Main Findings

Use of 4IR technologies: To address the first objective of the study, the respondents were asked to identify the 4IR technologies they use in providing library services. They were allowed to select different technologies that they used in the performance of their duties. The results are presented in Figure 4.

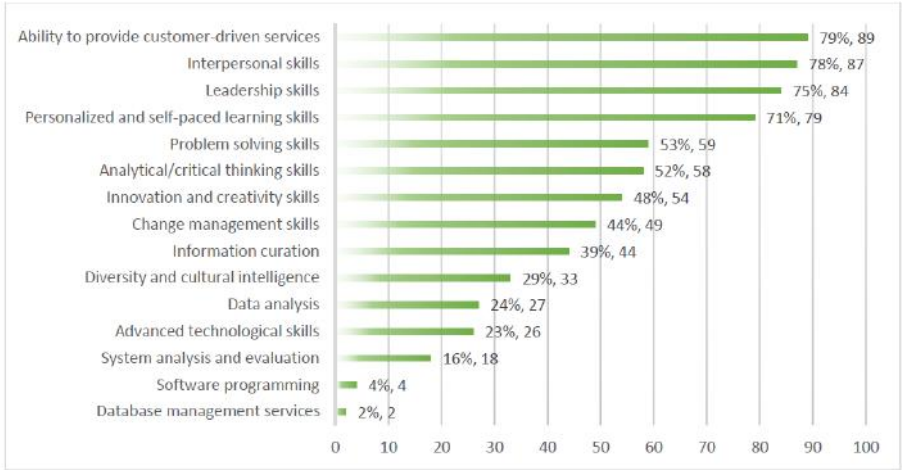
Figure 4: 4IR Technologies Used by Libraries in Botswana (n=111)



Source: Field data (2022)

As apparent from Figure (4), most of the respondents used 4IR technologies in Botswana libraries. Specifically, the findings indicated that Social Media applications were used by 106 (95%), followed by addictive technologies by 103 (93%), the Internet of Things by 92 (83%), and, YouTubes by 91 (82%) librarians, cloud computing 82 (74%) and RFID tags were used by 75 (68%) librarians. Machine learning technology for data generation was used only by 33 (30%) libraries and Blockchain and Big data were used only by one library each, while none of the libraries in Botswana use 3-D technologies or Robotics.

Participants’ current skills: To accomplish objective (2), the participants were asked to indicate which 4IR skills they currently possessed, the results are displayed in Figure (5).

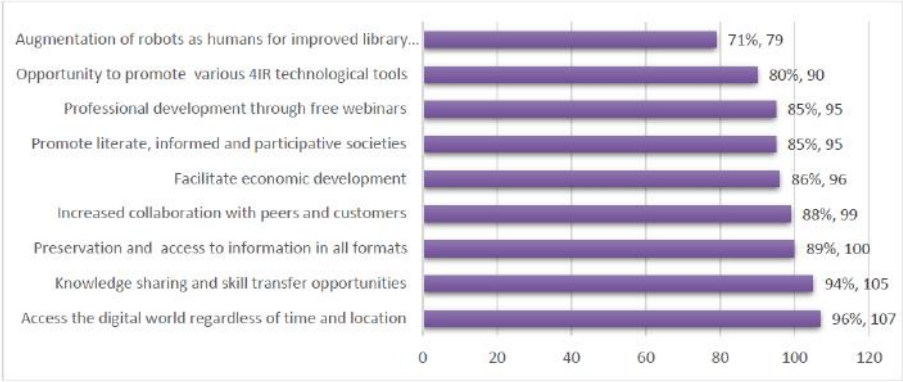
Figure 5: Skills Possessed (n=112)

Source: Field data (2022)

As evident from Figure (5), 89 (79%) participants claimed to have ability to provide customer-driven services, followed by 87 (78%) with interpersonal skills, 84 (75%) had leadership skills and 79 (71%) had personalised and self-paced learning skills. Of 112 librarians, 59 (53%) had problem solving skills while 58 (52%) had analytical and critical thinking skills. Fewer than 50% indicated that they had other skills with 54 (48%) possessing innovative and creativity skills, 49 (44%) change management skills, and, 44 (39%) information curation skills. Thirty-three (29%) librarians possessed diversity and cultural intelligence skills, 27 (24%) data analysis skills, only 26 (23%) claimed to have advanced technological skills, 18 (16%) system analysis and evaluation skills, while only 4 (4%) possessed software programming and 2 (2%) database management services skills.

Opportunities: To meet the objective (3) of the study, the participants were asked to indicate which opportunities the 4IR technologies offered to librarians. The responses are presented in Figure (6).

Figure 6: Opportunities Provided by 4IR Technologies (n=112)



Source: Field data (2022)

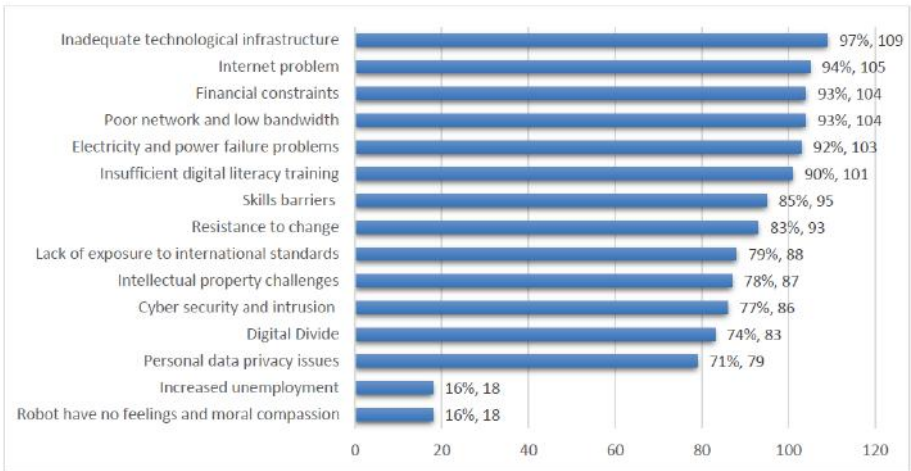
As evident in Figure above, of 112 librarians, the majority of 107 (96%) acknowledged the access to digital information without any geographical barriers as an opportunity, followed by knowledge sharing and skill transfer 105 (94%), preservation and access to information in all formats 100 (89%), increased collaboration with peers and customers by 99 (88%), and, facilitate economic development, 96 (86%) through increased access to information and knowledge were seen as opportunities by the participants. Other opportunities were identified as: the opportunity to promote literate, informed, and participative societies and professional development through free online webinars by 95 (85%) participants, and, the augmentation of robots as humans for improved library services 79 (71%) as an opportunity for the librarians.

Challenges: To accomplish objective (4), the participants were asked to point-out what challenges they faced in using 4IR technologies, and their responses are displayed in Figure (7):

As clearly shown in Figure 7 below, the most critical challenge faced by respondents who took part in the study was inadequate technological infrastructure (n=109, 97%) librarians. This was followed by internet problem (n=105, 94%), financial constraints and poor network and low bandwidth (n=104, 93%), electricity and power failure problems (n=103, 92%), inadequate digital literacy training (n=101, 90%). Other challenges mentioned were: skills

barriers 95 (85%), resistance to change 93 (83%), lack of exposure to international standards by 88 (79%), intellectual property challenges 87 (78%), cyber security and intrusion by 86 (77 digital divide 83 (74%) and personal data privacy issues 79 (71%), while increased unemployment and robots not having any feelings and moral compassion were found as challenges by an insignificant number 18 (16%) of participants.

Figure 7: Challenges Faced by Librarians when Using 4IR Technologies (n=112)



Source: Field data (2022)

To further understand the librarians' perspectives towards 4IR technologies and their impact on national development, they were given two open-ended questions. A majority (94%) of the respondents agreed that the 4IR technologies have impact on national development as they facilitate easy access, sharing and retrieval of information; provide improved library services; facilitate quality service delivery; improves efficiency and effectiveness in government transactions. These findings are evidenced by the quotes presented in Box 1.

Box 1

'4IR technologies have a huge impact on national development because access to quality information and knowledge is the essence of development.'

Librarians can provide the right information at the right time using 4IR technologies without any time and geographical barriers. As a result, 4IR technologies contribute to national development' said Participant 3.

'Without technology, research and development will suffer. As a result, this will impact innovation and realisation of the SDGs' said Participant 111.

'4IR technologies cut across all industries not just the library. Hence, they have a huge impact on national development. For example; in agriculture, drones are used to collect data in the fields, which can be used for informed decision making' acknowledged Participant 100.

'4IR technologies impact positively on achievement of SDGs since they enhance access to information for all to ensure social educational inclusion for communities' commented Participant 11.

'4IR improves information service delivery and thus contributes towards national development' said Participant 29.

'The new techno-economic paradigm offers a window of opportunity for countries that are late to adopt new technology as they are leaping directly into using more advanced technologies. Instead of rebuilding old things, they'll build everything based on smart 4IR technical ideology' Participant 41 further explained.

'By providing easy and increased information to all citizens' Participant 99 appreciated the impact of 4IR on national development

'Through increased access to information improved efficiency and effectiveness in all aspects of the government transactions and thus national development' explained Participant 41.

'The 4IR technologies help the library staff to provide value-added library and information services and remote access to online information resources thus enhanced access to information leading towards economic development' alluded Participant 67.

'Access to information and knowledge is the key to sustainable development. 4IR facilitates access to information, knowledge and data and consequently contribute to national development' stated Participant 52.

Source: Field data (2022)

Lastly, participants were also asked to state how libraries can improve their services and products upon using 4IR technologies. Three main themes were derived from the qualitative data and the corresponding excerpts are presented as follows:

a. Adoption of standards and policies that support implementation and use of 4IR technologies:

Participant 5 stated that *‘Libraries should improve standards on 4IR technologies by ensuring utilization of technologies that match today’s information needs and digitization process’* while Participant 47 argued that. *‘There is an urgent need to develop 4IR technology implementation policies’*.

b. Intensifying adoption of 4IR technologies in libraries:

Participant 20 posited that *‘Libraries should consider it very vital to jump on the bandwagon and not be left behind because there are daily advancements in technology, and technology is the future of all working environments, and if anyone is left behind then they should consider facing their doom’*.

c. Training of librarians:

Participant 27 asserted that *‘Training should be done on a regular basis and all librarians should be equipped with necessary skills to fit into 4IR era’*.

Participant 104 recommended the need for training staff *‘Reskill personnel, provide more resources to match growing number of users, frequent training for patrons’*, while Participant 109 further suggested that *‘There is need for libraries to encourage re-skilling and up-skilling of the staff members through trainings, workshops, seminars, etc. These must be sponsored regularly’*.

6 Discussion

The results presented above have revealed that the most used technologies in Botswana libraries are Social Media applications including Facebook, Twitter, WhatsApp, addictive technologies such as smart phones, laptops, and tablets, the Internet of Things, YouTube, Cloud computing and RFID tags. This development is very promising and encouraging. However, machine learning

technology for data generation was used only by 30% libraries and only one library used Blockchain, while none of the libraries in Botswana used 3-D technologies and Robotics. The findings of the study confirm the findings of a recent study carried out by Tella *et al.* (2022), which found that none of the libraries in Nigeria was currently using robots, artificial intelligence, Internet of Things, virtual and augmented reality, and Blockchain. However, this is contrary to the findings by Botha (n.d.: 4) who elucidated that,

The adoption and utilisation of 4IR-related technology (robotics, user-experience, ask-a-librarian, social media, reference management tools, e-Resources, Research Commons, WiFi access) by libraries in Africa are commendable and provide evidence of the growing commitment and intention of the LIS sector to become increasingly more mature in respect of adopting technology to address disruptive change and to realisation of SDGs.

This implies that Botswana libraries will remain behind as they are not harnessing the advantages of 4IR technologies. Without proper funding for 4IR technology implementation and appreciation of its benefit, Botswana libraries will continue to lag behind in innovation and realisation of hidden workforce capability which has the ability to digitally transform our information landscape. From the findings, it is also evident that Botswana libraries still have fractured ICT infrastructure which does not fully support innovation, growth, agile organisations, and a smart working environment. As a result, the lack of 4IR technology adoption by Botswana libraries leads to information scarcity, information deficiency, and delayed information access. For instance when Covid-19 was at its peak in Botswana, students from less privileged homes without internet access did not have access to library materials as majority of the library services are manually based. Therefore, this should have been enough motivation for libraries to harness 4IR technologies. For example, with the help of LibChain, a Distributed Library Management System based on Blockchain technology, library patrons can provide library books directly to other library users without bringing to the library, if they are library members. Thus, enhancing Inter-Library Loan (ILL) procedures or services among the member libraries of the Blockchain network (Ayinde & Kirkwood 2020; Suman & Patel 2021). Moreover, in Botswana, drones can be very useful for book delivery to transport information to remote areas, something which is currently

being undertaken through book box service by Botswana National Library Services (BNLS) but it is much slower. Therefore, using 4IR technologies in library services increasingly bridges the gap between rural and urban communities leading to inclusive socio-economic development through increased access to information and knowledge.

Skills possessed by librarians: The findings of the study established that more than 50% of the participants had soft skills such as ability to provide customer-driven services, interpersonal skills, leadership skills, personalised and self-paced learning skills, problem solving skills, and analytical and critical thinking skills. Soft skills are good as they allow organisations to build a healthy workforce that can effectively use their technical skills and knowledge without being hampered by interpersonal problems, thus, encouraging a productive work environment. Moreover, as Ayinde and Kirkwood (2020) have emphasized, problem solving, adaptability, collaboration, leadership, creativity, and innovation are crucial skills in the 4IR era. However, in this study it is disconcerting that librarians also had serious skills gap with regards to technological skills. such as innovative and creativity, change management, diversity and cultural intelligence, information curation, data analysis, system analysis and evaluation skills, software programming and database management skills. This is a clear indication that even if AI, robotics, IoT, machine learning and Blockchain technologies were to be implemented in Botswana, they would not be effectively utilised for information service delivery since librarians lack the key skills required to effectively manage and manipulate 4IR technologies. No wonder Ayinde and Kirkwood (2020) recommended that in order to respond to unpredicted circumstances such as Covid-19, information professionals need to have innovative and creative skills.

Opportunities: The findings of the study ascertained that most of the participants were aware of the opportunities offered by 4IR technologies. Majority of the respondents acknowledged that 4IR technologies offer access to digital information without any time and space obstructions, enhance knowledge sharing and skill transfer, support preservation and access to information in all formats, enhance collaboration with peers and customers and, facilitate economic development. Indeed, 4IR technologies have transformed the way information and knowledge is disseminated on a 24/7 basis without any geographical barriers. Information and knowledge are drivers of productivity

improvement and economic growth. For example, to facilitate economic development, librarians can disseminate agricultural related information with farmers on crop diseases, climate change, and seed prices through advanced automated Selective Dissemination of Information (SDI). Also, chatbots can be implemented in library systems for user queries. Using 4IR technological applications, librarians can send current information to politicians and policy-makers to make informed decisions on national policies and development. Thus, librarians have ample opportunities to contribute to economic development connecting the right people with the right information at the right time and in the right format.

Other opportunities for librarians are to promote literate, informed and participative societies by training library users in using 4IR technologies. Librarians can also develop professionally through free online webinars. Also, the augmentation of robots as humans facilitates better-quality library services. However, this may not be possible when librarians lack technological skills. ‘The advent of the Fourth Industrial Revolution has the potential to transform emerging economies to another developmental echelon by increasing productivity and improving future fluidity of innovation across various industries’ (Nyagadza *et al.* 2022:1). The advent of the 4th Industrial Revolution promises several social and economic opportunities and challenges which demand that governments respond appropriately in supporting societal transformation (Manda & Dhaou 2019).

Challenges: The results of the study identified the most critical challenges as inadequate technological infrastructure (97%), internet problems (94%) and low bandwidth. The findings are similar to those of Odeyemi (2019) who conducted a study on robots in academic libraries in Nigeria which revealed that unreliable power supply, inadequate technology infrastructure, and technical skills, negative attitude towards advanced automation, lack of senior management support, technophobia faced by academic libraries were the major challenges encountered by users in that country. Like most developing countries, electricity and power failures are problems experienced in Botswana. Hence, with such a scant ICT infrastructure how can Botswana libraries harness 4IR technologies?

Financial constraints (93%), electricity and power failure (92%), and insufficient digital literacy training (90%) were other challenges identified by respondents in this study. These findings again corroborate a recent study by

Tella *et al.* (2022) which identified several hurdles for libraries in Nigeria in the 4IR era including funding and financial constraints, inadequate expertise, limited power supply and frequent power outages, poor attitude of librarians toward new technologies among others. It is, therefore, vital for policymakers to actively seek solutions to these problems as failure to do so will hinder development and Botswana will continue to be a laggard. For instance, financial constraints have implications for the provision of 4IR infrastructure and staff training. Lack of exposure to 4IR international standards and intellectual property rights are other issues the current study identified. It is critical for librarians to be aware of international standards to motivate them to aspire to these, where relevant.

7 Conclusion and Recommendations

The purpose of this study was to assess the current digital transformation practices, prospects, and challenges of 4IR in libraries in Botswana and determine their role in national development. The study concludes that Botswana libraries are nowhere near to harnessing 4IR technologies as there is no evidence of the adoption of AI, Blockchain, robotics, big data, and 3D technology. It is also evident that even if Botswana libraries know where to implement 4IR technologies, they would not be utilised effectively and efficiently and institutions will not have maximum benefit from these technologies as the majority of the participants do not have the technological skills needed to manipulate 4IR technologies. On a positive note, the majority of the participants only had soft skills, which is also a good starting point for building a conducive working culture and productive workforce. The study further concludes that Botswana librarians are aware of and seem to appreciate the opportunities offered by 4IR technologies. Hence, practitioners and policymakers should advocate for the implementation of these technologies, the acceptance rate is likely to be high as the majority of the participants had a positive mindset toward 4IR technologies.

It is with a bleeding heart that the researcher concludes that Botswana libraries are not yet ready for 4IR technology implementation. This is based on the numerous challenges cited in this study including the lack of technological skills and the scarce technological infrastructure that does not support 4IR technologies. However, it is important to note that the disparity in technology implementation levels varies greatly among different types of libraries. This

shows that despite several initiatives by the Government of Botswana towards digital transformation, libraries in Botswana have a long way to go, in order to fit into 4IR era. Therefore, the chapter concludes with the words of Dr. Deonie Botha (2021: 6), Research and Innovation Specialist, National Library of South Africa: 'Fortunately, the 4IR has created an environment where reading and learning is no longer confined to a physical location but can be accessed in a highly personalised manner and according to the language preference of the client by means of one-touch'. So, Botswana libraries should use this opportunity and ride the bandwagon of digital transformation and 4IR to contribute towards research and national development by providing universal access to information and knowledge to all stakeholders at the right time in the right format and right language.

Based on the findings of this study and the author's own observations the following recommendations are put forward to overcome some of the challenges discussed in this chapter:

- **Allocate adequate budget for building a suitable technological infrastructure:** A robust ICT infrastructure, including high-speed Internet connection/bandwidth, high-performance computing facilities, and data services is necessary for digital transformation and reducing the digital divide, and this comes with a considerable cost.
- **Benchmarking with developed countries and providing new learning opportunities:** By benchmarking with developed countries, institutions should provide new learning opportunities to librarians to make them keep learning, unlearning, and relearning through continuous training.
- **Implementation of 4IR in Library School curriculum:** It is vital to provide the skills to future librarians that are required in the 4th IR era. The LIS curriculum offered by the University of Botswana, the Institute of Development Management (IDM) and other private training institutions should embed technical and practical skills such as SW programming, databased design and management, data analysis, machine learning and change management skills. Botswana Qualifications Authority (BQA) should monitor and review the LIS curriculum in various institutions to ensure that it suits the 4IR era.
- **Technology and digital literacy policy framework:** As most participants lacked the skills to fully fit into the 4IR era, libraries and parent institutions

should develop a digital literacy framework as a guide towards digital transformation.

- **Vigorous training of librarians:** There is a need for ICT training to equip librarians with skills to operate in the 4IR era. If the librarians do not know how to exploit 4IR technologies for improved information service provision, they cannot benefit from 4IR technologies to their fullest potential.
- **Government support:** To make technology, information, and knowledge accessible to everyone, the Government has a key role to play. Government should be committed to adequate funding for the required ICT infrastructure and high-speed telecommunication and Internet to overcome the digital divide and facilitate the adoption of 4IR to leverage economic development. 4IR international standards and policy implementation at the national level are critical. For example, the Maitlamo ICT policy should be reviewed and monitored to ensure that there is no digital divide and adequate ICT resources have been provided to all communities.

Further Study

The aim of the study was to establish a general view of the 4IR landscape in Botswana libraries. There is a need for further studies on specific types of libraries, such as academic libraries, public libraries, school libraries. This would give a comprehensive picture of each type of library in Botswana.

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Chapter 4

Sharpening the Digital Platform for Sustainable Virtual Learning in Higher Education in Ghana

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Abstract

The world is currently battling the worst pandemic, Novel Corona Virus (COVID-19). Coronavirus is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Although the use of virtual technologies for learning was already a reality in most Universities on specially designed courses, the current pandemic led virtual technologies to become a ubiquitous requirement for students to continue learning and for universities and teachers to continue teaching. Such a new paradigm led universities and teachers worldwide to change their ways of teaching in a very short period, which has led to both challenges and opportunities. Teaching means that others should be interested in learning something. This study critically examined the following issues: technological tools for e-learning, virtual classrooms and Gamification. It also examined the use of Virtual and Augmented Reality and Artificial Intelligence as learning tools. Recommendations are also made based on the findings to help universities to design and use modern technologies in the era of post-covid-19. One of the most challenging situations faced by those who are in contact with students is to be able to capture and retain students' attention, in such a way that they can assimilate the concepts and tasks proposed in the syllabus of the courses. Thus, all classroom experiences should be

analyzed and evaluated to be able to change strategies and implement innovative ideas that make the teaching-learning process more effective.

Keywords: Digital Platform, Virtual Learning, Higher Education, Technology, Ghana

1 Introduction

The world is currently battling the worst pandemic, Novel Corona Virus (COVID-19). Coronavirus is an infectious disease caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) It was first identified in December 2019 in Wuhan, Hubei, China. The current COVID-19 pandemic has forced companies, institutions, citizens, and students to rapidly change their behaviors and use virtual technologies to perform their working tasks. Although the use of virtual technologies for learning was already a reality in most Universities on specially designed courses, the pandemic led virtual technologies to become an ubiquitous requirement for students to continue learning and for universities and teachers to continue teaching. Such a new paradigm led universities and teachers worldwide to change their ways of teaching in a very short period of time, which has led to both challenges and opportunities. Teaching means that others should be interested in learning something.

With the growing concerns over COVID-19, many school districts have moved classroom instruction online for the foreseeable future. Some tools are recommended that may help make the transition to digital learning during these difficult times. These resources include general e-learning tools for educators, subject-based tools for students, and extensions to assist students with learning differences. Some of these tools are Age of Learning, Biteable, EdModo, Factive, FlipGrid, Kahoot, Nearpod, Padlet, Quizlet, Screencast-O-Matic, Seesaw, TesTeach, DocsTeach and Learn. Genetics (*E-learning Manual* 2020). Today's IT-intensive enterprise must always be on the lookout for the latest technologies that allow academic institutions to run with fewer resources while providing the infrastructure to meet today's and future student needs. Academic institutions will continue to adopt virtualization for many reasons: collections of inefficient servers can be replaced with fewer machines; software can be tested while isolated in harmless virtual partitions; and data centers can

gracefully (and virtually) conform to shifting work models, new technologies and changing corporate priorities.

The guiding objectives for this study are as follows:

1. To find out the technological tools for virtual classrooms
2. To establish technological tools for gamification
3. To ascertain the use of virtual and augmented reality as a learning tool
4. To ascertain the use of artificial intelligence as a learning tool

This chapter tries to review comprehensively the sustainable virtual technologies in Higher Education after Covid-19. This chapter is significant in different dimensions and it has dealt with the following: Technological tools for e-learning, Technological tools for virtual classrooms, Technological tools for Gamification, The use of Virtual and Augmented Reality as a learning tool and the use of Artificial Intelligence as a learning tool. Today's IT-intensive enterprise must always be on the lookout for the latest technologies that allow academic institutions to run with fewer resources while providing the infrastructure to meet today's and future student needs.

2 Technological Tools for E-Learning

Dyer (2019) mentioned that there is no shortage of strategies, techniques, and tools available to teachers who use formative instructional practice in their classrooms. She stated some technological tools for e-learning are AnswerGarden, Buncee, Dotstorming, Five Card Flickr, Flipgrid, Kaizena, Micropoll, Nearpod, Piazza, Quizalize, Remind, ShowMe, Spiral, Survey Hero, Verso and Voxer among others.

Oye, Salleh and Iahad (2012) conducted a study on e-learning methodologies and tools. They discussed three types of e-learning tools namely: curriculum tools, digital library tools and knowledge representation tools. Curriculum tools provide a systematic and standard environment to support classroom learning; their functions are particularly helpful in the initiation and selection stages; digital library tools facilitate effective and efficient access to resources to support exploration and collection while knowledge representation tools focus on formulation and representation.

The growth of e-learning leads to the creation of special authoring tools that help authors and fulfil the needs for easily creating courses. To create a proper course for e-learning, you need an authoring tool to facilitate this work; a program that helps you write using hypertext or multimedia applications and enables you to create a final application merely by linking together objects, such as a paragraph of text, and an illustration. In order to achieve this, Haghshenas, Khademi & Kabir 2012 categorized the authoring tools into unspecialized authoring tools (Microsoft PowerPoint, Flash, Front Page and Dreamweaver) and specialized authoring tools (Articulate, Adobe presenter/Captivate, GLO Maker) (Haghshenas, Khademi & Kabir 2012).

With the growing concerns over COVID-19, many school districts have moved classroom instruction online for the foreseeable future. Some tools are recommended that may help make the transition to digital learning during these difficult times. These resources include general e-learning tools for educators, subject-based tools for students, and extensions to assist students with learning differences. Some of these tools are Age of Learning, Biteable, Edmodo, Factile, FlipGrid, Kahoot, Nearpod, Padlet, Quizlet, Screencast-O-Matic, Seesaw, TesTeach, DocsTeach and 'Learn.Genetics' (*E-learning Manual* 2020).

Sánchez, Hueros and Ordaz (2013) investigated the factors that control the acceptance of the WebCT learning system among students of the faculties of Business and Education Sciences at the University of Huelva. The most noteworthy outcomes highlight the need to reexamine the first auxiliary model regarding the relations of specific factors, in spite of the fact that the creators likewise build up the significance of the immediate impact of specialized help on apparent convenience and saw value among the understudies. The researchers also approve that WebCT usage and acceptance are legitimately affected by perceived usefulness and indirectly by perceived ease of use. The discoveries in this investigation have inferences on the virtual learning systems managers at the University of Huelva, and for other tertiary institutions that use online tuition systems. This paper mirrors an absence of specialized help in which understudies need to utilize WebCT all the more productively and shows that instructional classes and specialized help for understudies must be broadened.

Lin and Wang (2012) proposed a research framework to investigate the relationship between perceived fit and system factors that can inspire learners in the continuous use of an e-learning system in merged learning instruction. As students have the face-to-face learning opportunity in communicating with

teachers, the examination targets exploring the basic highlights the e-learning framework can give in helping to learn. The study used the qualitative and quantitative approaches to gathering data from respondents. The findings revealed that information quality and task-technology fit to impact the validation of system acceptance. Perceived usefulness and system satisfaction have major influences on continuance intentions.

ŠUmak, HeričKo and PušNik (2011) conducted a systematic literature review of 42 independent papers, mostly published in major journals. Furthermore, in order to view the research context by combining and analyzing the quantitative results of the reviewed research studies, a meta-analysis of the causal effect sizes between common Technology Acceptance Model (TAM)-related relationships was conducted. The main findings of this study, which is the first of its kind, are: (1) TAM is the most-used acceptance theory in e-learning acceptance research, and (2) the size of the causal effects between individual TAM-related factors depends on the type of user and the type of e-learning technology. The results of the meta-analysis demonstrated a moderating effect for user-related factors and technology-related factors for several evaluated causal paths.

Martínez-Torres *et al.* (2008) conducted a survey on the technological acceptance of e-learning tools used in practical and laboratory teaching, according to the European higher education area. The objective of this research is to examine the Technology Acceptance Model (TAM) of web-based e-learning tools used in practical and laboratory teaching. The use of logical instruments to examine the utilization of Internet-based e-learning tools in scholastic settings is overlooked. E-learning tools are actually an up-and-coming topic as an effect of the new ideas introduced by the European Higher Education Area. Lifelong learning is the new pattern of learner-centred education. In this context, e-learning tools can represent an effective way of supporting this new movement in education. The research hypotheses derived from this model have empirically been confirmed using the responses to a survey on e-learning usage among 220 users. The results strongly support the extended TAM in predicting a student's intent to use e-learning and define a set of external variables with a significant influence on the original TAM variables. Surprisingly, perceived ease of use did not posit a significant impact on student attitude or intention towards e-learning tool usage. In this way, early assessment of e-learning material is viewed as fundamental to giving a structure to advance enhancements of the instrument.

Button, Harrington and Belan (2014) reviewed the literature on e-learning and information communication technology (ICT) in nursing education. The objective of the study was to examine primary research articles published between January 2001 and December 2012 that focused on the issues for students and educators involved with E-learning in preregistration nursing programs. The review highlighted that beginning preregistration nursing students required ongoing education and support surrounding nursing informatics. This would help empower students to advance and be furnished with the deep-rooted learning skills needed to give safe proof-based consideration. The review also acknowledged the expanded time and aptitude requests put on nurture instructors to adjust their present training systems and instructing techniques to consolidate E-learning. They further stated that E-learning is debatably the most important revolution to occur in nursing education since the transfer from hospital training to the tertiary sector. Changes in computer and information literacy for both students and educators influence the success of the implementation of E-learning into current curricula.

Building customized e-learning programs place high demands on design, programming skills, and time. An alternative to this can be a deployment of courses within learning management systems. One such system that has been gradually gaining worldwide popularity is Moodle (Modular Object-Oriented Dynamic Learning Environment), a course management system for online learning. Moodle is 'open source', allowing developers to tailor the system to individual needs. It also communicates extremely well with many web-based resources (Facebook, YouTube, Wikipedia, JClick, Hot Potatoes, etc.), allowing developers creativity and versatility. The design of Moodle is based on socio-constructivist pedagogy. This means its goal is to provide a set of tools that support an inquiry- and discovery-based approach to online learning.

Park (2009) conducted a study to analyze the Technology Acceptance Model in understanding university students' behavioral intention to use e-learning. A sample of 628 university students took part in the research. The outcome showed TAM to be a good theoretical tool to understand users' acceptance of e-learning. E-learning self-efficacy was the most important construct, followed by subjective norm in explicating the causal process in the model. Many colleges execute e-learning for different reasons. Clearly, the number of e-learning openings given by higher instructive foundations keeps on developing in Korea. However little exploration has been done to check the cycle of how college embrace and use e-learning. In the era of globalization of

goods and services difficulties in knowledge diffusion still remain. The effective exchange of experiences and skills is not guaranteed by the enormous potential of internetworking systems and devices. E-learning technologies represent a good opportunity to reduce the digital divide and to ensure faster and higher development trends. Several universities and companies are currently involved in using e-learning systems to provide a valid solution; this notwithstanding several problems related to e-learning activities remain open (Campanella *et al.* 2008)

Brady, Holcomb and Smith (2010) studied the use of different social networking sites in higher educational. The survey comprised graduate students enrolled in distance education courses using Ning in Education, an education-based social networking site (SNS), based on their attitudes toward SNSs as productive online tools for teaching and learning. The results of the study propose that education-based SNSs can be used most effectively in distance education courses as a technological tool for improved online communications among students in higher distance education courses. Distance education as a primary means of instruction is expanding significantly at the college and university levels. Simultaneously, the growth of SNS including Facebook, LinkedIn, and MySpace is also rising among today's college students. An increasing number of higher education instructors are beginning to combine distance education delivery with SNSs.

3 Technological Tools for Virtual Classrooms

Ekanan (2018) wrote on tools for the digital classroom. He stated that there is certainly no shortage of tech-based tools to use in the classroom. He examined some of the best eLearning tools, focusing specifically on those that are designed for encouraging, enhancing, and managing to learn such as Socrative, Scratch, Prezi, SelfCAD, Quizlet / Quizlet Live, Google Classroom, Adobe Spark Video, Khan Academy and Class Dojo. Today's world has been affected by the process of digitization, modern technology has taken over our lives on a daily basis, from shopping to bank transactions, to payment of bills (Abah 2019). What modern technology enables us to do is to introduce elements of gamification into the education process, which should improve student motivation and information retention, as well as their ability to do their own research and work in teams. It also allows for individualization of learning and encourages students to seek out the content that they like. Upon this background

Bartee (2016) put together a list of 12 digital tools for digital classrooms namely; Learn Boost, Moodle, ClassDojo, Cacoo, Pixton, VoiceThread, Socrative, Engrade, Top Hat, Trello, and Kahoot.

According to Falloon (2011), organizations have utilised an array of asynchronous online learning systems such as WebCT, Blackboard, Moodle, or InterAct to deliver course content to their students. This, in some cases, is enhanced by online discussion forums, synchronous one-to-one text-based chat, and break out rooms such as online cafés. Parker and Martin (2010) cited in Al-Nuaim (2012) states that ‘virtual classrooms are becoming progressively prevalent, as members can dialogue and sight each other through a webcam, use emoticons, and work together in break-out rooms all of which allow them to feel more related to one another’. Among the virtual classroom software options on the market, today are Elluminate, Webex, Adobe Connect, Horizon Wimba and Centra. Freeware virtual classrooms include Wiziq and DimDim. The interactive nature of the virtual classroom addresses the main challenge of distance education.

Simon, Haghirian and Schlegelmilch (2003) studied the usage and effectiveness of virtual classrooms in the global marketing curriculum and empirically investigated the antecedents of successful teaching in such an environment. The study is grounded on case instruction activities involving up to three university classrooms in different countries. In all, 90 students partook in the combined teaching sessions. The study offered was done in four countries (Spain, Austria, France and China) over a period of one year. The findings of the study indicate that teaching empathy and classroom communication have the highest effect on teaching efficiency in the virtual classroom. Global marketing education is embedded in an inexorably worldwide cutting-edge business environment. Strategic policies and advertising training are unequivocally impacted by these turns of events. New technologies are successfully implemented in university curricula to improve the effectiveness of teaching and the cooperation between universities in management teaching. Business practices and marketing education are strongly influenced by these developments (Simon, Haghirian & Schlegelmilch 2003).

Potts (2019) conducted a case study to understand profoundly gifted students’ perceptions of virtual programs. The partakers for this study were 5 profoundly gifted students who were registered in a fully virtual writing course held by a school that serves the profoundly gifted populace. Data was collected through focus groups on an online discussion board, individual interviews and

observations of synchronous sessions in their virtual classroom. The partakers said they preferred frequent interaction with the teacher and classmates, but expressed worry about the absence of social openings. While technical difficulties did occur, these were generally because of administrator mistakes or neglect of accessible tools. Finally, in relation to syllabus and training, the partakers saw little difference between brick-and-mortar and virtual classrooms, suggesting that for profoundly gifted students, the nature of the content and instruction exceeds the real factors of the learning environment. This information can be utilized either to improve online gifted training or make new programs, consequently enhancing chances.

Tomei (2011) states that online learning is the exemplification of applied innovation and ought to be coordinated into whatever number of degrees of the online educational program could be allowed. To get ready students for the future, instructors must take advantage of each chance to imbue the innovations their students will utilize at whatever point conceivable. Above all, instructors must recognize what works best in an online classroom circumstance, i.e., podcasting, interactive whiteboards, blogs, wikis, social networking, and virtual classrooms among others. With little dread of logical inconsistency, innovation has gotten pervasive, contacting almost every part of teaching and learning. Faculties at all stages of education continue to integrate technology into traditional classroom learning. Still, others are simply starting to investigate the genuine potential that different advances offer for expanding students learning results. When appropriately applied alongside sound course improvement standards, technology helps in the procurement of abilities required for understudies to get by in the complex, exceptionally mechanical data-based economy of the 21st century. Incorporating technology into classroom guidance envelops more than showing fundamental computing skill levels or utilizing technology for joints. Genuine innovation incorporation happens regularly on the side of four key segments of understudy learning: dynamic commitment, bunch cooperation, criticism, and replication of certifiable circumstances.

Berry (2019) studied the role of video and text chat in a virtual classroom on how technology impacts the community. The researcher interviewed 20 students in an online doctoral program and analyzed over 50 hours of footage from six online classes. Findings indicate that the video and text talk highlights of the virtual study hall gave chances for consistent connection and expanded understudies' commitment and feeling of network.

Virtual classrooms permit clients in a closed network to communicate through talk, text, and video. While virtual classrooms empower simultaneous online learning, little is thought about.

Universities are progressively going to online advancements to oversee, have and convey scholarly substance. Web conferencing programming is progressively used to have virtual classrooms where understudies and educators can meet simultaneously. There is a lot of variety in the sort of virtual classrooms accessible at the present colleges. A few foundations depend essentially on sound just classrooms, while some use the programming that considers members to transfer coordinated video notwithstanding sound Virtual classrooms normally additionally permit members to extend and share documents and to communicate through text chat. Virtual classrooms offer many benefits to distance learners. They allow interdisciplinary groups from numerous places to come together to work collaboratively and change ideas.

Harper (2018) conducted a study of review of empirical research on technology and teacher-student interactions. This review surveyed studies published in peer-reviewed journals between 2005 and 2016. Findings showed that studies examined two types of teacher-student interactions that technology influenced: (a) face-to-face interactions in traditional classrooms; and (b) online interactions in traditional and virtual classrooms. Technology advances cooperation among teachers and students during learning exercises, and instructors who utilized technology utilized it to boost their employment of procedures pointed toward encouraging learning and advancing students' investigation of substances. As technology gets ubiquitous in education, it is basic to comprehend the manners by which technology impacts cooperation among teachers and their students. Online education is quickly growing in admiration across the world. Teachers and professors fight to participate with and build evocative relations with online students in the same way as having face-to-face interactions with students, and without this serious module in place, online students report an absence of concentration, and thus, they produce a lesser excellent of work and report fewer general fulfilment. There is a mass of tools and approaches that can be used by the online teacher to build evocative relations with students and rise these fulfilment levels (Martin 2019).

Borba, de Souza Chiari and de Almeida (2018) undertook a study to analyze the role of digital technologies in two specific contexts: how teachers, tutors, and students play a role in creating collaborative digital educational material and how digital technologies themselves can play a role in teaching

distance learning courses. Data were formed from virtual observations in virtual learning environments and virtual interviews. The results emphasize that both highlighted roles are related. They change teacher and student characters and involvement in the virtual classroom, and an ‘agency of media’ emerges in online mathematics education. The effect of a classroom setting on the possibility of being caught cheating is likened between face-to-face classes and online classes (Cahn 2018). Gutiérrez-Esteban *et al.* (2016) conducted an evaluation of teaching design in synchronous virtual classrooms. The study was developed to evaluate teaching designs and procedures used in a course of the University Lecturer Training Plan at the University of Extremadura (Spain) called Virtual Learning and the environments in Synchronous Virtual Classrooms (SVCs). The training was given in three editions on different university campuses. The key discoveries pointed to the necessity to lessen both connection time and the number of tools used, the importance of the use of free software, and a positive valuation of the likelihoods and advantages of SVCs for teaching and for data collection in qualitative research. Digital change resembles a quick-moving tidal wave, with the digitalization of numerous strategic policies making new connections among organizations and clients and modifying the promoting scene. It is basic that undergrads gain an introduction to such front-line innovations and imbue the theoretical, request, basic reasoning, imagination, and integrative learning aptitudes expected to include an incentive in reality as we know it where machines will work close by human experts (Crittenden, Biel & Lovely 2019).

Pilgrim and Pilgrim (2016) present virtual reality as a tool for classroom literacy instruction. Building on the traditional use of images as a way to scaffold prior knowledge, the study extends this idea to share ways virtual reality enables experiential learning through field trip-like experiences. It indicates that the use of technology tools such as Google Expedition, Google Street View and 3D glasses offers a way for teachers to engage students with content. For the reading/language arts teacher, virtual reality tools may provide an affordable way to support students through visual and experiential scaffolding. Radovan and Kristl (2017) examined the acceptance and use of learning management systems (LMS) among higher-education teachers and the relation between their use of such systems and their teaching approaches in the context of online learning, following the community of inquiry framework. A total of 326 teachers at the University of Ljubljana completed a questionnaire. The findings revealed that the critical aspect of LMS acceptance by university

teachers is the immediate social influence at work, but the development of the learning process largely depends on the characteristics of the LMS tools and the perceived usefulness of the application.

Azhar and Iqbal (2018) undertook a study to assess teachers' perceptions on the effectiveness of google classroom. The qualitative research design (semi-structured interview method) was used in conducting the study with a sample of 12 higher education teachers who have applied Google Classroom for at least one semester in their classroom. The findings of the study revealed that teachers perceive it as only an enablement tool that can be used for document management and basic classroom management, without having a significant impact on teaching methods. The answers of the teachers specify that the lack of a user-friendly interface is the main reason for its inadequacy. They stated further that technology has become important in all phases of education yet educators have been unable to figure out which of the many available technological tools best fit their classroom practices. Google Classroom is one such tools that is free of cost and has gained popularity within a short span. Anekwe (2017) conducted a study on the impacts of virtual classroom learning on students of Nigerian federal and state universities. A descriptive approach was adopted to examine the impacts of virtual classrooms on students' learning. Virtual classrooms are technologically-driven classrooms that support self-directed and self-regulated learning. The study was carried out in two federal and two state universities in the South-East zone of Nigeria. The sample comprised 280 federal university students and 226 state university students given a total sample of 506 respondents. Stratified random sampling due to ownership (federal and state) was used. Other sample techniques used were; those students who have been involved in online programmes recently and those currently in the programme. Students' consent was also sought before the selection. The results indicate among others that virtual classrooms have positive impacts on the students of federal and state universities, they reported positively on their continued support and preparedness for virtual classrooms. Based on the findings, the recommendation was that many more students should be made aware of the impacts of the virtual classrooms. They should also be motivated to participate more in virtual classrooms.

Martin and Parker (2014) studied why instructors adopt synchronous virtual classrooms and how they use them after their adoption. An electronic survey was administered asking instructors from various institutions to describe their experience adopting a synchronous virtual classroom in either a blended

or online course. In describing their reasons for adopting the technology, respondents most frequently cited institutional resource availability, increasing social presence, enhancing student learning, and the availability of technology. Along with audio chat, the features that most influenced the adoption of virtual classrooms and were used most frequently by respondents were the ability to archive conference sessions, see participants through webcams, and use text-based chat interfaces. Open-ended survey responses revealed that instructors used virtual classrooms to promote interactivity, develop community, and reach students at different locations. There were also distinct trends characterizing the demographics of faculty members who reported using virtual classrooms. These discoveries make available meaningful data for teachers interested in providing synchronous components in their online teaching. Virtual classrooms allow students and instructors to communicate synchronously using features such as audio, video, text chat, interactive whiteboard, and application sharing.

4 Technological Tools for Gamification

Dyer (2019) mentioned that Kahoot, Wordables, and Duolingo are some technological tools for gamification. According to Kiryakova, Angelova and Yordanova (2014) there are many tools for gamification. Some of them are web-based (cloud services) and do not require the installation of special software and allow access at any time and from any location. Among the most popular gamification tools are Socrative, FlipQuiz, Kahoot!, Duolingo, ClassDojo, Ribbon Hero and Goalbook. Gupta (2016) mentioned that it is sad that education by evasion is considered to be a non-gaming area whereas technology incorporation can actually make things interesting by adding a gaming experience for kids to keep them engaged and also witnessing learning and teaching blooming. Tools such as KnowRe, ClassDojo, Socrative, MineCraft Edu, Play Brighter, Zondle, Virtonomics, Course Hero, Duolingo, Veri, Maven, Class Realm and Kahoot! can help you know more about gamification.

Gamification is progressively existing in the classroom, and it helps students to learn in a very simple and playful way. The use of gamification tools such as Brainscape, knowre, Cerebriti, Minecraft, Pear Deck, Kahoot!, Edmodo, Classcraft, CodeCombat, ClassDojo, ChemCaper, Quizlet, Toovari, Play Brighter, Quizizz, Trivinet, Arcademics and Genially can help students learn in a very simple way (*Essential Gamification Tools* 2020). Student engagement is very important. When students are engaged in a lesson, they pay

attention, ask questions, actively participate, and ultimately learn more. Students' engagement can be increased by using gamification apps, tools, and resources with your students. Students' engagement can be made possible by using gamification tools such as Socrative, Kahoot!, Play Brighter, Classcraft, Goose Chase, Minecraft, Breakout EDU and Quizizz (Lynch 2017).

Information technologies have constantly been progressing in recent years, and education systems cannot remain indifferent to these changes. Gamification is a promising line of research that provides many benefits to education, based on motivation, progressiveness, and instant feedback. Precisely, the motivation and the active role of students are key points to enhancing learning, which is one of the main challenges in education (Llorens-Largo *et al.* 2016). According to Chen (2014) gamification is the use of game and behavioral analytics, game mechanics, interactive media, and social networking to improve work performance and transform a business by engaging and training users to solve problems. Gaming techniques and strategies have been used in areas such as employee training programs, financial services websites, customer relationship management, project management, business intelligence, market research, online shopping, and education. The level of sophistication involved in the technology applied to these needs varies greatly. Garcia *et al.* (2019) undertook a study on gamified mobile experiences as smart technologies for tourism destinations to present gamified mobile experiences as valid tools to enrich the experience of tourists and to present the benefits provided to Destination Management Organizations (DMOs) by analytics tools integrated into gamified mobile experiences. The findings revealed that both DMOs and tourists can benefit from gamified mobile experiences. The integration of analytics tools to gain insights into the behaviour of tourists can be a relevant information source for DMOs. The findings confirm that personalizing a product through a gamified interface might have a positive impact in terms of experience during the process but also on patronage intentions. The rise of smart technologies is progressively grabbing the eye of scientists and professionals, particularly in retailing settings.

Villagrasa *et al.* (2014) describe the utilization of gamification and visual advances in a classroom for higher education, specifically for university students. The objective is to accomplish a significant increment in student inspiration and commitment using different technologies and learning techniques dependent on game mechanics called gamification. Gamification is utilized to draw in students in the learning cycle. This examination includes

learning procedures like Learning by Doing to students' collaborative work, and mixes teacher support with new, accessible technology, for example, virtual reality and perception 3D on the web on account of WebGL. This makes another management tool, called the Gamified LABORatorieS (GLABS), to aid the gamification of the classroom. Understanding the part of gamification and technology in training implies understanding under what conditions game components can drive an understudy's learning conduct with the goal that the person may accomplish better outcomes in the learning process.

Almeida and Simoes (2019) conducted a study to analyze the role of emerging technologies like serious games and industry 4.0 in the transformation of education 4.0 in higher education. A qualitative methodology was employed based on 25 case studies of innovative projects in Portuguese higher education institutions. The results indicate an outstanding adoption of serious games and gamification approaches only appear in less than 20% of the projects. It was additionally conceivable to recognize that most activities include a few partners, for example, teachers, students and college directors, and normally include multidisciplinary skills fields. The main benefits brought to the education context include greater involvement of students in projects, development of their skills and its application in a real context. Then again, the principle challenges are the improvement of this present reality made by these applications, the troubles innate to their incorporation in the didactical framework and the restricted abilities to offer more noteworthy intuitiveness without predefined outer boosts. The primary advantages brought to the education setting remember more noteworthy association of students for ventures, improvement of their aptitudes and its application in a genuine setting. Education 4.0 is another instructive worldview that plans to address the necessities and possibilities of the fourth mechanical unrest. Education 4.0 expands on the idea of learning by doing, in which students are urged to learn and find various things in particular manners dependent on experimentation.

Su and Cheng (2015) investigated how a gamified learning approach influences science learning, achievement and motivation, through a context-aware mobile learning environment, and explains the effects on motivation and student learning. A series of gamified learning activities, based on MGLS (Mobile Gamification Learning System), was developed and implemented in an elementary school science curriculum to improve student motivation and to help students engage more actively in their learning activities. The responses from participants indicate that students valued the outdoor learning activities made

possible by the use of a smartphone and its functions. Pre- and post-test results showed that fusing versatile and gamification advancements into a botanical learning process could accomplish a superior learning execution and a higher degree of inspiration than either non-gamified mobile learning or traditional instruction. Further, they uncovered a positive connection between learning accomplishment and inspiration. The relationship coefficient for ARCS measurements and post-test shows that the ARCS-A (consideration) is more noteworthy than ARCS-R, ARCS-C and ARCS-S. This implies the consideration (ARCS-A) of this framework is a significant measurement in this examination.

Poncin *et al.* (2017) examined the impact of two gamification mechanics, challenge and fantasy, on customer experience and patronage intentions. The findings confirm that personalizing a product through a gamified interface might have a positive impact in terms of experience during the process but also on patronage intentions. This research also shows that solely adding gamification mechanics such as challenge and fantasy in a smart interface is not enough to significantly enhance the quality of the perceived experience. The emergence of smart technologies is increasingly catching the attention of researchers and practitioners, especially in retailing contexts.

McCoy, Lewis and Dalton (2016) studied a landscape review on gamification and multimedia for medical education. A total of 5 electronic games and 4 mobile applications were identified for preclinical training, and 5 electronic games, 10 mobile applications, and 12 virtual patient simulation tools were identified for clinical training. Nine additional gamified, virtual environment training tools not commercially available were also identified. All improved learning outcomes have demonstrated virtual patient simulations. Games have the potential to promote learning, increase engagement, allow for real-world application, and enhance collaboration. They can also provide opportunities for risk-free clinical decision-making, distance training, learning analytics, and swift feedback. Medical instruction is quickly advancing. Understudies enter clinical school with a significant level of mechanical proficiency and a desire for instructional assortment in the educational program. Accordingly, numerous clinical schools currently fuse innovation upgraded dynamic learning and mixed media training applications. Instruction games, clinical portable applications, and virtual patient reenactments are together named gamified preparing stages. Many published studies suggest possible benefits of using gamified media in the medical curriculum.

Llagostera (2012) contributes to the discussion on gamification by understanding the gamification phenomenon from the viewpoint of the convincing enquires it poses, both as a discursive term and as persuasive systems. Nowadays virtual reality (VR) technology gives us substantial prospects to change new approaches to enhance outmoded physical therapy withstand valuable amount and quality of therapy. VR tools, like Leap Motion, have received great attention in the recent few years because of their inestimable applications, which include gaming, education, medicine etc. The foremost impression of gamification of hand rehabilitation is to help change the muscle tonus and increase accuracy in signals using the chances that VR offer by making the therapy procedure more effective and encouraging for patients.

The utilization of educational technology has been improving in schools since the turn of the century. The current instructive educational program has been patched up to incorporate information, communications and technology (ICT). The inundation has either been an independent subject or injected into components of different subjects, most conspicuously in Science, Technology, Engineering and Mathematics (STEM). In some instructive technology research, it has indicated that the imbuelement of innovation has demonstrated differentiating results when it came to educating and learning. Moreover, with the issues, for example, trouble in getting to technology, instructor misguided judgment about technology utilization in study hall, and understudy separation towards learning in the classroom, we were unable to see the full degree of the instructive technology ability. Thus, this generates the presentation of games as an instructive apparatus; as it is connected with delight and is distant from its connection to work. With the implantation of innovation, it has created offshoots, for example, game-based learning, genuine games and all the more as of late gamification. As gamification alludes to the consideration of ‘gamefulness’ to existing frameworks instead of making a totally new game; subsequently prepares for simpler usage as an instructive device (Sanmugam *et al.* 2015).

Rachels and Rockinson-Szapkiw (2018) studied the effects of a mobile gamification app on elementary students’ Spanish achievement and self-efficacy. A quasi-experimental, pretest-post-test, non-equivalent control group design was used to examine the effect of a mobile gamification application on third and fourth-grade students’ Spanish language achievement and student academic self-efficacy. In this study, the treatment group’s Spanish language instruction was through the use of *Duolingo*®, a computer and mobile app that

uses gamification and adaptive learning technology to teach foreign languages. Students in the control group received their regularly scheduled English L1/Spanish L2 class learning activities. The study was 12 weeks in duration. Students were assessed with a 50-question, multiple-choice English to Spanish and Spanish to English pretest covering vocabulary and grammar to control for prior Spanish language achievement. Students were assessed with the Pattern of Adaptive Learning Scales' (PALS) Academic Efficacy subscale to control for prior academic self-efficacy. The same two instruments were used as post-tests. An analysis of covariance showed no significant difference in students' Spanish achievement or in academic self-efficacy between students who used *Duolingo*® and students who were taught with traditional face-to-face instruction. This demonstrates that *Duolingo*® is a useful tool for teaching Spanish to elementary students.

Oluwajana *et al.* (2019) studied the adoption of students' hedonic motivation system model in the gamified learning environment. The study addressed the perception and usage of the gamified learning environment from a hedonic motivation perspective by incorporating the Hedonic-Motivation System Adoption Model into Gamified Learning Environment. The results show that perceived usefulness, perceived ease of use, enjoyment and control all have a significant positive relationship with behavioral intention of use and focused immersion which indicates that the acceptance of Gamified Learning Environment could serve as a new educational tool to expedite the improvement of pedagogical and instructional technology. Also, increases students' motivation and engagement in learning. On the contrary, the study also found a negative relationship exists between enjoyment and focused Immersion. Llorens-Largo *et al.* (2016) undertook a study to get a customized student-centered learning model in which the student may have some autonomy. To achieve this goal, they proposed an innovative and adaptive gamified training model, *LudifyME*, which takes advantage of the benefits of gamification and has a strong technological component as a basis. Finally, as a case study, the researchers detailed *PLMan*, an online gamified system based on *LudifyME* in which a progressive prediction system of students' performance has been developed.

Kopcha *et al.* (2016) presented the course design and evaluative data associated with the learning experiences of practicing teachers engaged in a gamified approach to a graduate-level course on technology integration. Twenty-two teachers across three offerings of the course completed a survey examining their experience with the gamified course and course elements. The

survey mean scores were positive overall. Participants reported they were motivated by the gaming principles incorporated into the course, including the use of badges and awards and the opportunity to tailor course experience to their own interests. Participant responses to open-ended matters similarly revealed that recognition and autonomy were important aspects of their learning experience. The development of Smart Learning Environments is a complex software engineering process combined with pedagogical principles. Smart pedagogy requirements have advanced beyond the delivery of interactive-adaptive content, which in the past was delivered through single-media systems and applications, to complex multisensory experiences. Contemporary systems are designed to offer customized media-rich interactive scenarios often implemented over various media, featuring technologies that include augmented reality, virtual reality, and holograms. However, problems are introduced as the development process is complex and content experts often do not possess programming experience or application development knowledge (Deliyannis & Kaimara 2019). Kiryakova, Angelova and Yordanova (2014), state that today's learners are digital natives. They grew up with digital technologies. Teachers have to solve important issues related to the adaptation of the learning process toward students who have different learning styles and new requirements for teaching and learning. Gamification is one of the educational approaches and techniques that increase the motivation and engagement of learners.

5 Use of Virtual and Augmented Reality as a Learning Tool

Augmented Reality (AR) refers to a technology that gives the ability the user to sense the real world while interacting with virtual and physical objects. Mobile refers to the portability and usefulness of the application itself, thus mobile AR application can be referred to as a portable AR application. The real world can be enhanced by AR through the augmented virtual object into the real environment and providing some additional information for users (Tomi & Rambli 2013). Learning to play an instrument is challenging for both children and adults. Adding to this music education in K-12 oftentimes is subject to budget cuts (Serafin *et al.* 2017). Virtual reality (VR) and augmented reality (AR -- overlaying virtual objects onto the real world) offer interesting and widespread possibilities to study different components of human behaviour and cognitive processes. One aspect of human cognition that has been frequently studied using VR technology is spatial ability.

Kaufmann (2003) conducted a study on collaborative augmented reality in education. The research gave a brief insight into the potential and challenges of using collaborative Augmented Reality (AR) in education within the greater context of immersive virtual learning environments. Construct3D is based on the mobile collaborative AR system 'Studierstube'. The researchers described their efforts in developing a system for the improvement of spatial abilities and maximization of transfer of learning. Anecdotal evidence supports the claim that Construct3D is easy to learn, encourages experimentation with geometric constructions and improves spatial skills. Technological advances enable the use of innovative learning tools for education. Improvement in instructional practices through dynamic means of delivery remains a central consideration to technology educators. These technologies must simultaneously relate to course concepts while engaging and exciting students about technology. An emerging technology that has the potential to both engage and excite is augmented reality leading expert in the field (Thornton, Ernst & Clark 2012).

Tomi and Rambli (2013) presented the development of an interactive mobile augmented reality magical playbook for preschool children in learning numbers using old folklore literature, The Thirsty Crow, via mobile augmented reality application and interactive physical book interface design. By applying this concept to an AR storybook, the physical book (the real world) will be enhanced by augmenting the virtual object (3D models, animations, and sounds) viewed over a mobile device. Dută *et al.* (2011) gave an overview of virtual and augmented reality in dental education. The researchers provide an overview of the use of one of these modalities, virtual and augmented reality systems in dental education and discuss the strengths and weaknesses of these systems. The review suggested that the use of virtual and augmented reality technologies offers the advantages of the reinforcement of theoretical dental knowledge, correct use of dental instruments, ergonomic positioning, students' self-evaluation, faster acquisition of skills and positive student perception. In general, any disadvantages arise because most of the dental simulators that use virtual and augmented reality are in an early and experimental stage. It can be concluded that virtual and augmented reality systems will play an increasing role in dental education. These technologies are likely to change clinical training and encourage the use of reflective forms of assessment, which involve students in a self-assessment process to identify individual learning needs and self-directed learning. These innovations promise not only to lower costs of the educational process but also to increase quality by providing a new set of

pedagogical tools for dental schools. Clinical dentistry is a complex area for education. This is because the development of clinical competence requires the assimilation of knowledge combined with the acquisition of clinical skills and problem-solving ability. In recent years, a variety of computer-based modalities including intelligent tutoring systems, medical simulation, and virtual reality techniques and the development of Web 2.0 collaborative authoring and social networking tools have become available (Dutã *et al.* 2011).

Lavrentieva *et al.* (2020) undertook a study on the use of simulators together with virtual and augmented reality in the system of welders' vocational training: past, present, and future. The findings revealed that the simulators allow not only training but also one can build neuro-fuzzy logic and design automated and robotized welding systems. The functioning peculiarities of welding simulators with AR have been revealed. It is shown they make it possible to ensure the forming basic qualities of a future specialist, such as concentration, accuracy and agility. The psychological and technical aspects of the coaching programs for the training and retraining of qualified welders have been illustrated. Possible directions for the development of simulation training for welders were revealed. Among them, the AR technologies have been presented as such that gaining wide popularity as allow to realize the idea of mass training in basic professional skills.

Chien, Chen and Jeng (2010) conducted a study on an interactive augmented reality system for learning anatomy structure. The study aimed to use augmented reality (AR) technology to create an interactive learning system, which helps medical students to understand and memorize the 3D anatomy structure easily with tangible augmented reality support. The researchers speculate that by working directly with a 3D skull model with visual support and tangible manipulation, this AR system can help young medical students to learn the complex anatomy structure better and faster than only with traditional methods. Advances in virtual immersive and augmented reality technology, commercially available for the entertainment and gaming industry, hold potential for education and clinical use in medicine and the field of medical imaging. Virtual and augmented reality technologies are a novel means to communicate and have the potential for supplementing radiology training; communicating with colleagues, referring clinicians, and patients; and aiding in interventional radiology procedures (Uppot *et al.* 2019). Fonseca *et al.* (2014) investigated the relationship between student profile, tool use, participation, and academic performance with the use of Augmented Reality technology for

visualized architecture models. They described the implementation and evaluation of an experiment with Augmented Reality (AR) technology in the visualization of 3D models and the presentation of architectural projects by students of architecture and building engineering. It was revealed that the use of mobile devices in the classroom is highly correlated with motivation, and there is a significant correlation with academic achievement. However, the difficulty of using and generating content is a complex factor that suggests difficulty when implementing more complicated models.

Martín-Gutiérrez *et al.* (2015) conducted a study on augmented reality to promote collaborative and autonomous learning in higher education. The learning scenarios described in this work reach further than any previous approach. The connections between augmented reality (AR) and traditional learning based on textbooks through the well-known augmented books also known as ‘magic books’, are already there. However, they are restricted to just a few isolated uses that commonly take place on a PC showing 3D information with few actions in higher education. It was revealed that students feel comfortable about it and consider that tools are nice, easy, and useful, according to the goal of learning contents, training on performance, and design of installations and machines.

Ibáñez and Delgado-Kloos (2018), performed a systematic review on augmented reality for STEM learning. This study presents a systematic review of the literature on the use of augmented reality technology to support science, technology, engineering and mathematics (STEM) learning. It synthesizes a set of 28 publications from 2010 to 2017. Qualitative content analysis is used to investigate the general characteristics of augmented reality applications in STEM education, the instructional strategies and techniques deployed in the studies reviewed, and the evaluation approaches followed in the interventions. This review found that most augmented reality applications for STEM learning offered exploration or simulation activities. The applications reviewed offered a number of similar design features based on digital knowledge discovery mechanisms to consume information through the interaction with digital elements. Kose, Koc and Yucesoy (2013) undertook a study to improve educational processes in abstract or technical courses, by providing a mobile Augmented Reality (AR) tool. This tool is a mobile software system aiming to provide supportive, e-learning material for students. By using the tool, students can view 3D animations, and specially-made videos to have more ideas about a course subject, or have a chance to improve their knowledge of the related

course content. In order to achieve this, students are enabled to use a mobile device camera interface on special signs placed in course books or any other supportive, physical materials that are given by course lecturers. Additionally, it is also possible to watch course materials after focusing on some physical objects in the real life. Consequently, the software tool has aimed to ensure an effective learning experience by employing the advantages of mobile devices and forming interactive sessions between virtual and real environments.

Popel and Shyshkina (2018) discussed the prospects of augmented reality use as a component of a cloud-based environment. The findings indicate that it has been established that the experience of augmented reality using the systems based on cloud technologies already exists. However, the success of such a combination has not yet been proven. Currently, laboratory tests are known, while the experiment was not carried out under natural conditions in control and experimental groups. It is revealed that the attraction of augmented reality for educators requires the development of new methodologies, didactic materials, and updating and updating of the curriculum. VR and AR technologies have the potential to radically augment human cognitive abilities (Zap & Code 2016). Alkhatabi (2017) states that today, primary school teachers face challenges when dealing with digital natives. As a result of the explosion and rapid growth in information technologies that can be used in education, there are increasing demands to adopt technology in education, in order to influence students to learn actively and motivate them to gain an effective learning process. Augmented reality applications show good potential in giving students more active, effective and meaningful learning processes. Moreover, augmented reality attracts research attention for its ability to allow students to be immersed in real experiences.

6 Use of Artificial Intelligence as a Learning Tool

Jain *et al.* (2014) in their study described a tool coined as artificial intelligence-based student learning evaluation tool (AISLE). The main purpose of this tool is to improve the use of artificial intelligence techniques in evaluating a student's understanding of a particular topic of study using concept maps. The need of the hour in the present-day education environment is adaptivity. Adaptive educational systems aim to customize the content and learning paths of students. These aid in minimizing disorientation and cognitive overload problems; thus, maximizing learning efficiency. Present learning systems are

lacking adaptivity; as they offer the same resources for all users irrespective of their individual needs and preferences. Students learn according to their learning styles and determining these is a crucial step in making eLearning or traditional education adaptive. To determine learning styles, learning models have been suggested in the literature, but there is no readily available software tool that provides the flexibility to select and implement the most suitable learning model (Bajaj & Sharma 2018).

Mrówczyńska *et al.* (2019) conducted a study on the use of artificial intelligence as a tool supporting the sustainable development of local policy. The aim of the study was to determine the delimitation of the areas that exceed a permissible noise level around the sanatorium on the example of a health resort in Inowrocław. The determination of the exceedance of permissible noise levels allows us to develop directly effective local policy tools to be included in planning documents. In order to reduce noise infiltration, it is important to define environmental priorities. Taking into account their impact on the health of users in the protection area, environmental priorities enable us to introduce additional elements to street architecture. In order to properly manage space, in accordance with the idea of sustainable development, zones of environmental sensitivity – and their socio-environmental vulnerability—have been designated for assessing the damage (exceeding permissible noise in health facilities) and defining methods of building resilience (proper management). Thus, the study results in establishing buffer zones where it is possible to use varied land utilization in terms of form and function, as described in the planning documents. Such an activity would limit the spread of noise.

Digital technologies have already become an internal part of our life. They change the way we are looking for information, how we communicate with each other, and even how we behave. This transformation applies to many areas, including education. Many of the network data visualization tools or applications are designed and being applied in network data visualization systems which are particularly for users with advanced network knowledge even though the tools are indispensable to diverse computer users (Hooi-Ten Wong & Chai 2010). Bellemo *et al.* (2019) conducted a study on artificial intelligence using deep learning to screen for referable and vision-threatening diabetic retinopathy in Africa. The findings revealed that a total of 4504 retinal fundus images from 3093 eyes of 1574 Zambians with diabetes were prospectively recruited. Referable diabetic retinopathy was found in 697 (22.5%) eyes, vision-threatening diabetic retinopathy in 171 (5.5%) eyes, and

diabetic macular oedema in 249 (8.1%) eyes. The AUC of the AI system for referable diabetic retinopathy was 0.973 (95% CI 0.969–0.978), with corresponding sensitivity of 92.25% (90.10–94.12) and specificity of 89.04% (87.85–90.28). Vision-threatening diabetic retinopathy sensitivity was 99.42% (99.15–99.68) and diabetic macular oedema sensitivity was 97.19% (96.61–97.77). The AI model and human graders showed similar outcomes in referable diabetic retinopathy prevalence detection and systemic risk factors associations. Both the AI model and human graders identified a longer duration of diabetes, higher level of glycated haemoglobin, and increased systolic blood pressure as risk factors associated with referable diabetic retinopathy. Radical measures are required to identify and reduce blindness due to diabetes to achieve the Sustainable Development Goals by 2030. Therefore, one has to evaluated the accuracy of an artificial intelligence (AI) model using deep learning in a population-based diabetic retinopathy screening programme in Zambia, a lower-middle-income country.

The next-generation wireless networks are evolving into very complex systems because of the much-diversified service requirements, and heterogeneity in applications, devices, and networks. The network operators need to make the best use of the available resources, for example, power, spectrum, as well as infrastructures. Traditional networking approaches, i.e., reactive, centrally-managed, one-size-fits-all approaches, and conventional data analysis tools that have limited capability (space and time) are not competent anymore. A novel paradigm of proactive, self-aware, self-adaptive, and predictive networking is much needed. The network operators have access to large amounts of data, especially from the network and the subscribers. Systematic exploitation of the big data dramatically helps in making the system smart, and intelligent, and facilitates efficient as well as cost-effective operation and optimization (Kibria *et al.* 2018). Next-generation wireless networks must be able to support ultra-reliable, low-latency communication and intelligently manage the internet of things (IoT) devices in a real-time dynamic environment. Such communication requirements and mobile edge and core intelligence can only be realized by integrating fundamental notions of artificial intelligence (AI) and machine learning across the wireless infrastructure and end-user devices (Chen *et al.* 2017)

Anthony and Lashkia (2003) proposed a novel computer software tool that can assist in the understanding and construction of technical papers, by automatically identifying the structure of writing in different fields and disci-

plines. They tested the system using research article abstracts and is shown to be a fast, accurate, and useful aid in the reading and writing process. When faced with the tasks of reading and writing a complex technical paper, many nonnative scientists and engineers who have a solid background in English grammar and vocabulary lack adequate knowledge of commonly used structural patterns at the discourse level.

7 Conclusion

In the present new economy portrayed by modern change, globalization, expanded serious rivalry, information sharing and move, and data innovation upheaval, traditional classroom education or preparation doesn't generally fulfill all the necessities of the new universe of deep-rooted learning. Learning is moving from teacher focused to student-focused, and is undertaken anywhere, from study halls/classrooms to homes and workplaces. E-Learning provides people with a flexible and personalized way to learn. It offers learning-on-demand opportunities and reduces learning costs. E-Learning furnishes individuals with an adaptable and customized approach to learning. It offers learning-on-request openings and decreases learning costs. Equipped with serious data and correspondence advances, e-Learning is having an extensive effect on learning in the new thousand years.

The rapid growth of technology encourages teachers, especially those who teach English as a foreign language to use it while presenting material and giving instruction in the classroom. Technology, as the newest instructional media developed in this globalization era, presents a situation which helps the students to have new authentic and meaningful learning experiences engaging their effort and behavior by providing more fun and effective learning atmosphere. In addition, it provides the opportunity for the students to work collaboratively and easily access the information that can supplement their learning experience. Those benefits become the central part of 21st-century education which should be optimized in order to create sophisticated learning immersion and maximize the quality of students in the future. Some media technologies such as Prezi as an online software presentation, Glogster as a visual online poster, Edmodo as an online networking application, Toondoo as online cartoon strip making and Goanimate as animated video creation, are known as web-based instructional media which can be used to teach English as a foreign language, are introduced to one hundred student-teachers having Technology Enhanced Language Learning class.

Indeed, e-learnig has become undeniably significant learning and showing a mode in ongoing decades and has been perceived as a proficient and successful learning technique. The speedily rising number of Internet clients with smartphones and tablets around the globe has upheld the spread of e-learning, in advanced education and professional preparation as well as in essential and optional schools. E-learning and traditional distance education approaches share the emphasis on ‘any time, any place’ learning and the assumption that students are at a distance from the instructor. The plan of the underlying e-learning courses would in general reproduce existing separation training practices dependent on content conveyance. Be that as it may, the literature seems to indicate that long literary talks were plainly not reasonable for the online condition.

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Chapter 5

Attitudinal and Motivational Factors as Correlates of Digital Resource Knowledge-Sharing Behaviour of Agricultural Researchers in South-West Nigeria

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Abstract

This study investigated attitudinal and motivational factors as correlates of digital resources knowledge sharing among researchers in agricultural institutes in South-Western-Nigeria. The study adapted the Theory of Reasoned Action (TRA) of Ajzen (1991) and focused on researchers in agricultural research institutions in South-west Nigeria. Using a total enumeration method, 421 agricultural researchers participated in the study. Data were obtained through a structured close-ended questionnaire. Collected data were subjected to descriptive and inferential statistics specifically regression at 0.05 level of significance. Findings revealed a significant relationship between attitude and digital resource knowledge sharing among the agricultural researchers. There was also a significant relationship between extrinsic motivation and digital knowledge resource sharing (DKRS) but there was no significant relationship between intrinsic motivation and DKRS. The study recommended that agricultural research institutions should expedite action in providing necessary motivation that could propel and increase digital resource knowledge sharing behaviour of agricultural researchers in their institutes.

Keywords: Digital Resource Knowledge, Agricultural research institutes, Agricultural researchers, Knowledge sharing behaviour, Theory of Reasoned Action, South-West Nigeria

1 Introduction

The use of the internet to achieve and enhance open access initiative towards making information easily accessible especially among academics and agricultural research institutes cannot be overemphasised. This has led to the dimensional increase of various digital resources in electronic formats. According to Mimbi and Bankole (2015); and Gray, Barnsley, Gagnon, Belzile, Kenealy, Shaw, Sheridan, Nji, and Wodchis (2018), access to various digital resources could have significant influence on the performance of staff in various institutes such as those in agricultural research institutes. Digital information resources refers to the various information stored in electronic format and cuts across e-journals, e-books, e-News, online database, e-libraries, and the like. In the recent global information society, their use is not new and has swept across the scholarly society because of its tremendous advantages over the print-based counterpart. Examples of such digital resources are The Essential Electronic Agricultural Library (TEEAL) and Access to Global Online Research in Agriculture (AGORA). These digital resources were developed to meet the information and knowledge sources and usage gaps that seem to exist between agricultural researchers in the developed and developing countries. According to Ogunjobi and Oyewusi (2014) and Obasuyi (2016), TEEAL and AGORA are examples of digital resources that are launched in 1999 and 2003 respectively to ease the access to numerous digital information sources that are offline and online to researchers in sub-Saharan Africa, including Nigeria. Other digital resources in the Sub-Sahara Africa are the International Network for the Availability of Scientific Publications (INASP), eIFL (Electronic Information for Libraries) and the Information Training and Outreach Centre for Africa (ITOCA) (Harle 2009).

The availability of digital resources for use in agricultural institutes can best explain the link between the digital society and agricultural development and in extension national development. According to Jubb (2008) and Harle (2009), although, the provision and availability of digital resources are elastic as provided above, its knowledge are however important for their successful usage. To this end, it is important that staff of agricultural institutes in Nigeria

is knowledgeable about the various digital resources that are made available for better use. Hence, the knowledge of the digital resources is very much important just as their availability. Due to the importance attached to digital resources and that its knowledge level varies across staff in any organisation or institute, there is need for digital resource knowledge sharing. According to Postolache (2017), such knowledge of digital resource can facilitate decision-making capabilities, build learning organisations (through a learning routine), stimulate cultural change and innovation and can also enhance staff performance in the various agricultural institutes.

The concept of digital resource knowledge sharing is best understood in terms of knowledge sharing and digital resource knowledge. Digital resources knowledge refers to the awareness, technical know-how and skills possessed by staff of agricultural institutes about the availability, access, search and ethical use of digital resources made available. On the other hand, knowledge sharing refers to the sharing of work-related knowledge and expertise with other members within one's organisation (Yi 2009; Appel-Meulenbroek, Weggeman and Torkkeli 2018). It involves a cognitive and behavioural process of individuals (Yeo & Marquardt 2015). There are two kinds of knowledge - explicit and tacit (Richtnér, Åhlström & Goffin 2014). Explicit knowledge are codified and written while tacit are not codified and hence resides in people. Tacit knowledge is more difficult to share than explicit knowledge (Hau, Kim, Lee & Kim 2013; van Wijk, Jansen & Lyles 2008). Digital resources knowledge is more of a tacit knowledge and its sharing could be facilitated when people share a common environment such as employees within an organisation (Nonaka & Konno 1998; Appel-Meulenbroek *et al.* 2018).

Hence, digital resource knowledge sharing refers to the process where individual employees in the agricultural research institutes share and/or seek digital resources knowledge; to or from other staff either through formal or informal collaborations. Huber (2001) noted that despite the importance attached to such knowledge sharing behaviour, employees fear to share the tacit knowledge and experiences they have accumulated as they feel they might lose their competitive advantage and their job because such knowledge gives them an edge over their fellow colleagues within and outside the organisation. However, Onifade (2015), on the contrary noted that employees in knowledge production organisation, agricultural research institutes inclusive share knowledge to an average extent. In addition, studies such as Mushi (2009); Mayekiso (2013); Maria (2014); Awodoyin, Osisanwo, Adetoro and Adeyemo (2016); Razmerita,

Kirchner and Nielsen (2016); revealed that only few of the staff in knowledge production organisation such as agricultural research institutes share knowledge.

Furthermore, several factors may be accountable for the disparities between employees who share as stated by Huber (2001) and those who do not share as stated by Onifade (2015); Mushi (2009); Mayekiso (2013); Maria (2014); Awodoyin *et al.* (2016); Razmerita *et al.* (2016). The works of Kulkarni Ravindran and Freeze (2006); Aris (2013); Opeke and Opele (2014); and Bello and Oyekunle (2014) revealed that factors such as attitudes, subjective norm, and perceived ease of use, perceived usefulness, facilitating conditions could explain human behaviour such as those related to digital resources knowledge sharing. Individual or personal factors of employees which include motivational factors could further influence the tendency to share knowledge in any organisation (Nov & Ye 2008). Sriratanaviriyakula and El-Den (2017) and Mohammad, Alajmi and Ahmed (2017) also attested to the significance of motivational factors in influencing knowledge sharing. Although, all these factors are important, the major focus of this study are attitudinal and motivational factors. The reason for this is that adapting the Theory of Reasoned Action (TRA) by Ajzen and Fishbein (1991) and Theory of Planned Behaviour (TPB) by Ajzen (1991), attitude of individuals could pose a major significant influence on certain human behaviour such as those related to digital resources knowledge sharing. In addition, Sriratanaviriyakula and El-Den (2017) and Mohammad *et al.* (2017) also noted that motivational factor is also a significant factor influencing knowledge sharing. Hence, the need for the adoption of attitudinal and motivational factor as influencing digital resources knowledge sharing among employees in agricultural research institutes.

Attitude refers to an individual's positive or negative feelings regarding a particular behaviour. In general terms, attitudes are expressions of evaluations or dispositions with respect to an attitude-object that range from positive (favour) to negative (disfavour) (Jowell 2005). They are formed through a process of individual subjective evaluation, involving a rational assessment of advantages and disadvantages, but also influenced by affective and emotional responses and related beliefs. According to Bock, Zmud, Kim and Lee (2005) and Alajmi (2011), attitude explains why employees in organisations share or hoard their knowledge. Also, Ajzen (1991); Crano, Cooper and Forgas (2010) and Nordin, Daud and Osman (2012) noted that attitude influences individual perception and plays a key role in regulating behaviours such as digital resource

knowledge sharing among employees in agricultural research institutes.

On the other hand, motivation is a drive or a need (Souders 2019) and it is classified into extrinsic and intrinsic motivations. While extrinsic motivations are to motivation that come from without and are directed to satisfy indirect or instrumental needs, for example the use of rewards to motivate staff to perform desired behaviours, and range from monetary incentives, to non-monetary awards such as promotions (Shanshan 2013). Intrinsic motivation is spurred from within by values provided directly within the work itself (Shanshan 2013). Whereas, some studies such as Kankanhalli, Tan and Wei (2005) and Razmerita *et al.* (2016) found positive relationship between motivation and knowledge sharing behaviour, He and Wei (2008) found no relationship. Saade, Nebede and Mak (2009) noted that motivation enhances increased knowledge sharing among colleagues and has significant influence on human behaviour and action such as, digital resources knowledge sharing. Although, various studies have noted the importance of attitude and motivation on human behaviour but very few have focused on their influence on digital resources knowledge sharing. In addition, little is also known about the level of influence of attitude and motivation on such human behaviour such as digital resources knowledge sharing. Furthermore, the several studies that focused on knowledge sharing focused on students, organisational studies which include those related to the faculties in academic institutions such as universities, among others. However, not much is known about agricultural research institutes. This study, therefore, investigated attitudinal and motivational factors as correlates of digital resources knowledge sharing among researchers in agricultural institutes in South-West Nigeria.

The rest of this chapter is structured as follows: the next section presents the literature review followed by the details of the methodological approaches adopted in the execution of the study. The next section presents the results and then a discussion of the findings. The conclusion and recommendations finalised the paper.

2 Literature Review

Knowledge sharing processes consist of either formal or informal structures of sharing knowledge (Cabrilo & Grubic-Nesic 2013; Reyhav & Te'eni 2009; Kakhkia, Hadadianb, Joyamec & Asl 2019). The formal structure includes sharing knowledge at meetings, workshops, and training activities while the

informal structure include the sharing of knowledge at thought rooms, during brainstorming, operational learning, etc. Thus, many personal or organisational factors do play major roles in influencing knowledge sharing behaviour among employees within an organisation such as digital resources knowledge sharing among researchers in agricultural institutes. Consequently, having noticed its importance on performance of employees and the organisation at large, there is a need for organisation and institutes which include agricultural institutes to provide various supports that could enhance knowledge sharing behaviour among their employees. Putting into consideration knowledge management theories, employees' intention to share knowledge could be influenced by several preconditions such as leadership empowerment, organisational climate, and motivational drives (Bergström & Garcia Martinez 2016; Kakhkia *et al.* 2019). In addition, studies such as Yang (2008); Yang (2010); Chen & Cheng (2012) and Kakhkia *et al.* (2019) have also proven that attitude is a major factor that influences knowledge sharing behaviour which cuts across the digital resources knowledge sharing among researchers in agricultural institutes. Also, Coelho & Augusto (2010); Hung, Durcikova, Lai & Lin (2011); Giancola (2014) and Kakhkia *et al.* (2019) have stated that motivational factor is a major factor that could influence knowledge sharing among employees, such as digital resources knowledge sharing among researchers in agricultural institutes.

In addition, Schepers & van den Berg (2007); Wahyuni (2013); Wang & Noe (2010); and Kakhkia *et al.* (2019) noted that organisational climate which could cut across an organisation providing a knowledge sharing and motivating climate for employees to share knowledge is also an influencing factor to knowledge sharing behaviour among employees in any organisation which also include digital resources knowledge sharing among researchers in agricultural institutes. Despite these, little is known about digital resources knowledge sharing among researchers in agricultural institutes and to what level would attitude and motivational factors influence digital resources knowledge sharing among researchers in agricultural institutes. In the above background, this study investigated the attitudinal and motivational factors as correlates of digital resources knowledge sharing among researchers in agricultural institutes in South-west Nigeria.

3 Research Framework

The study adapted the Theory of Reasoned Action (TRA) of Ajzen (1991). TRA is known as a social psychology model that seeks to explain selected factors

that influence human behaviour. This theory is widely used by different scholars to determine the intention of human behaviour such as the digital resources knowledge sharing among researchers in agricultural institutes. TRA postulated that the intention of an individual to perform certain behaviour such as digital resource knowledge sharing among researchers in agricultural institutes could be influenced by positive attitude and social norms. Attitude is defined as the disposition to respond favourably or unfavourably towards a behaviour (Ajzen 1991). Social norms is the degree to which an individual perceives how others approve the individual's participation in a specific behaviour such as digital resource knowledge sharing among researchers in agricultural institutes (Bock, Zmud, Kim & Lee 2005). TRA presents that employees attitude and social norms could influence the intention to share knowledge. Hence, from the TRA, the study formulated its own model as presented in Figure 1. From the research framework presented in Figure 1, it is assumed that attitude of researchers in agricultural research institutions in South-Western Nigeria could influence knowledge sharing behaviour. To buttress this, Ajzen and Fishbein (1991); Ajzen (1991); Bock *et al.* (2005); Alajmi (2011), Crano *et al.* (2010) and Nordin *et al.* (2012) noted that attitudes of respondents do have significant influence on actual behaviour such as digital resource knowledge sharing behaviour.

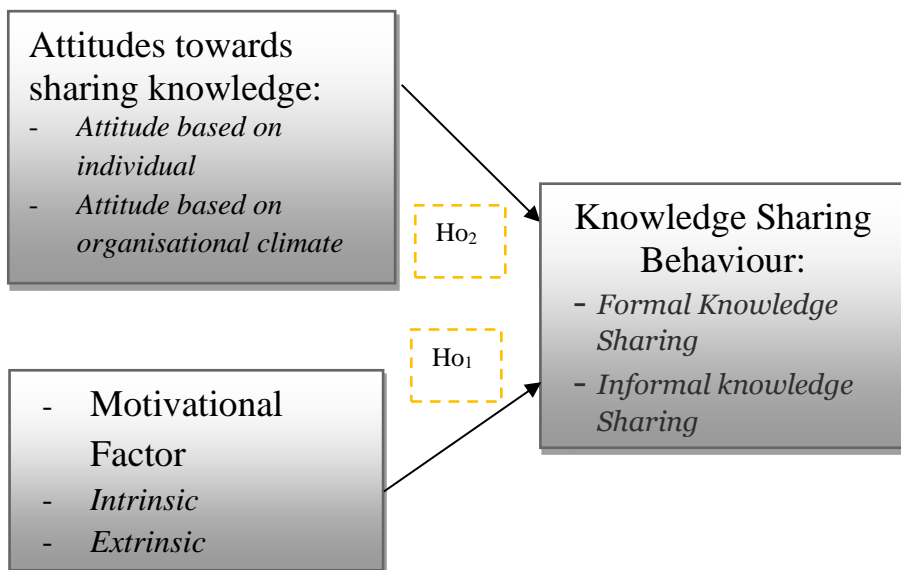


Figure 1: The Knowledge sharing model

The study hypothesised that:

Ho₁: There is no significant relationship between the attitudinal factors and digital resources knowledge sharing among agricultural researchers in South-West Nigeria

Also, Sriratanaviriyakula and El-Den (2017) and Mohammad *et al.* (2017) have demonstrated that motivational factors could also have significant influence on knowledge sharing behaviour such as digital knowledge resources knowledge sharing behaviour. Therefore, the study also hypothesised that:

Ho₂: There is no significant relationship between the motivational factors and digital resources knowledge sharing among agricultural researchers in South-West Nigeria

4 Methodology

The correlational survey design was adopted in this study and involved establishing relationship between and among variables of interest. The population of interest comprised researchers in agricultural research institutions in South-West geo-political zone of Nigeria. According to the Federal Republic of Nigeria, six (6) states are in the region Nigeria namely: Oyo, Osun, Ondo, Ogun, Lagos and Ekiti. There are 1,173 agricultural researchers in research institutions (comprising public and private universities and research institutions) in South-West Nigeria. Four hundred and twenty-one agricultural researchers from the agricultural research institutions have participated in at least one digital resource knowledge sharing programme. Table 1 presents the distribution of agricultural researchers in research institutions in South-West Nigeria.

Table 1: Agricultural research institutions in South-West Nigeria

S/N	Institution	State	No of Agricultural researchers	Sample
	Public Universities			
1.	Ekiti State University (EKSU)	Ekiti	54	37

2.	Ladoke Akintola University of Technology (LAUTECH)	Oyo	94	31
3.	Federal University of Agriculture, Abeokuta (FUNAAB)	Ogun	65	36
4.	Federal University Oye-Ekiti (FUOYE)	Ekiti	73	32
5.	Federal University of Technology, Akure (FUTA)	Ondo	158	32
6.	Obafemi Awolowo University, (OAU)	Osun	84	28
7.	University of Ibadan (UI)	Oyo	141	32
Private Universities				
8.	Babcock University (BU)	Ogun	35	30
9.	Bowen University (BOWEN)	Osun	37	23
10.	Wesley University (WU)	Ondo	25	25
Research Institutes				
11.	Forestry Research Institute of Nigeria (FRIN)	Oyo	90	30
12.	National Centre for Genetic Resources and Biotechnology (NACGRAB)	Oyo	65	25
13.	National Horticultural Research Institute (NIHORT)	Oyo	86	35
14.	Nigerian Institute for Oceanography and Marine Research (NIOMR)	Lagos	166	25
Total			1173	421

Source: Personal Contacts & ITOCA Nigeria Project Office (2019).

From Table 1, agricultural research institutions include seven (7) public universities, three (3) private universities and four (4) research institutes. The

population of researchers in each of the institutions is presented in Table 1. Fourteen (14) of the agricultural research institutions had current subscription to agricultural digital resources, TEEAL and AGORA; had hosted a digital resource knowledge sharing programme (training-of-trainers workshop) between 2014 and 2016; and had signed a Memorandum of Understanding with ITOCA to deliver digital resources knowledge training. Using a total enumeration method, the 421 agricultural researchers participated in the study.

A structured questionnaire was used to obtain data from the respondents. It was divided into three (3) sections as follows: Section A contained question on the demographic attributes of the respondents such as name of institution, department/unit, gender, age, work status, highest academic qualification and years of work experience. Section B centred on questions relating to digital resource knowledge sharing activities such as attendance of digital resources training, frequency of sharing knowledge, types of digital resource knowledge received, and modes of sharing digital resource knowledge. Section C measured attitudinal and motivational factors of the respondents. Variables are measured using the 5-point Likert scale of 1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, and 5 = strongly agree.

To establish the psychometric property of the questionnaire, content and construct validity were established by making sure that the items in the questionnaire fully captured the hypotheses and that the whole constructs or variables in the study were fully captured by the questionnaire. In addition, the questionnaire was administered to 30 respondents and subjected to a pre-test analysis using the Cronbach Alpha yielding a reliability coefficient of 0.76 for digital resources knowledge sharing, 0.75 for the attitudes of respondents and 0.73 for motivational factor.

Data collection was carried out between the months of June and December 2019. Both the Survey Monkey and paper formats of the questionnaire were used due to the busy schedule of the researchers. In administering the questionnaire, informed consent of the agricultural researchers' was obtained and confidentiality (protection of privacy) was ensured as information obtained was treated as anonymous during the presentation of the results. In all, a total of 386 copies of the administered questionnaire were returned, 262 in paper format and 124 electronically through Survey Monkey. After performing quality checks on the returned copies, 371 (88.1%) were found usable for analysis and 15 (3.9%) were found not fit for data analysis because of being incompletely filled. Both descriptive and

inferential statistics were performed on the data obtained. The inferential statistics involved the use of regression analysis to establish the relationships between variables of interest in the study which includes the relationship between selected factors and the digital information resource knowledge sharing among researchers in agricultural research institutions in South-West Nigeria.

5 Results

In this section, the results obtained from the study are presented starting with the demographic profile of the respondents. The demographic profile of the respondents revealed that males were higher in Obafemi Awolowo University (76.0%) and females were higher in National Centre for Genetic Research and Biotechnology (NACGRAB) (62.5%). Also, NACGRAB had the highest number of respondents between the age brackets of 20 and 29 years (12.5%), followed by Federal University of Agriculture Abeokuta (FUNAAB) (12.1%) and Babcock University (BU) (12.0%). Wesley University (WU) (63.6%) and Forestry Research Institute of Nigeria (FRIN) (63.6%) had the highest percentage of those between the age brackets of 30 and 39 years and Ekiti State University (EKSU) (25.0%) lowest. The highest number of Assistant Lecturer/Lecturer was found with WU (86.4%) with EKSU having the lowest (28.1%). BOWEN (61.9%) has the highest Lecturer I/Senior Lecturers and lowest in WU (13.6%). EKSU had the highest (21.9%) number of Reader/Professor respondents but BU had the lowest (4.8%). Also, FRIN had the highest number of Research/Senior Research Officers and National Institute of Oceanography and Marine Research (NIOMR) had the highest number of Principal/Chief Research Officer.

Furthermore, FRIN had the highest number of Bachelor degree holders (31.8%) with FUNAAB having the lowest (3.0%). WU had the highest number of Master's degree holders and the lowest was found in Ladoke Akintola University of Technology (LAUTECH), while M.Phil. degree was more in Federal University of Technology Akure (20.7%) and least in WU (4.5%). However, LAUTECH had the highest number of researchers with PhD degrees (67.9%) whereas FRIN had the lowest (4.5%). Moreover, Federal University Oye-Ekiti had the highest number of respondents with 1-3 years of working experience, FRIN was highest for the 4-6 years working experience, NIOMR had the highest number (38.9%) for the 7-9 years working experience. Also,

National Horticultural Institute, had the highest number of respondents with 9-11 years working experience and EKSU had the most (53.1%) number of respondents with more than 11 years working experience.

5.1 Attitude of Agricultural Researchers towards Digital Resource Knowledge Sharing

Table 2 reflects the frequency, percentage, mean and standard deviation scores of the items that best describe the respondents' attitude towards digital resources knowledge sharing.

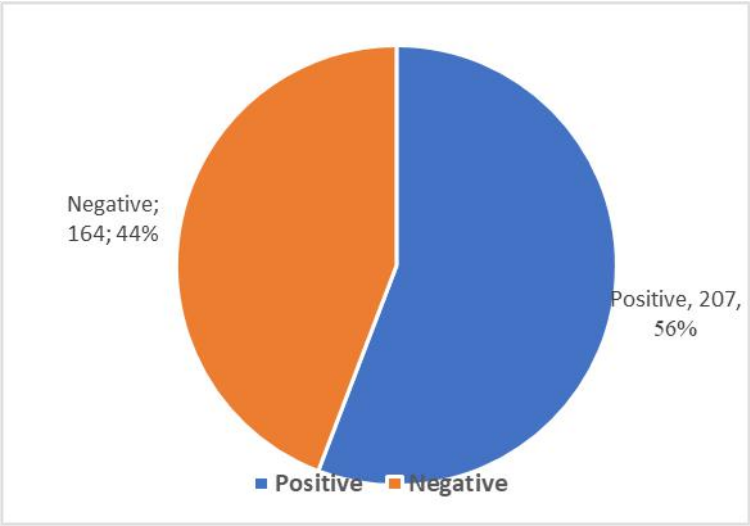
Table 2: Attitude towards digital resources knowledge (DRK) sharing of researchers

	SD	D	U	A	SA	Mean	S.D.
Sharing DRK with colleagues is good	0 (0.0)	2 (0.5)	3 (0.8)	165 (44.5)	199 (53.6)	4.54	0.59
Sharing DRK with colleagues is wise	0 (0.0)	0 (0.0)	7 (1.9)	173 (46.6)	191 (51.5)	4.50	0.54
Sharing DRK with colleagues is pleasant	0 (0.0)	2 (0.5)	4 (1.1)	185 (49.9)	180 (48.5)	4.46	0.55
Sharing DRK with colleagues is valuable	1 (0.3)	0 (0.0)	8 (2.2)	199 (53.6)	163 (43.9)	4.41	0.56
Sharing DRK with colleagues is harmful	212 (57.1)	44 (11.9)	4 (1.1)	41 (11.1)	70 (18.9)	2.23	1.64

Source: Field data (2019).

The results displayed in Table 2 show that ‘sharing DRK with colleagues is good’ (\bar{x} =4.54, S.D=0.59) was the major attitudinal disposition of agricultural researchers. This is followed by ‘sharing DRK with colleagues is wise’ (\bar{x} =4.50, S.D=0.534) while ‘sharing DRK with colleagues is pleasant’ (\bar{x} =4.46, S.D=0.55) was next and then ‘sharing DRK with colleagues is valuable’ (\bar{x} =4.41, S.D=0.56) pleasant. However, the least attitudinal disposition was ‘sharing DRK with colleagues is harmful’ with (\bar{x} =2.23, S.D=1.64). It could therefore be deduced that a high number of agricultural researchers in this study have positive attitude towards digital resources knowledge sharing compared to those that hold negative disposition towards sharing knowledge. To further illustrate the attitudinal disposition profile of the respondents, Figure 2 is presented as follows:

Figure 2: Attitude towards digital resources knowledge sharing



Source: Field data (2019)

Fig 2 illustrates that a higher percentage of the researchers (56.0%) had positive attitude towards digital resources knowledge sharing whereas those with negative attitude are lower (44.0%). This result suggests that much could be done to improve the attitude of agricultural researchers towards digital resources knowledge sharing.

5.2 Test of Hypotheses

The results of the test of the two hypotheses formulated to drive the study are presented in this section starting with hypothesis one.

Hypothesis One

Ho₁: There is no significant relationship between the attitudes and digital resources knowledge sharing among agricultural researchers in South-West Nigeria.

The regression analysis result for hypothesis one is presented in Table 3.

Table 3: Regression analysis result for Hypothesis one

Model	Unstandardised Coefficients		Standardised Coefficients	t	Sig.	Remark	Hypothesis Decision
	B	Std. Error	Beta				
(Constant)	17.906	1.989		9.004	.000		
Attitude	.434	.087	.301	4.964	.000	Significant	Rejected
a. Dependent Variable: DRKSB							

Source: Field data (2019)

The result in Table 3 reveals that attitudes of respondents towards knowledge sharing influences their digital resource knowledge sharing ($p < 0.05$) showing that there is a significant relationship between the attitude towards knowledge sharing and digital resources knowledge sharing among agricultural researchers. This implies that the null hypothesis was rejected. The result further shows that the strength of the relationship between attitude and digital resources knowledge sharing is 30% which revealed that a unit increase of attitude of researchers towards digital resources knowledge sharing in agricultural research institutes in South-West Nigeria raises the propensity of actual digital resources knowledge sharing by 30%.

Hypothesis Two

Ho₂: There is no significant relationship between the motivational factors and digital resources knowledge sharing among agricultural researchers in South-West Nigeria.

The regression analysis result for hypothesis two is presented in Table 4.

Table 4: Regression analysis result for Hypothesis two

Coefficients ^a						
Model		Unstandardised Coefficients		Standardised Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	21.762	1.210		17.991	.000
	<u>Intrinsic motivation</u>	-.082	.051	-.079	-1.598	.111
	Extrinsic motivation	.156	.056	.143	2.806	.005
a. Dependent Variable: DRKSB						

Source: Field data (2019).

The result in Table 4 shows that only extrinsic motivation is significant ($p < 0.05$) but the intrinsic motivation was not significant ($p > 0.05$). This implies that when agricultural institutes provided necessary rewards for knowledge sharing, employees tend to be motivated to share digital knowledge resources among other employees. In addition, the rate at which such relationship occurs is 14% implying that an increase unit of the necessary rewards provided by agricultural institutes, would create an impetus of 14% propensity of digital resource knowledge sharing among the employees.

6 Discussion of Findings

The findings revealed that attitude towards knowledge sharing does influence digital resource knowledge sharing among agricultural researchers in agricultural research institutes in South-West Nigeria. The finding bolsters the findings from the works of Ajzen and Fishbein (1991); Ajzen (1991); Bock *et al.* (2005); Alajmi (2011); Yang (2008); Yang (2010); Crano *et al.* (2010) and Nordin *et al.* (2012); Chen & Cheng (2012) and Kakhkia *et al.* (2019) that attitude of employees is a major influencing factor to be considered on actual knowledge sharing behaviour of employees in organisations. Also, there is a significant relationship between extrinsic motivation and digital resource knowledge sharing among agricultural researchers in agricultural research institutes in South-West Nigeria. However, there was no significant relationship between the intrinsic motivation and digital resource knowledge sharing among the agricultural researchers in agricultural research institutes in South-West Nigeria. Thus, the provision of certain motivational incentives by the institutes provided necessary impetus for employees to share digital knowledge resources among other employees. This supports the works of Nov and Ye (2008);

Sriratanaviriyakula and El-Den (2017); Mohammad *et al.* (2017); Bergström & Garcia Martinez (2016) and Kakhkia *et al.* (2019) that motivation is an important factor influencing knowledge sharing behaviour.

In addition, the findings of this study concur with that of Shanshan (2013) that when organisation use rewards as an extrinsic motivation to motivate staff to perform desired behaviours which include monetary incentives, to non-monetary awards such as promotions, it motivates employees to share knowledge such as digital resources knowledge sharing among agricultural researchers in agricultural research institutes in South-West Nigeria. This also supports the findings of Kankanhalli *et al.* (2005); Saade *et al.* (2009) and Razmerita *et al.* (2016) who affirmed a positive relationship between motivation and knowledge sharing behaviour. However, the findings in this study contrast that of the work of He and Wei (2008) who found no relationship. This also supports the findings of Coelho & Augusto (2010); Hung, Durcikova, Lai & Lin (2011); Giancola (2014) and Kakhkia *et al.* (2019) that motivational factor is key to creating impetus on knowledge sharing among employees. The findings also prop up the works of Schepers & van den Berg (2007); Wahyuni (2013); Wang & Noe (2010) and Kakhkia *et al.* (2019) that when organisations provide knowledge sharing and motivating environment for employees, it tends to influence knowledge sharing behaviour among employees in any organisation.

7 Conclusion and Recommendations

In conclusion, attitudinal and motivational factors to share knowledge do have a significant influence on digital resource knowledge sharing among agricultural researchers in agricultural research institutes in South-West Nigeria. In addition, when an organisation provides a knowledge sharing and motivating climate for employees to share knowledge, it triggers the impetus for the motivation to share knowledge. This could include extrinsic motivation such as monetary incentives and non-monetary awards and rewards such as promotions. Hence, organisational intervention is very important to make employees of agricultural institutes share knowledge. Based on the findings, the study recommends that:

1. Agricultural research institutions in South-West Nigeria should expedite action in providing necessary motivation that could propel and increase

- digital resource knowledge sharing behaviour among agricultural researchers,
2. Owing to the challenge of inadequate training on digital resource knowledge sharing in the research institutes, the institutes should provide necessary trainings that are directed towards enhancing the attitudes of agricultural researchers towards knowledge sharing.
 3. In addition, a wide array of relevant workshops that could make it possible for the agricultural researchers to share their knowledge and experiences in the use of digital resources should be organised.

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Chapter 6

The Influence of Contextual Factors on Electronic Resource Management in Academic Libraries in Ghana

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Abstract

Technological developments afford libraries the opportunity to remain relevant by being dynamic in their service delivery. In today's digital age, academic libraries worldwide including those in developing countries are increasingly making available electronic resources to their users. In Ghana, academic libraries have redefined their services to incorporate electronic resources (ERs) through various means such as consortia models and institutional repositories. As libraries provide more electronic resources, managing them effectively becomes crucial to their survival. Electronic resource management has consequently become a core function of libraries which libraries even in advanced countries are struggling to effectively implement. Challenges may be more pronounced in developing countries such as Ghana which are characterised by scarcity of resources. Academic libraries in Ghana appear ineffective at managing ERs. There is a lack of understanding on the factors surrounding electronic resource management. This chapter therefore explores the contextual factors affecting the management of electronic resources in academic libraries in Ghana. The study adopted a multiple case study approach, involving two public and two private universities in Ghana, and the library consortium. Using semi-structured interviews, data were collected from twenty-four library staff and three consortium executives. Collection development policies of case libraries were also analysed. The findings revealed enabling and hindering factors which were at the governmental and institutional levels. An enabling factor was cooperation with stakeholders whereas hindering factors included

inadequate policies, inadequate funding, inadequate infrastructure, inadequate skilled personnel, institutional management structure, communication gaps, low institutional commitment and low usage of electronic resources. The research provided recommendations and suggested that if hindering factors are adequately addressed, electronic resource management in academic libraries in Ghana could be successful which would encourage maximum usage of these resources thereby enhancing the image of the library and the educational sector to promote national development.

Keywords: Academic libraries, electronic resources, electronic resource management, Ghana,

1 Introduction

Technological developments afford libraries the opportunity to remain relevant by being dynamic and able to redefine their operations, collections and services to meet the changing information needs of users. Electronic resources (ERs) have become important tools for providing library services to users (Mukhtar & Maidabino 2021). In this twenty-first century, academic libraries worldwide including those in developing countries are making available ERs to their users in various formats.

In Ghana, many academic libraries have redefined their services to incorporate ERs through institutional repositories (IR), open access and consortia models. Most libraries are reducing their budget for print collection and increasingly investing in ERs to provide better and efficient user services. Through their membership of the Consortium of Academic and Research Libraries in Ghana (CARLIGH) and IRs, these libraries are currently providing access to full text journals and various online databases (Asamoah-Hassan 2008; Kwafoa *et al.* 2014). ERs are generally defined as information resources that can be accessed through the computer including personal or mainframe computers and mobile devices (IFLA 2012). These resources come in various forms including e-databases, e-Journals, e-books, e-theses, e-data archives, e-manuscripts, e-maps, e-research reports, and e-bibliographic databases. ERs present academic libraries with several opportunities for providing faster and quicker access to information both locally and globally (Mukhtar & Maidabino 2021). They serve as gateways to information and knowledge providing support

for teaching, learning and research (Dadzie & Walt 2015). ERs have numerous advantages over print information resources. They are readily available without time and geographic limitations, provide simultaneous multiple user access and numerous searching strategies (Oza & Prajapati 2020; Pandey 2018).

Despite the opportunities presented by ERs, these resources have brought along a new set of challenges for libraries particularly in developing countries (Mukhtar & Maidabino 2021). As libraries provide more ERs, managing them effectively becomes crucial to their survival. ERs need to be carefully selected, acquired, implemented, reviewed and cancelled or renewed for maximum usage. Electronic resource management (ERM) has consequently become a primary function of libraries which academic libraries even in advanced countries are struggling to effectively implement. ERM has been identified as a challenging function which is exacerbated by the rapid growth of ERs (Mukhtar & Maidabino 2021). Researchers have pointed out a lack clarity in workflow that is available with print information resources. Issues that libraries are grappling with are in the areas of staffing, time management, and workflow (Bothmann & Holmberg 2008; Elguindi & Schmidt 2012). The selection, licensing, acquisition, implementation and renewal of ERs are becoming more sophisticated and challenging than ever (Blake & Collins 2010). Challenges associated with ERM may be more pronounced in developing countries such as Ghana where there are inadequate resources. Furthermore, academic libraries in Ghana appear ineffective at managing ERs. There is a lack of understanding on the factors surrounding ERM. Previous studies (Dadzie & Walt 2015; Kwafoa *et al.* 2014; Kwadzo 2015) have indicated that, academic libraries in Ghana are ineffective at managing ERs. Moreover, the contextual factors surrounding the management of these resources are not well-understood. This necessitates an exploratory investigation to understand these factors in order to recommend strategies for addressing them. This chapter contributes to LIS research on the subject. It also serves as a point of reference from which academic libraries, policy and decision makers in Ghana and other developing countries can draw lessons to formulate policies and develop practices to promote effective ERM which would encourage increased usage of these resources thereby enhancing the image of the library and the educational sector to promote national development. In addition, it provides advanced countries with a deeper insight to guide them in providing support to developing countries.

This research was guided by the following research questions:

1(a). What are the contextual factors surrounding the management of ERs in academic libraries in Ghana?

1(b). In what ways do these contextual factors affect the management of ERs?

The research was carried out in the context of two public and two private universities in Ghana. The public universities in the study sample were the University of Ghana (UG) and University of Cape Coast (UCC). The private case universities were Central University (CU) and Wisconsin International University College (WIUC). Details on the case institutions are provided in the methodology section of the chapter.

2 Review of Literature

As libraries build larger collections of ERs, they are faced with a number of issues and factors serving as enablers or hindrances to the management of these resources (Obidike & Mole 2018). This section presents a review of literature on the factors affecting ERM in libraries.

2.1 Factors Affecting Electronic Resource Management

ERM has gained a considerable attention in the LIS literature as it has become a core function of libraries which is complex in nature. The literature has revealed various opportunities that ERs can provide libraries. However, in the midst of these opportunities for dynamism are various issues and challenges that libraries need to surmount. Chawner (2004) in her study on new opportunities and new challenges for free and open source software identified various success factors including organisational culture, technical infrastructure, staff skills, software functionality and extent of available community support. She concludes the study by recommending professional training and development for staff to effectively take on new roles. Other researchers have revealed various factors affecting the management of ERs in academic libraries which include the nature of ERs (Abrams 2015; Anbu, Kataria & Ram 2013); lack of policies for ERs, inadequate funding (Horava & Levine-Clarke 2016), infrastructural constraints (Mukhtar & Maidabino 2021), and inadequate skilled staff (Wadekar & Nagarkar 2018).

2.1.1 The Nature of ERs

A major factor surrounding ERM as indicated in the literature stems from the nature of ERs. The main challenges in managing ERs are their rapid growth with different packages from various vendors and publishers; and various business models such as bundles, open access and partly open access. All these factors have a bearing on ER collection development in academic libraries (Anbu, Kataria & Ram 2013; Bothmann & Holmberg 2008; Elguindi & Schmidt 2012). In addition, instability associated with ERs has been highlighted in the literature as affecting the management of ERs. Issues include URL changes, IP authentication, and missing archival coverage (Abrams 2015; Yu & Breivold 2008; Dadzie & Walt 2015; Erb & Erb 2015).

2.1.2 Inadequate Policies for ERs

Collection development policies (CDPs) for ERs in libraries are of vital importance as they inform stakeholders about the ER workflow (Johnson 2009; Mangrum & Pozzebon 2012). The literature has identified inadequate policies for ERs as affecting ERM. Policies for ERs have not been given the due recognition in libraries worldwide particularly in developing countries. Most libraries in developing countries are yet to formulate policies or seldom revise policies for their ERs (Dadzie & Walt 2015; Mwilongo 2017). ERM practices are usually not guided by policies for various reasons including evolving ER workflows, and financial constraints (Pickett *et al.* 2011; Mangrum & Pozzebon 2012). Horava & Levine-Clark (2016) studied current trends in collection development practices and policies in North American academic libraries and revealed that some libraries did not have CDPs and that, an obstacle to the implementation of policies was the overly prescriptive nature of the policies. In Tanzania, Mwilongo (2017) revealed challenges of implementing policies for ERs in libraries including inadequate funding, poor infrastructure and inadequate skills. In Nigeria, researchers have indicated the lack of policies for ERM in academic libraries (Mukhtar & Maidabino 2021; Iroaganachi & Izuagbe 2018). Inadequate policies could translate into inconsistencies in ERM practices which would hinder effective ER services.

2.1.3 Budgeting and Funding

Finance is the bedrock of libraries without which libraries cannot function.

Funding is indispensable for the acquisition and maintenance of ERs and infrastructure, and capacity building (Mukhtar & Maidabino 2021). Authors have provided guidelines on budgeting for ERs in libraries. Conger (2004) pointed out that budgeting for ERs is a planning process beginning with the library's purpose or values, past and anticipated demands. Budgeting should be flexible to make room for unexpected expenditure (Conger 2004; Elguindi & Schmidt 2012). Budgeting for ERs also involves negotiation through costs and benefits, and pricing models. Pricing models available in the electronic environment include price per unit, price per user, price per use and consortia purchasing (Conger 2004). Adequate funding is needed to sustain library services if libraries are to remain relevant in this technological environment (Dadzie & Walt 2015). Research has revealed that whereas budgeting for ERs in the developed world is high, it has been a major challenge in the developing world. At the University of California San Diego Library, 65% of library funds were spent on e-resources (University of California San Diego Libraries, n.d.). Generally, funding for academic libraries in Africa is obtained from the budgets of parent institutions which may come directly from government subvention (Ubogu & Okiy 2011; Okojie 2010). Library funding is usually inadequate (Jan & Sheikh 2011; Dadzie & Walt 2015; Mukhtar & Maidabino 2021) hindering the acquisition of adequate ERs.

2.1.4 Staffing for ERs

The success of ER implementation is greatly determined by staffing (Abrams 2015). Staffing at the library has usually not kept up with ER staffing needs and responsibilities (Abrams 2015; Elguindi & Schmidt 2012). Staffing challenges indicated in the literature revolve around skills, training and staff strength. Researchers have pointed out the inability of library professionals to effectively manage ERs due to a lack of management and technical skills (Elguindi & Schmidt 2012; Mukhtar & Maidabino 2021). Bothmann & Holmberg (2008) highlighted the inefficiencies associated with understaffing for ERs. A survey by Okoye & Ugwuanyi (2012) on the management of ERs by cataloguers in Nigerian Federal University Libraries revealed that there were no ER librarians, and ER related functions including licensing, access set-up and link maintenance were either non-existent or at embryonic stages of implementation. With the rapid growth of ERs, the current trend in ERM has been collaboration between ER units and other units of the library (Abrams 2015; Wadekar &

Nagarkar 2018). The need for library professionals to constantly update their knowledge and skill base in today's rapidly changing technological environment has been highlighted (Mukhtar & Maidabino 2021).

2.1.5 Poor Infrastructure and Lack of Maintenance

To provide adequate ER services, ICT infrastructure such as computers, internet connectivity and other devices are needed for quick and easy access to the resources (Mukhtar & Maidabino 2021). The literature has highlighted infrastructural challenges such as inadequate computers, unstable internet connectivity and power cuts as hindering ER services in libraries. This challenge appears to be a significant factor in the developing world especially in African countries (Akussah *et al.* 2015; Dadzie & Walt 2015; Das & Achary 2014; Kwadzo 2015; Malemia 2014) and can be attributed to inadequate funding which makes acquisition of the state-of-the-art ICT infrastructure a challenge. Inadequate computers, networking challenges and poor power supply hinder training sessions and access to ERs in libraries (Manjack, Dangani & Fari 2019; Mukhtar & Maidabino 2021). Academic libraries in today's technological age need to improve upon their ICT infrastructure to accommodate ERs. In summary, the literature has identified various factors affecting the management of ERs in academic libraries which are the nature of ERs, inadequate policies, inadequate funding, poor infrastructure and lack of maintenance. Higgins (2017) reported that due to the factors and complexities surrounding ERM, libraries still find it difficult to withdraw their print counterparts of ERs. These factors and challenges generally appeared more pronounced in developing countries.

3 Methodology

In this chapter, a selection of findings from a larger case study is discussed. A case study is appropriate for studying a contemporary phenomenon over which the researcher has little to no control or when behaviours cannot be manipulated (Yin 2014). This study seeks to explore contextual factors affecting ERM which is a contemporary phenomenon thereby making the case study method appropriate. Multiple cases were adopted to facilitate cross-case analysis of the phenomenon in diverse settings, strengthen the results and produce more general findings thereby enhancing external validity (Benbasat, Goldstein &

Mead 1987; Yin 2014). Cases were selected based on both similarities and differences (Yin 2014). To ensure that similar findings were predictable, all selected cases were members of the Consortium of Academic and Research Libraries and Ghana (CARLIGH) and had a similar structure. However, selected cases differed in terms of age, resources, size and the fact that two institutions (the University of Ghana and the University of Cape Coast) were public institutions whereas two other institutions (Central University and Wisconsin International University College) were private institutions. UG is the oldest public university, largest and well-endowed in terms of ICT infrastructure and other resources whereas UCC is a comparatively less endowed public university. CU is the oldest, largest and well-endowed private university whereas WIUC is relatively new, less endowed in terms of resources, and smaller in size. These similarities and differences were meant to facilitate a cross-case analysis and to discover prevailing contextual factors in the diverse settings.

The research adopted purposive sampling technique (Patton 2002) to select library staff and consortium executives who held ER-related positions or were knowledgeable about ERs of the library. Also, a content analysis of collection development policies (CDPs) of the case libraries was conducted. Interviewees consisted of university librarians, heads of ERs and staff of ER units, heads of other units of the library. The Chair, ER Chair and treasurer of CARLIGH were also included in the study due to the significant role CARLIGH played in the management of ERs of the case libraries. A total of twenty-seven (27) semi-structured interviews were conducted and all the interviews took place in the offices of the interviewees. The interviewees from selected cases are outlined in Table 1.

Table 1: Number of Study Interviewees

Public Academic Library		Private Academic Library		CARLIGH
Institution	Interviewees	Institution	Interviewees	Interviewees
UG	8	CU	6	3
UCC	8	WIUC	2	

Qualitative data analysis procedures prescribed by Miles, Huberman & Saldana (2014) involving data gathering, data reduction, data display and conclusion drawing were adopted for this study. Prior to data analysis, the audio recordings

of interviews were transcribed to refine them into text to facilitate analysis (Miles, Huberman & Saldana 2014). Transcripts were uploaded to the qualitative data analysis tool NVivo version 12. The data were then coded by selecting segments and grouping them into categories to form concepts that provide insight, facilitate comparison and develop theory (Kaplan & Maxwell 2005). The research complied with ethical considerations relating to informed consent, confidentiality and anonymity (Bryman 2004). All sources were duly acknowledged. In addition, labels consisting of alphabets and Arabic numerals were used to represent the voices of interviewees for confidentiality and easy referencing to quotes. Table 2 below depicts the labelling assigned to interviewees.

Table 2: Labels of Study Interviewees

Institution	Label of interviewees	Range assigned to interviewees
UG	A	1 – 8
UCC	B	1 – 8
CU	C	1 – 6
WIUC	D	1 – 2
CARLIGH	E	1 – 3

4 Findings and Discussion

The study identified several contextual factors affecting the management of ERs in the case institutions which are mainly at the governmental and institutional levels. Considering that a factor can be an enabler or a barrier, these factors are presented as such based on their impact on ERM and usage.

4.1 Governmental Factors as Hindrances

Policies and decisions by the government served as obstacles to the availability of human and non-human resources required for effective ERM particularly in the public institutions. Suspension of recruitment in public institutions by the government to facilitate the management of public wage bill and stabilisation of the economy contributed to understaffing. Interviewees A1 and B1 highlighted the effects of government directives on staffing for ERs at UG and UCC respectively:

We are understaffed. When a staff retires, we are not able to fill the position immediately because they [institutional leaders] need government clearance. Without government clearance they cannot hire anybody. So, somebody leaves and their position is vacant and people will have to manage other people's job. (A1)

For a very long time there has not been employment. People have retired and there hasn't been any replacement and people have upgraded themselves, and we are just managing. (B1)

Due to the suspension of recruitment, ER staff were overburdened as they needed to take on extra duties to make up for the low staff strength. In addition, power rationing in the country resulted in frequent power outage. Ghana had been experiencing a persistent irregular and sometimes unpredictable power outage popularly referred to as 'dumsor' ('off-and-on' of electricity supply) (Ghana Web 2018). In the early 2019s, power rationing became more intense which led to the coining of a superior term 'dumsaa' ('indefinite off' of electricity supply). This negatively affected training sessions and hindered access to ERs of the library.

Thirdly, inadequate funding from government coupled with high inflation rate as highlighted by interviewees from the public case institutions lowered purchasing power and affected the acquisition and sustainability of ERs of the library. Contrary to the assertion made by Fullan (2007) in examining the role of government in educational change that governmental activities encouraged continuous advancements in education, government decisions and regulations as revealed in the findings appeared to have hindered the management of ERs.

4.2 Organisational Factors

The findings revealed several factors as enabling or hindering ER services in the case institutions. Organisational factors mainly revolved around resources, structures and activities in the institutions that impacted on ERM either positively or negatively. These factors include cooperation with stakeholders, policies for ERs, funding, infrastructure and sustainability, staffing, communication, institutional management structure, institutional commitment, and usage of ERs. These are presented and discussed in the following sub-sections.

4.2.1 Cooperation with Stakeholders as an Enabler

The findings revealed cooperation as facilitating ERM in the case institutions. Cooperation between the ER unit and non-ER units of the library eased the burden on ER units by relieving them of less technical tasks such as training sessions and providing user support to focus more attention on technical tasks including acquisition, licensing, access, maintenance and evaluation of ERs of the library. For instance, A2 and B2 who worked in non-ER units of the library revealed the ER-related roles they played:

I am part of a team made up of library senior members who assist the ER unit in running training programmes on ERs of the library for faculty and students. (A2)

Sometimes lecturers are not able to access contents and they get to me and I contact the ER unit or technical support unit to find out what the problem is. (B2)

Collaboration with users informed promotional activities by the library which boosted awareness of the ERs, attendance to training leading to increased usage of the resources. For example, C1 pointed out a collaboration with faculty in assessing students' usage of ERs of the library at CU.

I have contacts with the lecturers so I asked them to let us know the level of usage of ERs of the library by students in terms of research assignments but the feedback we received was that the students used one source of information, that is Wikipedia. That is all that they know. They don't know about any database. (C1)

Cooperation with other libraries and international agencies such as International Network for the Availability of Scientific Publication (INASP) and Electronic Information for Libraries (EIFL) through the Consortium led to cost reduction and promoted sustainability of ERs, capacity building, and advocacy for the library. B1 highlighted some of the benefits the UCC library had reaped by joining the consortium:

Being a member of CARLIGH has really helped otherwise we couldn't have afforded because the ERs are very expensive but thanks to

CARLIGH, when we come together, we are able to share the cost. Even that is not easy but at least it's been very manageable with CARLIGH. (B1)

Joining the consortium was perceived as promoting a level of standardisation of ER services in both the endowed and less endowed institutions. With the increased demands of the technological environment, cooperation becomes crucial for the survival of libraries (Hsiung 2008). Researchers (Delaney & Bates 2015; Massis 2016) have stressed the need for academic libraries to adopt cooperative ways in their service delivery to remain relevant to stakeholders.

4.2.2 Inadequate Policies for ERs as a Hindrance

The findings revealed the lack of ER policies at UG whereas at UCC, CU and WIUC libraries, their collection development policies (CDPs) had a section on ERs. However, the CDPs of the CU library had not yet been ratified at the time the study was being conducted. Analysis of the CDPs revealed that the policies on ERs were inadequate as vital contents were missing. ERM practices therefore, as confirmed by some heads of ER units, were to a large extent discretionary which led to the lack of clarity on ER workflow and hindered succession planning. This could result in inconsistencies in ERM practices. C2 for example had this to say when asked about policies for ERs of the CU library:

We have drafted a policy but we use 'voluntary' [discretionary] methods of managing the ERs. Something has been drafted but it's not yet approved. (C3)

The findings supported various viewpoints in the literature indicating that policies for ERs had not received the necessary attention in libraries (Dadzie & Walt 2015; Kaur & Walia 2016). However, university librarians and heads of ERs key revealed efforts to develop and revise ER policies. Policies play a critical role in effective ERM (Johnson 2009; Mangrum & Pozzebon 2012). It is imperative for academic libraries to develop well-documented policies for ERs for consistency in ERM practices (Johnson *et al.* 2012) and to promote clarity of ER workflow.

4.2.3 Inadequate Funding as a Hindrance to ERM

In an era where academic libraries particularly in developing countries are

challenged with recurrent budgetary constraints, it is proving difficult to maintain adequate services for academics that require access to quality information (Dadzie & Walt 2015; Kaur & Walia 2016). Findings from the interviews indicated that all four case libraries received internal funding from their institutions, which was largely inadequate. A3 for instance pointed out some of the challenges associated with budgeting for ERs at the Balme Library.

Funding is never enough, sometimes we start a subscription and then we would have to cease subscription because of payments. We never get half enough. We wish we could give our users more but because of financial constraints. (A3).

However, inadequate finance was more pronounced in the private universities as private universities did not receive funding assistance from the federal government. Inadequate funding lowered the purchasing power of the library hindering the acquisition and sustainability of ERs. The findings paralleled those of similar studies (Bothmann & Holmberg 2008; Kaur & Walia 2016).

Public and private case institutions adopted some measures to address financial constraints which included joining the library consortium, cancellation of subscriptions to ERs that were underused, and soliciting for more funding from institutional leaders. At the consortium level, inadequate finance hindered the operations of CARLIGH due to payment delays by members. CARLIGH however ensured sustainable funding to cover payment delays through conference fees, membership fees and support from external organisations including INASP and EIFL.

4.2.4 Inadequate Infrastructure and Lack of Sustainability as Hindrances

Both public and private case libraries faced infrastructural challenges which included inadequate computers, lack of training facilities, poor Internet connectivity coupled with frequent power cuts. However, situations appeared worse in the private universities due to acute financial constraints. University librarians and heads of ER units including B1 and C4 explained some of the infrastructural constraints being faced by the library in providing ER services:

We have a lot of problems with our network. Sometimes two to four days the network is not available. Sometimes in the morning, it works. In the afternoon it's very slow. It's a major challenge but the university is working on it. (B1)

From time to time we have Internet interruption. For example, the Business Library did not have Internet access for almost one month. (C4)

The findings were similar to related studies by Ani *et al.* (2016); Dukic & Striskovic (2015), and Kaur & Walia (2016). Providing adequate ER services entails investment for sustainability. There was evidence to suggest that case libraries were not able to adequately maintain and sustain ERs which manifested in dysfunctional computers and inability to maintain subscriptions to ERs. Lack of sustainability was linked to inadequate funding and low institutional commitment, and compared with Okogwu & Ozioko (2018). Infrastructural challenges generally appear to be a major issue in developing countries where academic institutions are challenged with budgetary constraints, high cost of ICT facilities, inadequate ICT skills and unstable power supply (Ani *et al.* 2016; Ukachi 2015; Thompson & Pwadura 2014). To provide effective ER services, the ability to maintain ERs and ICT infrastructure becomes crucial.

4.2.5 Inadequately Skilled Staff as a Hindrance to ERM

Research indicates that staffing greatly determines the success of ERM in libraries (Abrams 2015). The interview findings showed that all case institutions were challenged with inadequately skilled staff which increased the workload and responsibilities of ER staff. The findings paralleled related studies (Bothmann & Holmberg 2008; Kaur & Walia 2016). Contributing factors however varied according to the type of institution. In the public case institutions, suspension of recruitment by the government of Ghana, and an institutional policy of compulsory staff annual leave to address a high record of stress-related illnesses among university staff resulted in understaffing for ERs. In the private institutions understaffing was a result of the institution's suspension of recruitment to cut down on budget, and high attrition rate. Some interviewees had the following to say regarding staffing for ERs of the library:

We have staffing challenges at the ER section. For instance, when someone goes on leave, the unit has to make do with the available staff.

Recently, staff were compelled to go on leave due to institutional policies and we had just two-three people running the place. It's really a challenge. They run more hours than they normally would. (B3)

We have staffing challenges. In the last few months the library has lost three of its permanent staff and these are people who come, they get trained but get opportunities elsewhere and they leave. (D1)

In addition, responses from some interviewees including E1, C3, and A4 revealed inadequate training, and perceived gaps in LIS education in Ghana as contributing to inadequate skills among library staff:

Knowledge and skills are very important. Not many of us who manage ERs have ICT skills and other requisite skills. These are not taught at the library school. (E1)

Actually, we don't have training programmes for library staff over here. Nothing usually comes up. (C3)

I hardly attend training workshops for staff. We are usually excluded from training programmes and workshops. (A4).

Consequently, some library staff were unable to provide adequate user support. Strategies adopted by case institutions to address understaffing include prioritisation of tasks, and internal and external cooperation. However, some interviewees perceived the role of external parties such as CARLIGH in the ER workflow as contributing to a lack of clarity on ERM practices among library staff and this supported the views of Bothmann & Holmberg (2008).

4.2.6 Poor Communication as a Hindrance

ER staff need to regularly engage with stakeholders for effective ERM which would lead to maximum usage of ERs (Bothmann & Holmberg 2008; Green 2013; Ullah 2015). The interview findings revealed communication issues involving ER staff and stakeholders, particularly institutional leaders, other library staff, and users which affected ER services in both public and private case institutions. Communication with institutional leaders which entails

advocacy and demonstrating value (Bothmann & Holmberg 2008) was perceived as lacking and contributing to low institutional commitment to the needs of the library. Also, there appeared to be communication gaps within the library among library staff which resulted in a lack of clarity on ER services and consequently hindered adequate user support. This has been identified as most challenging for ER staff (Bothmann & Holmberg 2008). At the consortium level communication gaps between CARLIGH and members led to delays in implementing decisions and ultimately impacted on ER activities. Communication with users involves publicity, instruction and reinstruction on the use of ERs of the library (Bothmann & Holmberg 2008) which was revealed as inadequate in the case institutions. This often translates into lack of searching skills contributing to low usage of ERs of the library (Deans & Durrant 2016; Ani *et al.* 2016) which fuels low institutional commitment.

4.2.7 Centralised Management Structure as a Hindrance

The management structure adopted by the case institutions impacted on ERM practices. Private case institutions adopted a fundamentally centralised management structure whereas their public case counterparts operated a decentralised management structure. This determined the span of control of the library over the ER workflow. Public case libraries had a separate library budget, and a budget for ERs while private case libraries had no separate budget. Furthermore, non-library decision makers in the private case institutions oversaw aspects of the ER workflow, particularly the selection and acquisition of individual library contents, and the renewal of ER subscriptions. The consequences were that, private case libraries had less autonomy in the acquisition and sustainability of ERs and ICT infrastructure, lacked clarity on the aspects of the ER workflow that were controlled by institutional leaders. On the contrary, public case libraries had a level of autonomy in their ERM practices. Having a separate budget allowed the library to budget for the acquisition and sustainability of ERs, and ICT infrastructure. Also, less interception by institutional leaders promoted clarity on ER workflow among library staff.

4.2.8 Low Institutional Commitment

The interview findings revealed low institutional support as a major factor

hindering the management of ERs in the case institutions. Interviewees including C3 and A2 opined that appreciation of the role of the library and the value placed on ERs would translate into prioritisation of the needs of the library:

Actually, the logistics to work with, management are finding it hard to release money for it because they don't see how important the library is. That's the problem. (C3)

It's not just about the lack of budget but the commitment to give, seeing the need and working at it, knowing that the ERs are not for the library but for the general community because when we see it in that light, there will be a willingness to invest. (A2)

There was a perceived lack of interest and commitment by institutional leaders to the needs of the library which manifested in unwillingness to invest in the ERs of the library. In addition, the cost per use of model implemented by CARLIGH for sharing ER costs among members was perceived by the smaller member institutions as problematic which contributed to the low commitment of member libraries. As a way forward, E1 revealed the establishment of a committee to assess the various cost sharing models adopted by other consortia in Africa to assist CARLIGH in reaching a fair decision. There was a general consensus that Ghanaian leaders were not interested in libraries or information management. Allocation of insufficient resources and delays in providing support to the library hindered the sustainability of ERs in the case libraries which ultimately affected usage. The findings of low institutional commitment compared with Boamah & Liew (2017).

4.2.9 Low Usage of ERs of the Library as a Hindrance

Academic libraries expect faculty and students to make use of ERs of the library to enhance their academic output and performance, and to justify financial investments. Low usage of the ERs was a great concern for interviewees such as A3 and E1 at both the individual library and consortium levels:

Management are always using usage statistics for renewal and cancellation decisions and we end up punishing the few who are using cancelled subscriptions because people are generally not using it. (A3)

We are worried about low usage. Some institutions are not using these online databases effectively. It is an issue because these days, institutional leaders request for usage statistics before making funding available. (E1)

Preference for alternative sources of information and inadequate searching skills were perceived as the main factors contributing to the observed low usage of ERs of the library. Generally, low usage of ERs affected budgetary allocation for acquisition and sustainability of ERs of the library as institutional leaders were unwilling to invest in underused ERs. This, for instance, led to the cancellation of subscription to some ERs at UG although deemed relevant by certain users. The findings compared with related studies (Adeyoyin, Idowu & Sowole 2016; Cameron & Siddall 2015; Dukic & Striskovic 2015).

5 Conclusion

ERs have come to stay in our tertiary institutions due to their relevance and the opportunities they provide. Their management and usage present libraries with a number of issues to address. This research has identified various contextual factors affecting ERM in selected academic libraries in Ghana. The factors were identified at the governmental and institutional levels. Governmental factors comprised policies and decisions made by the Government of Ghana that hindered the availability of both human and non-human resources required for effective ERM. The broader theme on organisational factors was characterised by cooperation as an enabler and hindrances including inadequate policies for ERs, inadequate funding, inadequate infrastructure and lack of plans for sustainability, inadequate skilled staff, Poor communication, institutional management structure, low institutional commitment, and low usage of ERs. These factors had varying effects on the phenomenon.

As a beginning towards effective ERM, it is recommended that academic libraries give policies for ERs the due recognition and develop well-documented policies and workflows to guide ERM practices, succession planning, and provide justification for institutional support. Also, academic institutions should prioritise investment in ICT infrastructure which would encourage maximum usage of these resources. Again, the government and institutional leaders need to recognise the significant role academic libraries play in institutional and national development and support them accordingly

with adequate resourcing. Furthermore, academic libraries can advocate for centralised funding whereby ERs are centrally funded at the government level for the benefit of all public and private academic and research institutions to enhance the educational and research sectors of the country to promote national development. In addition, there is the need for academic libraries to constantly demonstrate their value to their user community by advocating for institutional support and intensifying the marketing of ERs. Users should be made aware of the implications of low usage of ERs on institutional commitment and budgeting for ERs of the library.

It is also important for Library and Information Science (LIS) educators in Ghana to develop LIS curricula that incorporate courses and programmes on skills and knowledge required by the current electronic environment. Furthermore, frequent training programmes should be organised for all library staff to equip them with ICT and ERM skills. Private case institutions should also rethink their centralised management structure and provide the library with a separate budget and a considerable level of autonomy in their operations to facilitate effective ERM. Finally, cooperation with stakeholders as revealed in the findings facilitated the management of ERs and this should be deepened for more positive outcomes.

Implementing these recommendations would promote successful ERM in academic libraries which would encourage maximum usage of ERs thereby enhancing the image of the library and the educational sector to promote national development.

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Chapter 7

Knowledge Sharing Patterns of Postgraduate Students: A Case Study of School Library Media Technology Students, University of Ibadan, Nigeria

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Abstract

Knowledge sharing is a process of mutual exchange of knowledge by individuals to create new knowledge. It helps individuals to learn from experiences and practices of others. Knowledge sharing among students is believed to be the most effective way to obtain knowledge. Therefore, knowledge sharing has become a central issue facing students in the 21st Century because of the collaborative learning approaches of this Century. However, students may be hoarding knowledge because of the erroneous impression that the recipients of their knowledge may have a competitive advantage over them. This chapter investigated knowledge sharing patterns of postgraduate students of the School Library and Media Technology Department, University of Ibadan, Nigeria. A pre-tested questionnaire was administered through Google Form and 74 postgraduate students participated in the study. The findings revealed that the respondents have a negative general attitude towards knowledge sharing, the majority of them seldom share knowledge. Some of the preferred channels of knowledge sharing were face to face and social media platforms, whilst the types of knowledge shared by the respondents were academic-related issues, library experience and social issues. In addition, knowledge sharing motivators found include willingness to discuss new ideas with colleagues, gaining knowledge beyond classroom boundaries, developing a stronger class community and self-satisfaction. Lastly, the study identified some inhibiting factors to

knowledge sharing, such as lack of relationship, fear of being perceived as a ‘show-off’ and lack of sharing culture, among others. Based on the findings of the study, it was recommended that there must be an avenue for practising knowledge sharing by offering programmes and activities that can enhance a knowledge sharing culture. The students should also be enlightened about the importance of knowledge sharing in this era of collaborative learning and its benefits in the workplace.

Keywords: Tacit Knowledge, Explicit knowledge, knowledge sharing patterns, Postgraduate students, School Library and Media Technology, University of Ibadan, Nigeria

1 Introduction

Knowledge is a critical resource in the 21st Century and the activities of managing it comprise acquiring, sharing and storing. Sharing is considered the most crucial activity. According to Bamigbola (2021), knowledge is an elusive word used by everybody and classified into two main categories, explicit and tacit. Explicit knowledge is the knowledge that has been expressed, captured, recorded, and can be easily shared with others, while tacit knowledge resides in individuals, is unexpressed, hard to formalise, and difficult to document in a formal context. Knowledge sharing is a critical aspect of knowledge management, it is a process where individuals mutually exchange knowledge (experiences, skills and expertise) to create new knowledge. Other terms in the literature used for knowledge sharing are knowledge transfer, knowledge distribution, knowledge diffusion and knowledge dissemination (Najla *et al.* 2017).

According to Frost (2016), explicit knowledge sharing transpires when the knowledge provider articulates or describes the knowledge and the knowledge recipient has access to the knowledge provider and is aware of the knowledge expressed by the knowledge provider. On the other hand, tacit knowledge sharing occurs in informal different socialisations fora, that is, in unmonitored, unstructured discussions and less structured work practices. In the past few decades, knowledge management and knowledge sharing studies, in particular, focused on corporate and public organisations, but in recent times studies on knowledge management in education has gained attention but research on students’ knowledge sharing behaviour is limited. Gamlath and

Wilson (2017) submitted that not many studies have investigated knowledge sharing by university students while Dzandu, Boateng and Tang (2014) submitted that literature is scarce on knowledge sharing behaviour among students in higher education in sub-Saharan Africa. Knowledge sharing in the education sector could be between lecturers and students, lecturers and lecturers, and students and students. This study focuses on knowledge sharing among students because knowledge sharing supports collaborative learning which constitutes an essential aspect of the 21st Century learning.

Furthermore, knowledge sharing among students is important because it develops the knowledge sharing behaviour of students for future work. Whilst technological innovations have provided a lot of opportunities for interactive learning, the aftermath of the Covid-19 pandemic has made the education sector, even in developing countries, embrace interactive learning using varied technologies. There are learning activities such as group assignments, group projects and collective problem solving that demand sharing of knowledge among students. However, despite its importance in learning, it has been observed that students are not willing to share knowledge because of academic competition, they believe that if they share knowledge, others will outperform them.

The Department of School Library and Media Technology, University of Ibadan, Nigeria was established to provide postgraduate training in school librarianship, a speciality in library and information studies. It is the first Department in Nigeria and Africa that specializes in training and equipping school library media specialists, who in turn will man school library media centres. Presently, the Department trains at the postgraduate levels. Whilst there have been researches on knowledge sharing among students at different levels, there seems to be no literature on knowledge sharing of the postgraduate students of School Library and Media Studies.

Therefore, this chapter investigated knowledge sharing patterns of the postgraduate students of the Department of School Library and Media Technology, University of Ibadan, Nigeria. It examined attitude towards knowledge sharing, frequency of knowledge sharing, preferred channel of knowledge sharing, types of knowledge sharing, knowledge sharing motivators and inhibiting factors of knowledge sharing.

2 The Objective of the Study

The main objective of this study was to investigate the knowledge sharing

patterns of the postgraduate students of the Department of School Library and Media Technology, University of Ibadan, Nigeria. The specific objectives were to: ascertain the general attitude of the postgraduate students towards knowledge sharing; find out the frequency of knowledge sharing; identify the preferred channel of sharing knowledge; establish the types of knowledge shared; identify the motivators to knowledge sharing and the inhibiting factors to knowledge sharing by postgraduate students of the Department of School Library and Media Technology, University of Ibadan, Ibadan, Nigeria.

3 Research Questions

The following research questions provide a framework in which the research was conducted.

1. What is the general attitude of postgraduate students of the Department of School Library and Media Technology towards knowledge sharing?
2. How frequent do postgraduate students of the Department of School Library and Media Technology share knowledge?
3. What are the preferred channels of sharing knowledge among postgraduate students of the Department of School Library and Media Technology?
4. What types of knowledge do postgraduate students of the Department of School Library and Media Technology share?
5. What are the motivators of knowledge sharing among postgraduate students of the Department of School Library and Media Technology?
6. What are the inhibiting factors to knowledge sharing by postgraduate students of the Department of School Library and Media Technology?

4 Literature Review

Knowledge is a concept that has no consensus definition. It has been defined severally by scholars, based on various disciplines, hence, knowledge can only be contextualised. Nonaka (1994) perceived knowledge as an object, defined as ‘justified true belief’, while Ping (2015) defined it as processed information that resides in individuals and is used at an appropriate time. Thus, when knowledge is captured, it stays in an individual, waiting for an appropriate time to be used

or applied. One thing that is agreeable about knowledge is its forms. There is a consensus that there are two forms of knowledge: tacit and explicit. Tacit knowledge is the knowledge that is not easily expressed or recorded, it is referred to as ‘know-how’, values and is extremely personal. On the other hand, explicit knowledge is the knowledge that is easily codified, expressed, recorded, shared and communicated. It is referred to as ‘know-that’ (Edward & Kidd 2003). However, whichever form of knowledge, managing it is critical in knowledge-based organisations such as higher education institutions. Knowledge management, therefore, is the process of capturing, storing, sharing, and using knowledge.

4.1 Knowledge Sharing

Knowledge sharing (KS) is an important part of knowledge management and a critical part of learning activities that ought to take place among students but it should not be taken for granted because it is not an easy task (Kalu *et al.* 2019). According to Majid and Wey (2009), some of the academic activities that entail knowledge sharing are group presentations, online discussions, collective problem solving and team projects. Integration of these activities in learning involves active knowledge sharing and enhances academic achievements, interpersonal skills and communication, positive interdependence and a sense of satisfaction among students.

Knowledge sharing among students produces a sense of fulfilment for contributing towards the learning of others and boosts the total learning experience. It also fosters interactive and collaborative learning (Ratsoy 2011; Baleni 2011). Knowledge sharing behaviour among students, therefore, is dependent on some factors, such as knowledge self-efficacy, enjoyment in helping others, willingness to learn, and share, organisational support to share knowledge, organizational culture, use of ICT and attitude to learning (Areekkuzhiyil 2019). Majid and Yueng (2007) submitted that attitude, trust, motivation and reciprocity are factors that determine knowledge sharing among students. Students share knowledge basically to improve their understanding of academic works, for group assignments and to build a relationship (Majid & Chitra 2013). In a study of knowledge sharing of students in the Faculty of Arts, Dhaka University, Pakistan, Islam *et al.* (2017) reported that motivators for knowledge sharing among the students were to ‘learn from each other’ (75.26%), and ‘self-satisfaction’ (13.9%). Kalu *et al.* (2019) found that the

motivation for knowledge sharing of students of electrical electronic engineering technology of National Institute of Construction Technology, Uromi Edo State Nigeria were: trust 100%, humility 81% and enjoyment of helping others 81%. In summary, the extent of sharing knowledge by students is dependent on the above factors.

Another critical factor that can influence knowledge sharing among students is attitude. Attitude depicts how an individual views things, people, and phenomena. Ajzen and Fishbein (2005) described attitude toward a particular behaviour as an individual's assessment of that behaviour at the point of deciding to perform it. Attitude towards a particular behaviour is either positive or negative. Students' positive attitude towards knowledge sharing will motivate them to share their knowledge and a negative attitude will inhibit knowledge sharing behaviour. Previous studies (Yaghi *et al.* 2011; Fullwood *et al.* 2013; Keong and Subhi 2015; and Nisar ul Hag and Haque 2018) have confirmed a relationship between attitude and knowledge sharing. According to Yaghi *et al.* (2011), students' attitude always stimulates sharing of knowledge with each other. In the study of Fullwood *et al.* (2013), respondents in the United Kingdom (UK) universities believed that sharing knowledge will make their relationship stronger. Keong and Subhi (2015) investigated attitude towards knowledge sharing among the Iraqi English as a Foreign Language (EFL) postgraduate students in Universiti Kebangsaan Malaysia (UKM) and found that postgraduate students had a positive attitude towards knowledge sharing. The attitude was also found to boost knowledge sharing among students by Nisar ul Hag and Haque (2018). However, in Yaghi *et al.* (2011) respondents sharing knowledge was found to cause a loss in competition among them.

Students share different types of knowledge. Majid and Chitra (2013) in their study on the role of knowledge sharing in the learning process found that junior college students shared class notes/handouts, previous assignments/term papers and previous examination papers among others. Opeke and Opele (2014) submitted that types of knowledge shared by postgraduate students in selected Nigerian universities were 'knowledge in the area of my studies' (3.26), 'political news' (2.80), 'religious news' (2.72) and 'library experience' (2.65). According to Chutia and Devi (2020), the type of knowledge shared by 70 postgraduate students of the University of Science and Technology Meghalaya, India were information about departmental activities, awareness and helps in publicity.

Students share knowledge through different channels such as face-to-

face interaction, short message service (SMS), telephone, email and online forums. Hussein and Nassuora (2011) investigated higher institutions Jordanian students' attitudes and perceptions towards knowledge sharing and discovered that the most preferred channels of sharing knowledge were face to face (85%), email (81%) and online learning system (75%). According to the study of Majid and Chitra (2013), of 226 students from twelve junior colleges in Singapore, the most frequently used channels of sharing knowledge was, face-to-face interaction (mean 4.14), followed by Short Message Service (SMS) (mean score 4.03). Opeke and Opele (2014) assessed the knowledge sharing behaviour of postgraduate students in selected Nigerian universities and the finding revealed that face to face (55.6%) is the most frequently used channel followed by Internet platforms (15%). Islam *et al.* (2017) found preferred channels of sharing knowledge by students as group discussions (53%) and Social networking (24%). Based on the above past studies, it seems face to face is the most preferred channel of knowledge sharing among students. However, Kalu *et al.* (2019) investigated knowledge sharing behaviour and patterns of 27 students of the National Institute of Construction Technology in Edo State, Nigeria and found online chat (100%) followed by face to face (78%).

As germane as knowledge sharing is to learning in the 21st Century, there are several inhibiting factors to knowledge sharing among students, as highlighted by past studies. The study of Hussein and Nassuora (2011) revealed that inhibiting factors to knowledge sharing by students were lack of time, lack of depth in the relationship and being afraid that others will perform better than them if they share their knowledge. Similarly, Majid and Chitra (2013), in their study of 226 students of twelve junior colleges in Singapore confirmed that lack of time, lack of knowledge sharing culture, lack of depth of relationship, students only share with those who share with them, out of altruism to help others and lack of initiative to voluntarily share knowledge were inhibiting factors to knowledge sharing of students. Kalu *et al.* (2019), submitted some inhibiting factors to knowledge sharing include low self-esteem (100%), illiteracy (100%), social relationship (89%) and fear of being perceived as a 'show off' (81%). Others were being self-centred and social attributes and inability to use the library, lack of communication, lack of training, network problems and fluctuations of internet connectivity (Akanbiemu *et al.* 2021; Chutia & Devi 2020; Ong *et al.* 2011).

As crucial as knowledge sharing is to learning in this dispensation, there are few studies that examined knowledge sharing on educational contexts. as

Areekkuzhiyil (2019), submitted that knowledge sharing among students is an unexplored area. There seems to be no study that examined knowledge sharing among the postgraduate students of the Department of School Library and Media Technology. To this end, this study aims to investigate knowledge sharing patterns of postgraduate students to fill this gap in literature.

5 Methodology

The study is positivistic in nature, hence, it adopted survey research design and quantitative approach. The population was 112 postgraduate students of the Department of School Library and Media Technology, University of Ibadan, Oyo State, ten of them were professional students which were used for pre-test and the remaining 102 were sampled for the main study. The sampling technique was total enumeration because the remaining 102 postgraduate students were sent notification message. Thereafter, consent form was sent to them through their personal WhatsApp platforms and it was filled and returned.

Questionnaire was considered the most appropriate data-gathering instrument for the study. It was an online google form questionnaire, which consisted of seven sections and the first section of the questionnaire was the demographic information of the respondents. The second section dealt with students' general attitude towards knowledge sharing, the third was on frequency of knowledge sharing, the fourth gathered information on the types of knowledge shared, the fifth, sixth and seventh sections dealt with preferred channels of knowledge sharing, motivators of knowledge sharing and inhibiting factors to knowledge sharing respectively. Sections two, five, six and seven were adapted from Majid and Chitra (2013) while the fourth section was adapted from Opeke and Opele (2014) and the third section was self-constructed. The questionnaire contained fixed response type questions with four Likert-type response option scales ranging from 1 (Strongly Disagree) to 4 (Strongly Agree), which is described as follows: Strongly Disagree (SD) = 1, Disagree (D) = 2, Agree (A) = 3 and Strongly Agree (SA) = 4. The reliability of the scale has been established by estimating the Cronbach alpha, which was (0.78).

6 Results and Discussion

Copies of the questionnaire were filled out by 74 (a 72.5% return rate) postgraduate students in the Department of School Library and Media technology, University of Ibadan, Nigeria.

6.1 Respondents' Profile

The respondents' profile is presented in Table 1.

Table 1: Respondents' profile

Demographic	Classification	Frequency	Percentage
Gender	Male	26	35.1
	Female	48	64.9
	Total	74	100
Programme	Doctoral	25	33.8
	Master	49	66.2
	Total	74	100

The respondents comprised 26 (35.1%) male and 48 (64.9%), the majority 66.2% were master students while 33.8 were doctoral students as revealed in Table 1.

6.2 General Attitude of Postgraduate Students to Knowledge Sharing

The general attitude of postgraduate students to knowledge sharing is presented in Table 2.

Table 2: General attitude of postgraduate students to knowledge sharing

Items	SA	A	D	SD	Total	Mean	STD
It is better to avoid sharing knowledge with peers whenever possible	17	45	8	4	74	3.01	.749
Many students feel that they might be penalized by the lecturer for sharing knowledge	6	48	13	7	74	2.72	.750

Many students have the mindset that sharing knowledge is a type of plagiarism	7	41	22	4	74	2.69	.720
Students should share knowledge with their peers only when approached	3	36	25	10	74	2.43	.778
Knowledge sharing takes place when students care about the needs of each other	0	6	23	45	74	1.47	.646
Students should voluntarily share their knowledge with peers	0	2	24	48	74	1.38	.542
I feel that it is important to share knowledge with other students for the benefit of all.	0	0	10	64	74	1.14	.344

The data in Table 2 reveals the respondents’ general attitude to knowledge sharing. The foremost one is ‘it is better to avoid sharing knowledge with peers whenever possible’ with the mean of (3.01) followed by ‘many students feel that they might be penalized by the lecturer for sharing knowledge’ with the mean of (2.72). Other items are presented in the Table. This finding implies that the respondents were sceptical to share their knowledge. Their attitude towards knowledge sharing is negative, the implication is that sharing of knowledge is seen as alien probably because it has not been well emphasised and the culture of sharing knowledge is new to them. The finding is in agreement with Farahian *et al.* (2022) that found that 104 Iranian English Literature students did not have positive attitude towards knowledge sharing. However, this finding contradicts Fullwood *et al.* (2013) and Keong and Subhi (2015).

6.3 Frequency of Knowledge Sharing

The frequency of sharing knowledge by postgraduate students is shown in Table 3.

Table 3: Frequency of knowledge sharing by postgraduate students

Frequency	SA	A	D	SD	Total
Seldomly	11	46	13	4	74
Occasionally	7	34	21	9	71
Twice a month	5	36	25	8	74
Twice a week	1	21	44	8	74
Weekly	2	21	35	16	74
Daily	0	8	24	42	74

The data in Table 3 shows that the respondents ‘seldomly’ share knowledge with the mean of (2.86) followed by ‘occasionally’ share knowledge with the mean of (2.57) and few respondents share knowledge on a ‘daily’ basis with the mean of (1.54). This implies that knowledge sharing is not well embraced by the respondents because the majority (60.8%) seldomly share knowledge while 10.8% share knowledge on a daily basis. This also confirms that negative attitude inhibits knowledge sharing, as earlier confirmed in this study, that the general attitude of the respondents toward knowledge sharing is negative in Table 2. This is in agreement with Farahian *et al.* (2022) that found that Iranian English Literature students did not have a positive attitude towards knowledge sharing. Therefore, attitude determines the frequency of knowledge sharing.

6.4 Preferred Channels of Sharing Knowledge

The preferred channels of sharing knowledge by postgraduate students are presented in Table 4.

Table 4: Channels of knowledge sharing by postgraduate students

Channel	Frequency	Percentage
Face to face	39	52.7
Social Media Platforms	29	39.2
Short Message Service (SMS)	3	4.1
Telephone	2	2.7
Email	1	1.3
Total	74	100

The most preferred channels of sharing knowledge by the respondents as presented in Table 4 were ‘face to face’ (52.9%), followed by ‘social media platforms’ (39.2%). The finding of this study is in agreement with previous studies; Hussein and Nassuora (2011); Opeke and Opele (2014) and Majid and Chitra (2013). The three previous studies found that face-to-face was the most-used channel of sharing knowledge among students of higher institutions. This might be because face-to-face sharing gives immediate feedback, non-verbal clues and it costs no extra money like other channels such as social media platforms and the telephone. However, the studies of Kalu *et al.* (2019) and Chutia and Devi (2020) were contrary to the finding of this study, in that students’ most preferred channels of sharing were online chat and social media platforms respectively.

6.5 Types of Knowledge Shared by Postgraduate Students

The types of knowledge shared by postgraduate students are shown in Table 5.

Table 5: Types of knowledge shared by postgraduate students

Items	SA	A	D	SD	Total	Mean	STD
Academic-related issues	37	36	1	0	74	3.49	.530
Assisting others with library use	36	36	2	0	74	3.46	.554
Social issues	24	47	2	1	74	3.27	.580
Religious issues	20	43	8	3	74	3.08	.736
Political issues	17	39	17	1	74	2.97	.721
Personal issues	1	3	35	35	74	1.59	.639

The types of knowledge shared by the respondents as presented in Table 5, shows the two most shared knowledge were: ‘academic-related issues’ with a mean of 3.49 with STD .530 followed by ‘assisting other students in library use’ with a mean of 3.46 with STD .554. This study established that the most shared knowledge among postgraduate students in the area of studies were both ‘academic-related issues’ (98.6%) and ‘library experience’ (84%). This finding is partly in agreement with Opeke and Opele (2014) because the first most shared knowledge is studies area but others were slightly different.

6.6 Motivators of Knowledge Sharing

Motivators of knowledge sharing by postgraduate students are presented in Table 6.

Table 6: Motivators of knowledge sharing by postgraduate students

Items	SA	A	D	SD	Total	Mean	STD
Willingness to discuss new ideas with colleagues	46	27	1	0	74	3.61	.519
Gaining knowledge beyond classroom boundaries	43	29	2	0	74	3.55	.553
Develop stronger class community	40	32	2	0	74	3.51	.555
Self-satisfaction	33	38	3	0	74	3.41	.571
Learning from each other	32	37	2	1	72	3.35	.635
Students can interact conveniently on 24/7 basis	26	36	12	0	74	3.32	.650
Cultivating image of expertise	32	35	6	1	74	3.30	.685
Exchange or feedback	29	38	7	0	74	3.19	.696
Reward or recognition	21	29	22	2	74	2.93	.833

The motivating factors for knowledge sharing as indicated in Table 6 reveals that the top three factors were ‘willingness to discuss new ideas with colleagues’ with the highest mean of 3.61with STD.519 out of 4 points scale, ‘gaining knowledge beyond classroom boundaries’ with a mean of 3.55 with STD.553and ‘develop a stronger class community’ with a mean of 3.51 with STD .555. On the other hand, the least three factors were ‘cultivating the image of expertise’ with a mean of 3.32 with STD .650, ‘exchange or feedback’ with a mean of 3.19 with STD .696 and ‘reward or recognition’ with a mean of 2.93 with STD .833. This study implies that most postgraduate students discuss new ideas with their mates to gain knowledge outside the classroom and sharing among them foster relationships. This finding concurs with Opeke and Opele (2014), Islam *et al.* (2017), and Kalu *et al.* (2019).

6.7 Inhibiting Factors to Knowledge Sharing by Postgraduate Students

Inhibiting factors to knowledge sharing, are presented in Table 7.

Table 7: Inhibiting factors toward knowledge sharing by postgraduate students

Items	SA	A	D	SD	Total		Mean	STD
Lack of relationship	39	32	3	0	74		3.49	.579
Fear of being perceived as a ‘show off’	25	34	14	1	74		3.12	.758
Lack of sharing culture	23	35	15	1	74		3.08	.754
Afraid others may perform better	24	31	18	1	74		3.05	.792
Shyness and introvert personality	24	31	16	3	74		3.03	.844
Insufficient time to read multithread posts before giving responses	23	31	19	1	74		3.03	.793
Fear of providing wrong information	23	32	16	3	74		3.01	.836
Some classmates do not care about others’ opinions	14	42	17	1	74		2.93	.689
Only share when people share their knowledge with them	21	26	26	1	74		2.91	.830
Slow internet connection	16	34	23	1	74		2.88	.758
Lack of time	16	34	21	3	74		2.85	.806
I do not want to share my knowledge with other students	15	23	33	3	74		2.68	.846

The data in Table 7 shows that the first three inhibiting factors to knowledge sharing among the postgraduate students of the Department of School Library and Media Technology were: ‘lack of relationship’ with a mean of 3.49, with STD .579 ‘fear of being perceived as a show-off’ with a mean of 3.12 with STD

.758 and 'lack of sharing culture' with the mean of 3.08 with .754. The last three were 'slow internet connection' with a mean of 2.88 with .758, 'lack of time' with a mean of 2.85 with STD .806 and 'I do not want to share my knowledge with other students' with a mean of 2.68 with STD .846. This result implies that a relationship is germane to sharing of knowledge, without it, it will be difficult, if not impossible to share knowledge. In addition, fear of being perceived as showing off, is 'mind-set' and lack of sharing culture are serious issues that inhibit knowledge sharing among postgraduate students. On the other hand, slow internet connection, lack of time and not wanting to share knowledge with others are not critical inhibiting factors to postgraduate students' knowledge sharing behaviour.

The issue of slow internet connectivity is well understandable because the respondents' most used channel of knowledge sharing is face to face, hence, slow internet is not considered a problem. Similarly, lack of time might not constitute a serious problem because, the mode of study mainly face-to-face. This study is consistent with Majid and Chitra (2013) Kalu *et al.* (2019) and Akanbiemu *et al.* (2021) but it is at variance with Hussein and Nassuora (2011).

7 Conclusion

Knowledge sharing remains a vital aspect of knowledge management in corporate organisations including higher institutions. This is so because knowledge sharing is the incomparable way to increase knowledge value. It aids students to learn from experiences and practices of others. Knowledge sharing among students is believed to be the most effective way to obtain knowledge. This study investigated knowledge sharing patterns among postgraduate students of the Department of School Library and Media Technology, University of Ibadan, Nigeria. Overall, the findings of this study indicated that the respondents held negative attitudes toward knowledge sharing, as a result they seldom share knowledge among themselves. The implication is that in their future career lives they might not embrace knowledge sharing if nothing is done to stimulate them to embrace knowledge sharing while they are still in the university. In addition, the study found that postgraduate students shared knowledge in their area of studies and library experience. This might be because they are library and information professionals.

The study identified face-to-face and social media platforms as the most preferred channels of knowledge sharing, whilst, motivators of knowledge

sharing were willingness to discuss new ideas with colleagues, gaining knowledge beyond classroom boundaries, developing a stronger class community and self-satisfaction. In the same vein, the study found certain inhibiting factors to knowledge sharing, the most critical ones were lack of relationship, fear of being perceived as a show-off and lack of sharing culture. Conclusively, this study has provided knowledge sharing practices of postgraduate students of the Department of School Library and Media Technology, University of Ibadan, Nigeria. It serves as an eye opener for the Department to take appropriate actions to boost the knowledge sharing practices of the postgraduate students because of its importance in the 21st Century learning and lifelong working situation.

8 Recommendations

The outcomes of this study presented the need to encourage knowledge-sharing practices among postgraduate students of the Department of School Library and Media Technology. Attitude toward knowledge sharing of students has to be enhanced as it has a significant role in knowledge sharing practices and generation of knowledge. Thus, there must be an avenue for practising knowledge sharing by offering programmes and activities that can enhance a knowledge sharing culture. The students should be enlightened about the importance of knowledge sharing in this era of collaborative learning and its benefits in their future workplace. In addition, more group assignments and group projects should be given to postgraduate students to improve their relationships among themselves.

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Chapter 8

Mapping Knowledge Management Practices in Africa: A Bibliometric Analysis

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Abstract

This chapter accounts for the growth analysis of research output in the knowledge management domain in Africa, using the Scopus database, covering the period 2000-2021. Three hundred and fifty-two publications were retrieved from the Scopus database. African researchers mainly disseminated their KM research through journal articles and conference proceedings. Majority of the KM publications were multi-authored. Growth rate of KM publications during the period under review was slow and varied from year to year. The leading channels in which African scholars published KM research were the Proceedings of the European Conference on Knowledge Management, Proceedings of International Business Information Management Association Conference, and the Journal of Knowledge Management. The institutions that contributed most of KM research outputs were the five leading South African universities, namely: University of University of Pretoria, the University of South Africa, the University of Johannesburg, the University of Cape Town and the University of KwaZulu-Natal. African institutions mainly collaborated with institutions in the North, especially in the United States and the United Kingdom.

Keywords: Knowledge management, Africa, Bibliometrics

1 Introduction

Today knowledge is increasingly being recognized as one of the principal re-

sources in development. Knowledge contributes to development in numerous ways. For instance, knowledge is an indispensable input and output in education, scientific research and industrial technology; it is a catalyst for social change and economic development; and it is the foundation of civilization. Knowledge forms the fabric of cultural values that promote integrity and harmony; ultimately it is the foundation for development. Therefore, knowledge must be systematically and effectively identified, acquired, stored, retrieved, shared, and disseminated for sustainable development. This chapter accounts for the bibliometric analysis of research output in the knowledge management domain in Africa, using the Scopus database, covering the period 2000-2021.

1.1 Definition of Knowledge Management

The classic one-line definition of knowledge management was offered by Tom Davenport early on (Davenport 1994): ‘Knowledge management is the process of capturing, distributing, and effectively using knowledge’. Knowledge management is the conscious process of defining, structuring, retaining, and sharing the knowledge and experience of employees within an organization (VALAMIS 2022; IBM Cloud Education 2020). It is the process of creating, sharing, using and managing the knowledge and information of an organization.

1.2 Types of Knowledge

When discussing knowledge management, it is helpful to consider the different types of knowledge and how it is possible to share them within an organization. There are three types of knowledge: explicit knowledge, implicit knowledge, and tacit knowledge. Explicit knowledge is knowledge and information that can be easily codified and taught, i.e. it is knowledge that is easy to write down and share. For example how to operate a machine or how to solve a mathematical equation. Explicit knowledge is captured within various document types such as manuals, handbooks, reports, and guides, allowing organizations to easily share knowledge across teams (IBM Cloud Education 2020). This type of knowledge is perhaps the most well-known and examples of it include knowledge assets such as databases, white papers, and case studies. This form of knowledge is important to retain intellectual capital within an organization as well as facilitate successful knowledge transfer to new employees (IBM Cloud Education 2020).

Implicit knowledge is applied knowledge, learned skills or know-how. It tends to exist within processes and therefore it is gained by applying explicit knowledge to a specific situation. Tacit knowledge is gained through personal experience. It is informal, learned with experience over time, and usually applies to a specific situation and, therefore, more intuitive and less easy to share with others (VALAMIS 2022). Examples of tacit knowledge are: ‘know-hows’, innovative thinking, and understanding body language (VALAMIS, 2022). VALAMIS (2022) observes that while knowledge management for implicit and tacit knowledge can be harder to implement, with correct procedures in place, an organization can ensure that all relevant information is shared around an organization and retained as staff retire or move on. Utilizing all the expertise in an organization benefits the organization as a whole, creating best practices for everyday tasks, improving situational awareness, developing employee intuition for course corrections, and enhancing organizational capacity.

1.3 Knowledge Management Process

The knowledge management process can be summarized as involving knowledge acquisition, creation, refinement, storage, transfer, sharing and utilization (IBM Cloud Education 2020). Effective knowledge management system typically goes through three main steps (IBM Cloud Education 2020):

1. **Knowledge Creation:** During this step, organizations identify and document any existing or new knowledge that they want to circulate across the organization.
2. **Knowledge Storage:** During this stage, an information technology system is typically used to host organizational knowledge for distribution. Information may need to be formatted in a particular way to meet the requirements of that repository.
3. **Knowledge Sharing:** In this final stage, processes to share knowledge are communicated broadly across the organization. The rate in which information spreads will vary depending on organizational culture.

1.4 Importance of Knowledge Management

Omotayo (2015) argues that if information is the currency of the knowledge economy, human expertise is the bank where it is kept, invested and exchanged.

Peter Drucker once commented that the product of the pharmaceutical industry wasn't pills, it was information. VALAMIS observes that as institutions evolve, expand in their operations, they develop significant institutional knowledge. Therefore, this knowledge is invaluable to the organization. It is vital that an organization ensures that this knowledge is imparted to new and less experienced members of staff in order to maintain the organization's successful operations (VALAMIS 2022).

The practice of knowledge management enables organizations to spread information and raise the level of expertise among staff; and ultimately improves their efficiency and professional practice. The popular saying that 'knowledge is power' is no longer disputable. Knowledge management is important because it boosts the efficiency of an organization's decision-making ability. By making sure that all employees have access to the overall expertise held within the organization, a smart workforce is built that is more able to make quick, informed decisions, benefiting the entire organization. Furthermore, knowledge management allows innovation to grow within the organization. Consequently, customers benefit from increased access to the best practices, and employee turnover is reduced. The importance of knowledge management is growing every year. As the marketplace becomes more and more competitive, one of the best ways to stay ahead of the curve is to build an organization in an intelligent, flexible manner. An organization must have the ability to spot issues from a distance and respond quickly to new information and innovations.

Other benefits of knowledge management include the following (IBM Cloud Education 2020; VALAMIS 2022):

- Efficient access to knowledge and information;
- Reduced time for new staff to acquire competence;
- Reduced operational costs;
- Improved customer satisfaction;
- Faster decision-making;
- Increased collaboration and idea generation;
- Enhanced communication throughout your organization;
- Improved quality of information and data; and
- More security for intellectual property.

2.0 Objectives of The Chapter

This Chapter is an analysis of the research output in the knowledge management (KM) domain in Africa, covering the period 2000 to 2021, using the Scopus database. The following objectives were considered in the accomplishment of this study.

1. Identify publication counts by year between 2000 and 2021
2. Analyse the growth rate of research output in KM
3. Classify the means of communication of KM publications
4. Examine top journals in which articles on the KM domain were published
5. Discover different fields where the KM domain is published and its subject areas
6. Determine the most productive institutions by affiliations relating to KM
7. Classify countries and their external association in the KM domain

The remaining part of this chapter is organized as follows: Section 3 presents a brief literature review; Section 4 presents the research methodology used in this chapter; Section 5 presents the results; Section 6 discusses the results; and finally, Section 5 draws the conclusion and presents the recommendations.

3 Literature Review

Bibliometrics is the application of statistical methods to analyze scientific processes and research outputs like books, articles, conference papers, and various media of communication (Pritchard 1969). Bibliometric methods are frequently used in the field of library and information science. Bibliometrics originates from the field of library and information sciences (Kumar, Sureka & Pandey 2020). It was first coined by Pitchard in 1969 as a methodology studying bibliographic data quantitatively (Pritchard 1969).

Many research fields use bibliometric methods to explore the impact of their field, the impact of a set of researchers, a particular paper, to identify particularly impactful papers within a specific field of research, or identify trends, research yield, and impact in a research area (Cobo, López-Herrera,

Herrera-Viedma & Herrera 2011; Henderson, Shurville & Fernstrom 2009; Pritchard 1969; Ellegaard & Wallin 2015). Bibliometrics tools have been commonly integrated in descriptive linguistics, the development of thesauri, and evaluation of usage of literary works. Beyond specialized scientific use, popular web search engines, such as the PageRank algorithm implemented by Google have been largely shaped by bibliometrics methods and concepts. This method is extremely relevant in the review and consolidation of copious amounts of data without the researcher's bias due to its quantitative components (Ramos-Rodríguez & Ruíz-Navarro 2004). Thus, the researcher found this method most suitable to synthesize the KM publications produced by African researchers.

Previous studies by Ocholla and Ocholla (2007) observed that very few bibliometric studies are done in Africa, especially in the subject areas of library and information science (LIS), in which KM resides. For this reason, Aina and Mooko (1999) appealed to African LIS professionals to take advantage of this opportunity to promote bibliometric studies. Since then, there has been a notable increase in the number of publications in bibliometrics by African scholars, mostly dominated by South Africans. Notable bibliometrics studies are those by Mabawonku (2001), Ocholla and Ocholla (2007), Nelson (2013), Tella and Aisha Olabooye (2014), Ani and Okwueze (2017), and Ani *et al.* (2017), to mention just a few. Despite the documented studies on bibliometrics mentioned in this present study, there is still a paucity of knowledge in the literature regarding bibliometrics studies in Africa; hence, the author's decision to emphasize the growth analysis of research output in the KM domain in Africa.

Fombad and Onyancha (2017) investigated the extent of research on KM on developmental targets in South Africa. A bibliometric study was conducted using four EBSCO-hosted databases to extract relevant data. It was noted that there has been continued growth in the number of KM publications in South Africa focusing on a variety of subject areas. The researchers observed that limited researcher attention has been paid to KM for development (KM4D) and most of the research on KM4D addresses quality education and infrastructure, unemployment and economic growth. The study advocates for the need for academic institutions and research organizations to devote considerable attention to research that enhances the application and integration of the effectiveness of KM in South Africa's development as the country strives to achieve its development goals.

Nyamasega, Onyancha and Kwanya (2019), using a bibliometrics analysis, examined collaboration patterns in knowledge management research in

Eastern and Southern Africa region as indexed in the Scopus database for the period 1991 - 2016. There were a total of 3,681 papers published on KM in Eastern and Southern Africa between 1991 and 2016. The number of publications was not consistent and varies from year to year. The number of papers published per year ranged from 7 to 518. The number of publications stagnated between 1991 and 1992, with a slow growth rate being observed from 1993 to 2000. There was a significant steady increase of the number of publications from 2001 to 2016. Two-author publications were dominant (33.93%), followed by three-author publications (23.03%) while single-author publications constituted only 9.04% of the total publications. Most of the publications emanated from academic institutions. The study revealed collaborative efforts among authors and countries, both at the local and international levels. The authors recommend that researchers should increase collaborations in the field of KM in a bid to advance KM research productivity and impact in the Eastern and Southern African region and by publishing in open access journals.

Jain (2020) conducted a bibliometric perspective of knowledge management (KM) literature in libraries for the period 1998-2019, based on Web of Science database. The objectives of the study were to examine a bibliometric profile of publications in the field of KM in libraries and analyze the emerging research trends in KM research in African libraries and information centers through keyword co-occurrence. A total of 83 sources were retrieved. The findings revealed that the most research outputs were produced in year 2018 mostly in article form and the University of South Africa led in contribution to knowledge management research in libraries. Most research were produced by the United States, followed by South Africa. The researcher observed that bibliometric studies on KM were too general and none of them gave a clear view of research trends of KM in libraries.

Oyetola and Anakrire (2022) conducted a growth analysis of research output in the knowledge management (KM) domain in Africa, using the Web of Science database covering the period 1974- 2019. The findings indicated that 2,564 publications such as articles, conference papers, reviews, and proceedings were the platforms used the most. Management was at the top of the list of subject areas. A top journal that publishes KM papers is the South African Journal of Science. The most productive institutions by affiliation were the University of Cape Town and the University of Pretoria, and inter-continental collaboration in KM research was affirmed with the United States of America. The National Research Foundation of South Africa was among the top bodies

that fund research in Africa. The growth analysis of publication output in KM in Africa indicated a slow productivity rate of 6.4 percent within the study period. This paper demonstrates that the KM domain remains an evolving and interesting phenomenon, which requires integration in different organizations. Every actualization of work performance today by individuals depends on tacit and explicit knowledge application, which forms the spectrum of KM.

4 Research Methodology

The Scopus and Web of Science databases are the most widely used indexing tools in bibliometrics. The author used Scopus database to harvest data on research papers published in the KM domain. In comparison to the Web of Science, Scopus has extensive coverage of academic literature (Farooque, Zhang, Thürer, Qu & Huisinigh 2019); (Gaviria-Marin, Merigo & Popa 2018). Moreover, Scopus is one of the largest multidisciplinary databases of peer-reviewed literature from scholarly journals (Bartol, Budimir, Dekleva-Smrekar, Pusnik, & Juznic, 2014); (Norris & Oppenheim 2007). Therefore, Scopus was used to extract the bibliographic data for this study.

The research was conducted by following the systematic literature review general strategy proposed by Nunes *et al.* (2009) and specific protocol suggested by Jesson, Matheson and Lacey (2011). The approach adopted consists of the following steps: 1. Identification of keywords; 2. Production of search queries; 3. Definition of inclusion and exclusion criteria 4. Identification of relevant databases; 5. Query of databases and selection of relevant documents; 6. Analysis of the dataset selected.

Science mapping is an approach based on the use of techniques aimed to build bibliometric maps that describe how specific disciplines and scientific domains are conceptually and intellectually related. Among the most commonly used techniques in science mapping are co-citation analysis and the keyword co-occurrence. The researcher used VOSviewer software to conduct network analyses for the following reasons: (1) it is an easy-to-use tool; (2) it allows to visualize large networks and presents clearly the results; (3) it incorporates three types of visualizations: network visualization, overlay visualization, and density visualization; (4) it offers distance-based visualization in which the nodes' distance infers their relatedness (Van Eck & Waltman 2014); and (5) it helps in visualizing the outputs through various bibliometric metrics (Merigó, Pedrycz, Weber & de la Sotta 2018).

4.1 Identification of Keywords and Production of Search Queries

The focus of the present review was to identify KM research in Africa. Therefore the followed keywords were selected: knowledge management, knowledge sharing, tacit knowledge, and explicit knowledge. To these keywords Africa was added. Structured searches were carried out in a well-established database called Scopus.

4.2 Inclusion and Exclusion Criteria

Structured searches were performed for the records published from 2000 to 2021. The study adopted the specified period mentioned above and, as such, studies published before or after that boundary were not included. After screening the titles, keywords, abstracts, and duplication check, 352 full texts were identified and included in this research.

4.3 Construct Keyword Co-occurrence Networks

In bibliometrics, keywords are often used as tools to identify the research content, core topics, and method/technology used in a certain field. For identifying and analysing the distribution and evolution of core topics in KM research, we constructed keyword co-occurrence networks. Co-word (or word co-occurrence) refers to the specific statistical correlations between different words or keywords that appear in the same document. A keyword co-occurrence network therefore shows the relationship between these keywords in the form of a network map. The closer the distance between certain keywords, the more relevant they are. Additionally, these more relevant keywords form a cluster that can then be used to describe a core topic of research. A whole series of topic analyses can then be conducted using these keyword co-occurrence networks. VOSviewer was used to build keyword co-occurrence networks that reflect the state of research in the field of KM.

5 Results

This section presents the results followed the objectives that guided this chapter.

5.1 Publication Counts by Year between 2000 and 2021

The publication count between 2000 and 2021 indicated that there were 352

publications in Africa in this period of 21 years (Table 1). The number of publications per year varied from 2 to 36. There was very little growth in publications in the KM domain during the period 2000-2006. However, there was a significant increase in the number of publications from 2008 to 2021 with a sudden leap in the year 2007. The largest number of publications was recorded in 2008 when 36 publications were produced; this was followed by 27 publications in 2010, 2016 and 2020, respectively (Figure 1). The lowest number of KM publications was recorded in 2000.

Table 1: Distribution of publications by year

Year	Frequency	Percent	Cumulative Percent
2000	2	.6	.6
2001	4	1.1	1.7
2002	4	1.1	2.8
2003	4	1.1	4.0
2004	7	2.0	6.0
2005	3	.9	6.8
2006	7	2.0	8.8
2007	15	4.3	13.1
2008	36	10.2	23.3
2009	26	7.4	30.7
2010	26	7.4	38.1
2011	20	5.7	43.8
2012	17	4.8	48.6
2013	16	4.5	53.1
2014	14	4.0	57.1
2015	20	5.7	62.8
2016	27	7.7	70.5
2017	13	3.7	74.1
2018	21	6.0	80.1
2019	25	7.1	87.2
2020	27	7.7	94.9
2021	18	5.1	100.0
Total	352	100.0	

Figure 1 shows that KM publications varied from year to year with ups and downs. It can be deduced that the growth rate was slow considering the range of years. These results indicated that the most publications in the KM domain were in 2008 (36: 10.2%), followed by 2010 (27: 7.4%), 2016 (27: 7.4%), 2016 (27: 7.4%), and (27: 7.4%), as the four highest publication years. The year with the least publications was 2000 (2: 0.6%).

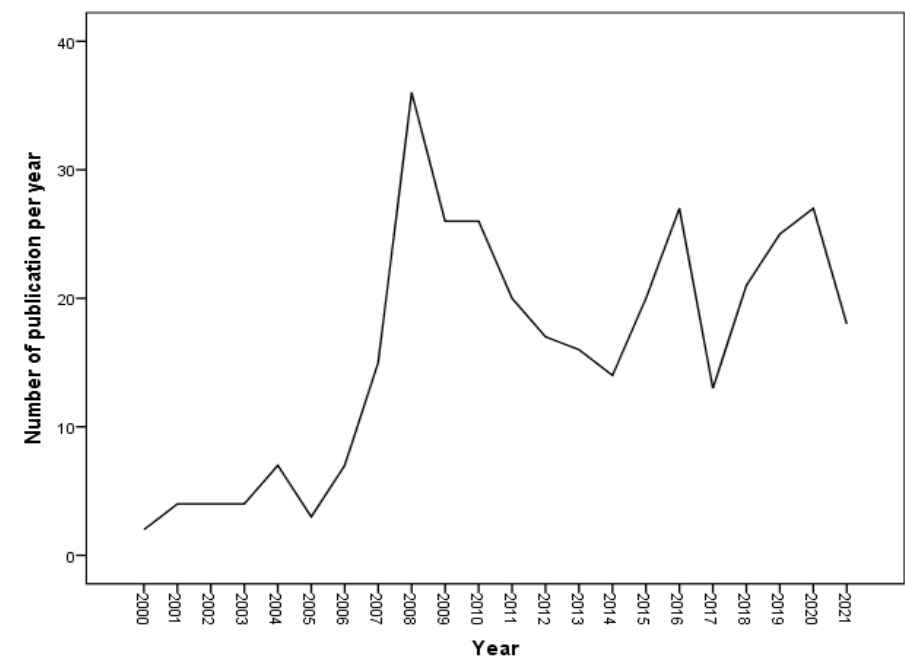


Figure 1: Trends of growth in publication counts per year

5.2 Means of Communication in KM Publications

This section gives the means through which KM publications were communicated (Table 2). The results indicated that articles (171: 48.6%) were the highest, followed by conference papers (142: 40.3%), book chapters (16: 4.5%), and reviews (16: 4.5%). The least results were short surveys (4:1.1%), notes (2:0.6%), and letters (1: 0.3%). These results revealed that most scholars/researchers published their work in peer reviewed journal and conference proceedings, where the most recent events are communicated.

Table 2: Document type

	Frequency	Percent	Cumulative Percent
Article	171	48.6	48.6
Conference Paper	142	40.3	88.9
Book Chapter	16	4.5	93.5
Review	16	4.5	98.0
Short Survey	4	1.1	99.1
Note	2	.6	99.7
Letter	1	.3	100.0
Total	352	100.0	

5.3 Author Collaborations

Table 3 lists the findings by the identified authors. It indicates that the number of authors involved in writing KM research ranged between 1 and 5. Ninety-two (26.1%) were single authored publications and 260 (73.9%) were multi-authored publications. The results indicate that the highest number of publications (132; 37.5%) were two-authored. This is followed by three authored (74; 21.0%); single author contributed 92 (20.1%) publications, while four authored contributed 20 (5.7%) publications. The number of joint contributions by five authored was 34 (9.7%).

Table 3: Single vs. multi-authorship patterns of KM papers, 2000-2021

Number of authors	Frequency	Percent	Cumulative Percent
1	92	26.1	26.1
2	132	37.5	63.6
3	74	21.0	84.7
4	20	5.7	90.3
5	34	9.7	100.0
Total	352	100.0	

5.4 Keyword Co-occurrence Analysis

Keyword co-occurrence is a common research method in bibliometrics. By studying the co-occurrence relationship of co-occurring keywords in a large number of documents, it is used to analyze the link strength between co-occurring keywords. Its usage is to describe the internal relationship and structure of a certain academic field and to reveal the research front of the subject. The research front refers to the conceptual combination of temporary research topics and basic research issues, as well as theoretical trends and new topics that arise or emerge unexpectedly.

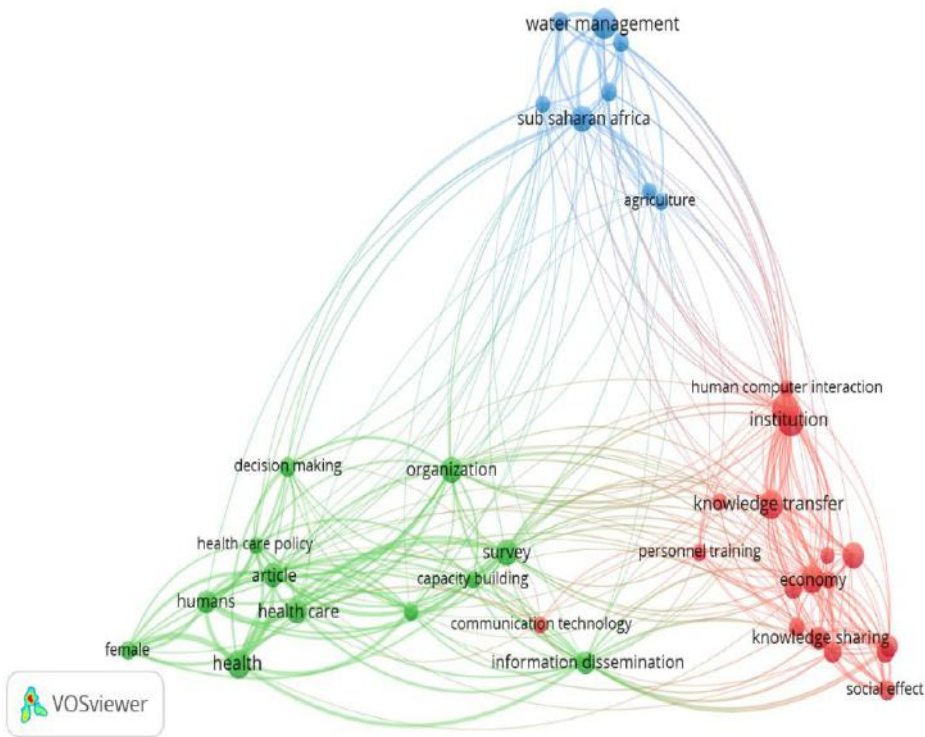


Figure 2. Co-word analysis of keywords

In VOSviewer, co-occurrence analysis is used to generate a KM research co-occurring keyword network, as shown in Figure 2. Consequently, the text

mining software generated an intellectual distribution map of 38 items (terms), assigned to three different clusters (Figure 2), sharing 302 links and a total link strength of 1206. An initial finding is represented by the strong correlation between all 19 terms.

Cluster 1 consisted of the following 18 items:

communication technology; economic; economics; economy; engineering education; human - computer interaction; institution; knowledge acquisition; knowledge sharing; knowledge transfer; online; personnel training; project management; social; social effects; societies; teaching; and technology transfer.

Cluster 2 consisted of the following 12 items:

article; capacity building; decision making; female; health; health care; health care policy; human; information dissemination; organization; questionnaire; and survey.

Cluster 3 consisted of the following 8 items:

agriculture; climate change; Nigeria; resource allocation; Southern Africa; Sub-Saharan Africa; water management; and water resource.

5.5 Top Journals in which KM Articles are Published

In this section, the results (Table 4) relating to the top journals in which KM articles are published indicated that the Proceedings of the European Conference on Knowledge Management (27: 7.6%) was used the most, followed by Proceedings of International Business Information Management Association Conference (12: 3.4%), Journal of Knowledge Management (11: 3.1%), Aslib Proceedings New Information Perspectives (8: 2.3%), Physical Chemistry Earth (8: 3.1%), Proceedings of the International Conference on Intellectual Capital, Knowledge Management and Organisational Learning (ICICKM) (8: 2.3%), International Conference Proceedings Series (7: 2.0%), Lecture Notes in Computer Science (LNCS) (5: 1.4%), and Proceedings International Conference on Industrial Engineering and Operations Management (5: 1.4%). It can be noticed that most of the journals are not only in the KM domain but also in different

subject areas because KM is a multidisciplinary field. These findings have revealed that knowledge management, being an interdisciplinary field, in published journals in different disciplines.

Table 4: Top journals in which KM articles are published

	Frequency	Percent
Proceedings of the European Conference on Knowledge Management (ECKM)	27	7.6
Proceedings of the International Business Information Management Association (IBIMA)	12	3.4
Journal of Knowledge Management	11	3.1
Aslib Proceedings: New Information Perspectives	8	2.3
Physics and Chemistry of the Earth	8	2.3
Proceedings of the International Conference on Intellectual Capital, Knowledge Management and Organisational Learning (ICICKM)	8	2.3
ACM International Conference Proceeding Series	7	2.0
Lecture Notes in Computer Science	5	1.4
Proceedings of the International Conference on Industrial Engineering and Operations Management	5	1.4

5.6 Distribution of KM Publications by African Countries

The results in this section (Table 5) indicate that, of the various countries in Africa where KM articles are published, South Africa (234: 68.6%) was at the top of the list, followed by Nigeria (17; 5.0%), Uganda (14; 4.1%), Kenya; 12; 3.5%), Botswana (10; 2.9%) and Mauritius (7; 2.0%). Together these countries produced 86.2% of the KM publications. The rest of the countries (Egypt, Ethiopia, Ghana, Namibia, Tanzania, Zambia, Tunisia, Algeria, Benin, Congo, Zimbabwe, Burkina Faso, Cameroon, Cape Verde, Gabon, Lesotho, Morocco and Rwanda) produced 13.8% of the KM publication. Furthermore, it was observed

that African countries collaborate with other countries outside Africa like the USA, England, Germany, Netherlands, Canada, and others. These results indicated that South Africa is doing very well in academic growth and research productivity in the KM domain compared to other African countries (Table 5).

Table 5: Distribution of KM by African countries

	Frequency	Percent	Cumulative Percent
South Africa	234	68.6	68.6
Nigeria	17	5.0	73.6
Uganda	14	4.1	77.7
Kenya	12	3.5	81.2
Botswana	10	2.9	84.2
Mauritius	7	2.1	86.2
Egypt	5	1.5	87.7
Ethiopia	5	1.5	89.1
Ghana	5	1.5	90.6
Namibia	5	1.5	92.1
Tanzania	5	1.5	93.5
Zambia	4	1.2	94.7
Tunisia	3	.9	95.6
Algeria	2	.6	96.2
Benin	2	.6	96.8
Congo	2	.6	97.4
Zimbabwe	2	.6	97.9
Burkina Faso	1	.3	98.2
Cameroon	1	.3	98.5
Cape Verde	1	.3	98.8
Gabon	1	.3	99.1
Lesotho	1	.3	99.4
Morocco	1	.3	99.7
Rwanda	1	.3	100.0
Total	341	100.0	

Table 6 lists foreign countries collaborating with African countries in KM research. Foreign countries collaborated with African countries in a total of 234 publications.

Table 6: Foreign countries collaboration with African countries in KM research

	Frequency	Percent	Cumulative Percent
United States	53	22.6	22.6
United Kingdom	51	21.8	44.4
France	24	10.3	54.7
Germany	17	7.3	62.0
Netherlands	16	6.8	68.8
Canada	11	4.7	73.5
Finland	9	3.8	77.4
Australia	6	2.6	79.9
Sweden	5	2.1	82.1
Denmark	4	1.7	83.8
Italy	4	1.7	85.5
Belgium	3	1.3	86.8
Iran	3	1.3	88.0
Ireland	3	1.3	89.3
Switzerland	3	1.3	90.6
Austria	2	.9	91.5
China	2	.9	92.3
Malaysia	2	.9	93.2
Mexico	2	.9	94.0
Romania	2	.9	94.9
United Arab Emirates	2	.9	95.7
Costa Rica	1	.4	96.2
Estonia	1	.4	96.6
Hungary	1	.4	97.0
India	1	.4	97.4
Lebanon	1	.4	97.9
Norway	1	.4	98.3
Peru	1	.4	98.7
Portugal	1	.4	99.1
Puerto Rico	1	.4	99.6
Scotland	1	.4	100.0
Total	234	100.0	

The United States (53), United Kingdom (51), France (24), Germany (17), the Netherlands (15), and Canada (11) were the major collaborators with African countries in KM research. These countries contributed 73.5% of the 234 publications. Furthermore, the findings indicate that African scholars mainly collaborate with European scholars (148) and North American scholars (64). Together these two continents collaborated with African scholars in a total of 212 KM publications, which is 62.2% of the total KM research output produced during the period under review.

5.7 Most Productive Institution by Affiliations in KM

It was established that the most productive institutions in the KM domain were in South Africa (Table 7); together they contributed 58.8% of the publications.

Table 7: Top African institutions that contributed KM publications

	Frequency	Percent	Cumulative Percent
University of Pretoria	34	8.6	8.6
University of South Africa	32	8.1	16.8
University of Johannesburg	27	6.9	23.6
University of Cape Town	24	6.1	29.7
University of KwaZulu-Natal	15	3.8	33.5
Makerere University	11	2.8	36.3
University of Botswana	10	2.5	38.8
North-West University	8	2.0	40.9
Tshwane University of Technology	8	2.0	42.9
Cape Peninsula University of Technology	7	1.8	44.7
Stellenbosch University	7	1.8	46.4

University of the Witwatersrand	7	1.8	48.2
University of the Western Cape	6	1.5	49.7
University of Zululand	6	1.5	51.3
University of Mauritius	4	1.0	52.3

At the top of the list was the University of Pretoria (34: 8.6%), followed by the University of South Africa (32: 8.1%), the University of Johannesburg (27: 6.9%), the University of Cape Town (27: 6.9%), and the University of KwaZulu-Natal (15: 3.8%). These South African institutions were followed by the University of Makerere, Uganda, which produced 11 (2.8%) publications; and the University of Botswana (10: 2.5%). It is therefore, worth noting that KM research is dominated by academic institutions, mainly universities, followed by research institutions.

6 Discussion

This paper conducts a bibliometric overview of KM literature in Africa using the Scopus database. A total of 352 publications were produced during the period 2000-2021 as captured by the Scopus database; giving an annual average of 17 publications. These results indicate that African research output in the field of knowledge management is still very low and varied from year to year; thus confirming earlier findings by several scholars who observed that although many African scholars are gradually conducting research in KM, the research output in this field is still slow (Oyetola & Enakrire 2022). This slow growth could be attributed to a number of factors such as lack of awareness of this field of study, poor access to research funds, lack of interest in the field of knowledge management, and researcher capabilities. Furthermore, limited access and use of information and communication technology, as well as the digital divide between the countries, may be a reason behind such difference of contribution among the African countries. This paper contributes to the body of knowledge by providing a comprehensive overview of KM literature in this way.

The major communication channels used by African researchers to disseminate KM research are journal articles, followed by conference papers.

The least results were short surveys, notes and editorial letters. Data paper, meetings, abstracts, and reprints were not popular means of communicating KM research. These findings agree with Jain (2020) and Oyetola and Anakrire (2022) who reported that most of African KM research output was mostly in article form. The popularity of articles and conference papers as communications channels for KM could be attributed to improved access to online publishing, especially in open access journals where the most recent events are communicated. Furthermore, conferences provide an opportunity for scholars to share cross cutting and trending topics. Increased collaboration with scholars in the developed world has also contributed to increased access to publishing in peer reviewed journals. Others are book chapters and reviews.

The analysis has revealed that majority of the African KM research output is co-authored, dominated mainly by two-authorship. These results agree with previous findings by Nyamasega, Onyancha and Kwanya (2019). Therefore, it can be concluded that in Africa the KM research landscape is dominated by contributions from small numbers authors comprising two, three or four co-authorship; although single authorship is still lingering in the background.

It was established that the top journals in which African KM articles were published include *Proceedings of the European Conference on Knowledge Management (ECKM)*, *Proceedings of the International Business Information Management Association (IBIMA)*; *Journal of Knowledge Management*; *Aslib Proceedings: New Information Perspectives*; *Physics and Chemistry of the Earth*; *Proceedings of the International Conference on Intellectual Capital, Knowledge Management and Organisational Learning (ICICKM)*; *ACM International Conference Proceeding Series*; *Lecture Notes in Computer Science*; and *Proceedings of the International Conference on Industrial Engineering and Operations Management*. It is worth noting that most of these journals are not in the KM domain but in different subject areas. This is attributed to the fact that that KM is an interdisciplinary field.

South Africa currently dominates, in terms of number of publications, followed by Nigeria with 17 publications (5.0%), Uganda with 26 publications (4.1%), Kenya with 12 publications (4.1%), and Botswana with 10 publications (2.9%). This South African dominance can be attributed mostly improved funding and provision of better researcher infrastructure. These results confirm earlier findings by various scholars (Nyamasege, Onyancha & Kwanya 2020; Oyetola & Enakrire 2022) who have reported that South African institutions are leading in the publication of KM research in Africa. The most prolific South

African institutions in KM research include the University of Pretoria, the University of South Africa, the University of Johannesburg, the University of Cape Town, and the University of KwaZulu-Natal. These are among the best universities in Africa mainly due to adequate funding and provision of infrastructural facilities, thus leading to deepened research practices in the various institutions (Oyetola & Enakrire 2022). These are followed by institutions in Kenya, Nigeria and Botswana.

The results have revealed that United States, United Kingdom and France based institutions are the major foreign based institutions that have a strong collaboration in KM research with African institutions. It was further observed that African collaboration with Asian, South American and Australian scholars in KM research was more or less insignificant. These results confirm earlier studies by (Oyetola & Enakrire 2022) and (Nyamasege, Onyancha & Kwanya 2020). Therefore, this study has confirmed that collaborative research between Africa and the North and is becoming increasing more frequent and more extensive in the field of KM, just like other fields. This is largely due to funding of African scholars and academics in the North probably through bilateral aid agencies, multilateral organizations, and national and international non-government organizations. Easier access to increasingly less expensive information and communication technologies, and exchange programs have also contributed to increasing volume research collaboration between Africa and the North (Luukkonen, Persson & Sievertsen 1992). These collaborative projects offer many advantages including access to new funding sources, access to methodological expertise and valuable new data sources, as well as opportunities to publish in high impact journals. Lack of strong collaboration with the Asian, South American could be attributed to language barriers as these continents are non-English speaking.

7 Conclusions and Recommendations

This study aimed at analyzing the growth of research output in the knowledge management domain in Africa, using the Scopus database, covering the period 2001-2021. The findings indicated that 352 publications such as articles, conference papers, reviews, short surveys, notes, and letters were the platforms used the most within the period. African researchers mainly disseminated their KM research through journal articles and conference proceedings. Majority of the KM publications were multi-authored. Growth rate of KM publications

during the period under was slow and varied from year to year. The leading channels in which African scholars published KM research were the Proceedings of the European Conference on Knowledge Management, Proceedings of International Business Information Management Association Conference, and the Journal of Knowledge Management. The most productive institutions by affiliation were the five leading South African universities, namely: University of University of Pretoria, the University of South Africa, the University of Johannesburg, the University of Cape Town and the University of KwaZulu-Natal. African institutions mainly collaborated with the North with the United States leading followed by the United Kingdom.

The study recommends increased financial and institutional support to boost KM research in Africa. African scholars are encouraged to conduct more research in this field and publish it in both open access journals in order to enhance its visibility. Furthermore, African researchers should continue presenting the findings of their research in KM at local conferences to in order to increase the awareness of the KM field and the use of bibliometrics among African scholars.

Although this article significantly contributes to the field of KM, nevertheless this study is not without limitations. Scopus database does not index all the journals publishing KM, particularly a substantial number of African journals that are still being published as print journals. Hence, several other major databases should be considered (e.g. WoS, EBSCO and Google Scholar) in future research. Furthermore, reliance on a few search terms may have limited the number of publications retrieved. Lastly, research production in terms of quantity may not reflect research quality or impact. Thus, the quality or impact of the publications reviewed in this study was not assessed.

This study gives a noteworthy contribution to the body of knowledge on KM. The present study applies bibliometrics to identify the most influential institutions and countries as per the number of articles published. Secondly, the findings can assist the private sector and governments to identify the main research institutions working in the field of KM for further funding. Thirdly, editors organizing special and regular issues on the topic can invite leading authors and institutions. Fourthly, the clustering of keyword co-occurrence can provide a guide to scholars to identify the research gaps and new areas for further research in KM. Finally, compared to prior qualitative literature reviews, the usage of bibliometrics offers a more rigorous, updated, and detailed outline of research on KM.

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Chapter 9

The Role of Records Management in Good Governance, Transparency, Accountability and Human Rights in Africa

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Abstract

Well preserved and organized public records serve various purposes. They constitute an indispensable national resource, documenting a country's collective memory, showing its culture, traditions, aspirations as well as its past failures and successes. Public records shed light on the country's past development efforts, its demographic details, and provides valuable information needed for planning and development purposes. Records also play a critical role in the promotion of national identity and in fostering a sense of nationhood and belonging. Above all, records are of great importance in the administration of justice, holding governments accountable for their actions, the protection of individual's rights and entitlements and in fostering national cohesion. However, despite the critical role played by public records, in many African states, they remain a neglected resource; inaccessible and under-utilized. This is due to various factors ranging from backlog accumulation of unprocessed collections, restrictive legislative regimes and sheer negligence. This chapter seeks to articulate the critical role played by records and archives in promoting good governance, transparency, accountability and the protection of rights and entitlements of individuals in Africa. It also investigates the various factors inhibiting utilization of records for the attainment of good governance, transparency, accountability and the protection of rights and entitlements by citizens in Africa. The chapter concludes by proposing measures, which when implemented, will enhance the management and preservation of records in Africa.

Keywords: Accountability, Archives and National Identity, Corruption, Records Management, Good governance, Transparency, Protection of Human Rights

1 Introduction

The value of records in the society cannot be overstated. The International Council on Archives (ICA) (2014), argues that records constitute the memory of nations and of societies, shaping their identity, and serve as a cornerstone of the information society. The association went on to state that records are a basic resource needed to assert the rights and entitlements of the citizens. ICA (2014) further argued that records are an essential part of a national heritage useful for cultural and economic development. To start with, what is a record? A record may be defined as a document regardless of form or medium created, received, maintained and used by an organization (public or private) or an individual in pursuance of legal obligations, or in the transaction of business of which they themselves form a part or provide evidence (International Organization for Standardization 2016). A record may include a report, fax, e-mail message, telex, telegram, internal memoranda, photograph, compact discs, video, sound recording or film. Records may also include registers, ledgers, architectural or engineering drawings (maps) and computer printouts. In most organizations, paper documents or files are the most prevalent form of records. Records may be handwritten, typewritten or printed. Traditionally, records management was seen as that area of general administration which is basically concerned with achieving efficiency and economy in the creation, maintenance and use of records and in ensuring the timely disposal of records that are no longer required to support the current business of the organization. Yusuf and Chell (2005:129) posit that records management is, 'a relatively new branch of information management that has proved to be successful in developed countries, where such systems can maximise production and the exploitation of resources and contribute substantially to development'. With advances in the use of information technology in the creation, storage, retrieval and disposal of information, records management should be viewed within the broader context of information management. Generally, records management is concerned with the capturing of information created or received in the organization, providing timely access and retrieval of information, and in ensuring that the information is protected and retained for as long as it is needed to support organizational

activities. Records management should also be viewed as a key strategic resource necessary for strategic planning, a tool used to fight corruption, enable citizens to hold their institutions accountable and transparent, and as means of ensuring the protection of rights and entitlements by the citizens. Without records, it is virtually impossible to know who did what and when. An understanding of records management must begin with the knowledge of what organizations do. This is because records are not created in a vacuum. They are information products generated as a result of activities and transactions which form part of the business process.

Public records, which are the focus of this chapter, may further be defined as records emanating from the activities of the government and include records created or received in the course of conducting the activities of governments. Such records would normally include records of the national assembly, the judiciary, central government ministries and departments, local governments and local councils, state funded agencies (corporations and quasi-governmental institutions), commissions of inquiry funded by the national treasury, and records created by institutions that are funded directly from the Treasury. Public institutions rely on records for the execution of their day-to-day activities, hence timely access to institutional records ensures that decisions are based on reliable and accurate information.

In as much as records management is concerned with the efficient and effective management of current and semi-current records, it is equally interested in the long-term preservation and accessibility of the corporate memory of organizations. The significance of preserving public records was perhaps best summed up by Arthur Doughty, the Canadian Dominion Archivist when he wrote, 'Of all national assets, archives are the most precious, they are the gifts of one generation to another, and the extent of our care of them marks the extent of our civilisation' (Doughty 1924:1).

Although records play a critical role in the effective management and operations of public institutions, they are often a neglected resource or are poorly managed. Consequently, this results in poor decision making, inefficient and expensive service delivery, curtailment of rights and entitlement by members of the public, increased corruption, plunder of public resources by those charged with managing public resources, delays in the administration of justice in the courts, lost opportunities as well as delays in the completion of government projects. Tale and Aleffaio (2011) observed that records keeping in developing countries has not received the attention it deserves. Similar senti-

ments were expressed by Mosweu and Rakamane (2020:104) who state that ‘Examples across the continent of Africa have shown that where there was bad governance, records were poorly kept’. Yusof (2022) posited that as a whole, issues relating to records management are often ignored or overlooked, due to lack of awareness and perceptions that records are insignificant resources in the organization. Burns, Ferris and Liatsopoulos (n.d.) noted that in Africa, the practice of managing records is often seen as a needless or a minor administrative function that can be undertaken by any member of staff within the organization. All these authors stressed the need to have good filing systems and well trained personnel in the field of records management. The sections that follow explore various aspects which are impacted upon by ineffective and inefficient records keeping systems in public institutions.

2 Records Management and Good Governance

The concept of good governance has been defined differently by various authors. According to the United Nations Office on Drugs and Crimes (UNIDOC) (2022:1), good governance is defined as ‘the process whereby public institutions conduct public affairs, manage public resources and guarantee the realization of human rights in a manner essentially free of abuse and corruption, and with due regard for the rule of law’. The United Nations Office of the High Commission on Human Rights (2022), identified the attributes of good governance to include: full respect of human rights, the rule of law, effective participation, multi-actor partnerships, political pluralism, transparent and accountable processes and institutions, an efficient and effective public sector, legitimacy, access to knowledge, information and education, political empowerment of people, equity, sustainability, and attitudes and values that foster responsibility, solidarity and tolerance’. Dikopoulou and Mihiotis (2012) on the other hand define good governance as the exercise of the Executive, Legislative and Judicial power for the public and state leadership by political, elective administrative authority organs. There is general agreement that good governance relates to the manner in which power is utilised in the management and utilization of public resources for national development. The United Nations Economic and Social Commission for Asia and the Pacific (n.d.:1) asserted that accountability is a key requirement of good governance. The UN agency went on to state that ‘not only governmental institutions but also private sector organizations and civil society must be

accountable to the judiciary and an impartial and incorruptible police force'. The existence of good governance can only be evident if information held in the records created by the institutions charged with the management of public resources and their utilization, are readily available for audit purposes and public scrutiny. Without access to the records and the information contained therein, or in those situations where officials deliberately fail to create or capture records as evidence of their activities and decisions; issues of good governance become questionable and opportunities for corrupt practices begin to emerge.

The relationship between good governance and records management was perhaps best stated by Kargbo (2009) when he noted that:

The link between good governance and record keeping cannot be over-emphasized. Information is a key public resource; there cannot be accountability, responsiveness and active citizenship without information. Governments are concerned with the quality of information they hold; they also have a responsibility to ensure that members of the public have the information they need to fulfill their rights and obligations. Good governance values are identified, defined and promoted in records. Authority is authenticated and exercised through recorded laws and regulations. Institutional policies and practices are developed, expressed and managed by means of records. The relationship, rights and mutual obligation of governments and society are defined, expressed, promoted, defended and measured by means of records'.

3 Records Management, Accountability and Transparency

Paul (1991:2) defined accountability as 'holding individuals and organizations responsible for performance measured as objectively as possible'. Schenkelaars and Ahmad (2004:6) viewed accountability as 'the obligation of anyone handling resources, public office or other position of trust to report on the intended use of the resources of the designated office'. To Chabal (1986) accountability reflects a close relationship between stated intentions, goals or actions and services rendered to the public. Accountability also demonstrates the effective and efficient utilization of public resources. Chabal (1986) concluded that accountability is one major test for measuring consistency between public policy and service provision. Lack of accountability often leads to corruption, abuse of office, and misuse of public resources.

The United Nations Economic and Social Commission for Asia and the Pacific (n.d.:1) asserts that ‘transparency means that decisions taken and their enforcement are done in a manner that follows rules and regulations. It also means that information is freely available and directly accessible to those who will be directly affected by such decisions and their enforcement. Transparency further means that enough information is provided and that it is provided in easily untestable form and media’. Heller (2012:1) stressed that through information transparency ‘the public understands the workings of their government (including freedom of information initiatives; open data and Big [Public] Data efforts, including open data portals; procurement, budget, and policy transparency (e.g., voting records, meeting minutes, political finance transparency)’.

It cannot be over-emphasized that good record keeping is a key factor in achieving good governance, transparency, and accountability in public sector organizations. The usefulness of records as tools of good governance, accountability and transparency was illustrated by Piggot (2002:1) who argued that ‘without access to good records, officials are forced to take decisions on an ad hoc basis without the benefit of institutional memory. Fraud cannot be proven, meaningful audits cannot be carried out, and government actions are not open to review’. Clearly, there are justifiable reasons why governments need to manage and maintain records properly. According to Piggot (2002:3), these reasons are:

- (1) Government relies upon legislative records, court records, police and prison records to preserve the rule of law.
- (2) To demonstrate accountability to its citizens, a government relies upon policy files, budget papers, accounting records, procurement records, personnel records, tax records, election registers, property and fixed asset registers.
- (3) The protection of entitlements depends upon pension records, social security records, land records and birth/death records,
- (4) In providing services for its citizens, a government needs hospital records, school records, and environmental protection monitoring records.
- (5) In documenting its relationship with other countries, government needs foreign relations and international obligations, treaties, correspondence with national and international bodies, loan agreements etc;
- (6) Without adequate records, the effectiveness of development projects

suffer. There will be no means of verifying that the development projects fall within acceptable legal, financial and cultural boundaries of a client government. There will be no means to verify that funds for development are used as intended.

- (7) Lack of records management is directly linked to the persistence of corruption and fraud. Experts in financial management control recognize that well managed records systems are vital to the success of most anticorruption strategies. Records provide verifiable evidence to fraud that can lead to investigators to the root of corruption. Well-managed records can act as a cost-effective restraint. On the whole, prevention is much cheaper than prosecution.
- (8) The loss of control of records has consequences for all citizens, especially for the poorest, who are least able to defend themselves.

As argued by Piggot (2002), it is evident that without records, public servants and all those charged with the responsibility of managing public resources, cannot to be held accountable for their actions and the management of public resources that have been entrusted to them by the public. Consequently, Schenkelaars and Ahmad (2004:6) asserted that ‘accountability and transparency depend upon complete, accurate and legally verifiable records. Without reliable records, officials cannot be held accountable, and fraud cannot be prosecuted’. According to Casadesús de Mingo and Cerrillo-i-Martínez (2018), records management provides the foundation for transparency and accountability. They emphasized that:

Records management provides the operational basis for effective transparency in public administrations, as it permits the creation of quality documentation (authenticity, reliability and integrity), the tracking of decisions taken over time (traceability), the provision of the foundations for planning programmes, activities and budgets, the simplification and standardisation of records processes (simplification and standardisation), the fulfilment of the right to rapid access to information (accessibility and reliability) and the preservation of records over time (preservation).

While explaining the close relationship between records management and accountability, Ngoepe (2004) argues that:

To be accountable in the sense expected by modern governance is no easy matter. Accountability requires that the systems of reporting and controls in the organization are appropriate and transparent. At the base of many of these systems lies basic system of recordkeeping. If records were never going to be used again it would not matter how they were stored. Good recordkeeping is essential for accountability because records are the primary means by which governmental bodies explain their decisions and prove what they have done. The requirement for explanation and proof might come in the form of a single query from a member of the public. Success in answering such queries will depend on how well the governmental body has managed its records’ (Ngoepe 2004:2).

To support accountability, records management systems must be designed to ensure the creation of adequate records and their capture, maintenance and accessibility over time (Uppward 2000). The relationship between governance objectives and records needed to support them are shown in the Table 1 below.

Table 1: Records and their Values

Governance Objective	Key Records Required
Rule of law	Legislative records Court records Prison records citizen rights records
Accountability	Accounting records Procurement records Tax records Custom records Electoral records Policy files Case files
Management of state records	Budget papers Policy files. Accounting records Personnel records Payroll records Procurement records Fixed assets

	Fixed assets Property registry
Protection of entitlements	Pension records Social security records Land registration records Birth/death records

Source: World Bank/IRMT (2000)

4 Records Management and Corruption

The Webster and Oxford English Dictionary (2022) defines corruption as the ‘impairment of integrity, virtue or moral principles’, ‘the perversion or destruction of integrity in the discharge of public duties by bribery or favour’ and ‘moral deterioration or use of corrupt or tainted practices.’ According to the International Commission of Jurists (2004) corruption includes demanding and accepting cash bribes; sexual favours; free transport, hospitality and other gifts in return for partisan judgments; fraud through not accounting for money received, fiddling official receipts, stealing exhibits, abuse of office by doctoring evidence, and giving promotions through patronage rather than merit.

A survey conducted by Transparency International (2020) revealed that the most common cases of corruption included ‘absenteeism, informal payments from patients, embezzlement, inflating the costs of services, favoritism and manipulation of data (billing for goods and services that were never sent or done)’. According to Chukwuemeka (2022), very few countries are performing well on matters relating corruption and these include: Mauritius, Rwanda, Cape Verde, Namibia, Botswana, Seychelles, while eleven other African were reported to be performing poorly with regard to control of corruption related issues, The identified countries include Somalia, South Sudan, Equatorial Guinea, Sudan, Libya, Democratic Republic of Congo, Congo, Burundi, Chad and Zimbabwe.

The effect that corruption has on the society cannot be under-estimated. Wainaina (2007:1) posited that corruption drains vital resources meant for socio-economic development. Corruption is at the heart of Human Rights violations, torture, weakening of democratic institutions, impunity and undermining the rule of Law’. Wainaina went on to argue that ‘Corruption undermines public confidence in governance institutions and governments, leading to conflicts and propagates inequality, thus disenfranchising the largest

section of the society by denying it access to justice and human dignity. Corruption is anti-social justice, and it is the hindrance to fairness in access to resources and means of production'. Wainaina (2007) concluded that it is absolutely necessary to connect Human Rights, poverty, access to information and the fight against corruption.

The World Bank and International Records Management Trust (2000) argued that there is a direct relationship between record keeping and corruption. They asserted that:

The loss of control of financial records creates opportunities for fraud, leads to loss of revenue, and impedes fiscal planning. It makes it difficult, if not impossible, to preserve an audit trail of decisions, actions, and transactions. The consequences are particularly apparent in the procurement of goods and works. Well managed records provide a cost-effective deterrent to fraud and corruption. Records systems provide controls on access to records; track the movement of records through the organization; and provide reliable and authentic audit trails which demonstrate an unambiguous link between an authorization, an individual's actions, and a date. They can serve as evidence to identify abuse, misuse, and non-compliance with financial instructions and other laws and regulations. Without well-managed records anti-corruption strategies are impaired (The World Bank and International Records Management Trust 2000:1).

Similarly, studies conducted in Australia have revealed that there is a direct relationship between records and the audit process, which is essential in all governmental systems. Lowell (1987:2-4) opines that 'Government records have a unique character that imposes special responsibilities on the agencies that preserve and manage them'. He further stressed that 'the value of state records derives from information they contain and evidence they provide. State records not only document past decisions, but they also often establish and protect current rights and responsibilities of both the government and the governed'. He concluded that 'records provide a source of public accountability for the ways in which elected officials and the bureaucracy have carried out their public trust and the mandates of the citizenry'.

Effective management of records is a good weapon to dealing with corruption especially in the public sector. Well managed records provide veri-

liable evidence of what has actually happened and helps catch the corrupt official or other person. Similarly, poorly managed records provide bad or unreliable evidence, and help make it easy for corrupt activity to occur and flourish. Poor record keeping practices may also lead to the evidence contained in them being corrupted as part of the crime or corrupt activity. In other instances records may be destroyed, hidden, altered or forged. If this is easy to do without detection, again this helps make it easy for corrupt activity to take place.

Studies conducted by Dietel (2000) in Australia indicate that records can be useful and reliable tools in the fight against corruption, if they meet certain requirements. Dietel (2000) explained that for records to be considered as being useful in the fight against corruption, they must meet the following conditions:

- (a) They must be accurate, that is, they must accurately reflect the transactions that they document.
- (b) They must be reliable, that is when it is possible to rely on the evidence that they contain as being accurate. There are cases where, human error or deliberate falsehoods can affect the reliability of records, but this must be guarded against. One way of ensuring that records are accurate is the ability to prove that the records have been held under secure environments where they have not been tampered with. Sir Hillary Jenkinson, a well-known Keeper of Public records, posited that the reliability of the records is subject to proving that the records had been held under unblemished custody (Jenkinson 1966).
- (c) The records must be complete.
- (d) The records must contain the context in which the transaction was conducted,
 - business process of which the transaction documented by the record,
 - the participants in the transaction,
 - the exact time of the transaction or communication and
 - its chronological relationship with others (Dietel 2000).

Records play a vital role in the avoidance or propagation of corruption. Roberts (2001) argues that regardless of the technological environment, at the funda-

mental level, records feature in corruption in three possible ways:

- (a) the records provide good evidence of what has actually happened and help catch the corrupt official or other person,
- (b) the records, if there are any at all, provide bad or unreliable evidence and help make it easy for corrupt activity to occur and flourish.
- (c) the evidence, to the extent that it takes the form of records, may itself be corrupted as part of the crime or corrupt activity: records may be destroyed, hidden, altered or forged. If this is easy to do without detection, again it helps make it easy for corrupt activity to take place (Roberts 2001:1).

That records play a fundamental role in providing public accountability was further stressed by the International Records Management Trust (1999:8), a records management consultancy firm based in the U.K, when it was observed that ‘the ability to remove ambiguity and firmly establish who did what, when, why and how is a powerful means of constraining individuals from engaging in corruption and enforcing accountability. Well-managed records provide an unbiased and accurate account in recording responsibilities and therefore liability’.

5 Electronic Records Management, Transparency and Accountability

While electronic records have created opportunities for managing recorded information more effectively and efficiently including storage, retrieval and sharing of information in the organization, it has nonetheless created opportunities for corruption and other malpractices to flourish. Setareki and Opeta (2005:1) argued that ICTs ‘present opportunities for recordkeeping in developing countries. Examples include Enhanced retrieval systems and online search facilities to name a couple. Opportunities for compact storage through electronic and digital storage devices, are becoming more enticing to those responsible for records as they offer an alternative to bulky paper records that need a considerable amount of space for storage’. On the other hand, Burns, Ferris and Liatsopoulos (n.d.:16) argued that ICTs can ‘present an opportunity for developing countries to improve their Records information management

systems by allowing for advanced information retrieval systems and providing online search functions to the public. They also provide the ability to store huge amounts of information in a relatively small physical space on servers’.

Palmer (2000:66) contends that the potential for corruption and fraud in the electronic environment is even greater because of the characteristics which distinguish electronic records from paper records, namely:

- Easily lost, overwritten, erased or rendered inaccessible;
- Multimedia (comprise text, sound, image);
- Media independent, that is primarily logical rather than physical entities;
- Hardware and software dependent;
- Randomly located;
- Easily duplicated; and
- Stored on potentially unstable media.

Other known challenges relating to the management of electronic records include:

- (i) inadvertent destruction or corruption of electronic records;
- (ii) unauthorised tampering with electronic records; resulting in the authenticity of the original record being questioned.
- (iii) the possibility that electronic records and operating systems will become obsolete, due to constant upgrading or changing of computer systems.
- (iv) E-documents are system dependent and there is no guarantee that hardware and software they dependent on will be available in future.
- (v) Most organizations have established strict measures for managing their paper records, but not electronic records.
- (vi) Inadequate links between paper records and e-documents resulting in selective collection and preservation of e-documents.
- (vii) Records provide evidence of actions, but systems do not adequately capture necessary information about the context of the creation and use of the records.

Schenkelaars and Ahmad (2004:8) posited that ‘electronic records are far more

vulnerable than paper records and must be carefully managed to ensure their accuracy and to maintain an audit trail of their handling. The current technology of scanning, copying, imaging, and colour printing make it possible to create documents that are indistinguishable from their originals. This technology opens up the possibility to manipulate, falsify and forge contents in documents'. Schenkelaars and Ahmad (2004:8) further assert that 'electronic systems can create increased opportunities for corruption and fraud pointing out that users may collude with ICT technicians, ICT technicians may take advantage of information monopolies, or local managers may remove controls that existed in paper systems'. Moreover, Schenkelaars and Ahmad (2004:8) noted that many if not most users of ICT systems including legal experts, auditors, and accountants are not always fully aware of the issues involved, and of the operational, legal and accountability implications. It is of vital importance that records managers and information technology personnel, work collaboratively to ensure that records created or received via electronic systems are captured and preserved as part of an institution's recorded memory. Failure to do so is bound to result in information gaps in the collective memory of the Organization.

6 Records Management and The Protection of Rights and Entitlements

In 1998, The United Nations General Assembly acknowledged access to information as being a critical component in the protection of Human Rights when adopting the Declaration on the Right and Responsibility of Individuals, Groups and Organs of Society to Promote and Protect Universally Recognized Human Rights and Fundamental Freedoms (the Declaration on Human Rights Defenders) (Office of the United Nations High Commissioner for Human Rights 1998). Article 6 of the Declaration stipulates that:

Everyone has the right, individually and in association with others:

- (a) To know, seek, obtain, receive and hold information about all human rights and fundamental freedoms, including having access to information as to how those rights and freedoms are given effect in domestic legislative, judicial or administrative systems.
- (b) As provided for in human rights and other applicable international instruments, freely to publish, impart or disseminate to other views, information and knowledge on all human rights and fundamental freedoms; and

- (c) To study, discuss, form and hold opinions on the observance, both in law and in practice, of all human rights and fundamental freedoms and, through these and other appropriate means, to draw public attention to those matters.

The above stated rights and benefits can only be enjoyed if records are well maintained and are easily accessible when required. The effective management of records promotes the protection of rights and entitlements by the citizens. According to Ngoepe (2008:1) ‘the proper management of records is the foundation any government needs to provide services to fulfil its obligation of accountability towards its citizens and to protect their rights. Lack of records of birth, citizenship, property ownership, health, social grants etc., hinders the government from addressing issues such as poverty, crime, social grants, land rights and even the provision of basic services such as water and electricity’.

Studies conducted by the International Records Management Trust (2000) suggest that there is a direct relationship between records management and the protection of rights and entitlements of the citizens. International Records Management Trust (2000:1) avers that ‘The public suffers when inadequate information systems affect the delivery of programs as all aspects of public service including health, education, pension, land and judicial rights depend upon well-kept and well managed records’. According to the Office of the United Nations High Commissioner for Human Rights Report (2014), ‘lack of civil records denies citizens their right to obtain legal identity and citizenship. A birth record provides proof of citizenship and family relationship. It also provides legal proof of age, dependency status, legitimacy status on which a wide variety of rights depend, particularly in regard to the exercise of civil functions, entitlements to family allowances, education, property ownership, etc’.

7 Records Management and COVID-19 Pandemic

This chapter will be incomplete without reference to the impact that Covid-19 pandemic has had on records management and the delivery of public services in the world and Africa in particular. The Covid-19 pandemic has impacted organizations in different ways. For some, the pandemic has presented unprecedented challenges while for others it has provided opportunities for exploring new and innovative ways of delivering archives and records management services in a manner that ensures continuity of access to the vast

amounts of records and other information resources held in both public and private sector organizations. Due to frequent lockdowns, most organizations have had to suspend their operations, limit the number of staff working in the key function areas while others were permitted to work from their homes. Perhaps one of the key areas where the impact of Covid-19 is noticeable relates to the management and utilization of records in the organization.

The COVID- 19 pandemic has had unprecedented impact on organizations. Ayassa (2020) observed that during the Covid-19 pandemic, managers in Australia faced some of the following problems:

- (i) Many Australian government agencies were not operating in a cloud environment, which of course became a huge thing when those organizations needed to be able to quickly enable those who had to work from home.
- (ii) Only 31% of the organizations studied had migrated to cloud-based applications, although 39% were on their way.
- (iii) The significant reliance on paper records. In one organization it was reported that ‘An entire department could not be deployed to work from home because they would lose access to basically all their information! There would be no way to digitize the volume of content in the timeframe available, so everyone had to keep coming in each day’.
- (iv) Some teleworking employees may find that they use personal email accounts or other electronic messaging applications, like text messages or messaging apps within social media or video conferencing tools, to communicate for work’.

Millward (2021) observed that COVID-19 pandemic had impacted organizations in numerous ways. He went on to argue that:

The effect on employment can also be seen in the way people work. Jobs that were previously carried out in offices for years are now being done remotely (where possible), resulting in businesses and employees having to adapt the way they work. Tasks that previously would have taken minutes could now take much longer (for example, printing a document and handing it to a colleague) and things previously taken for granted (colleagues in the office to ask a quick question to, in-person

collaboration needed for creativity, etc.) may not be as readily available or easily done. However, during all the changes and uncertainties that this last year has brought, the benefits of an automated document management system have been emphasized. Businesses and employees were suddenly faced with challenges to complete routine processes whilst working from home. An example of this is that supplier invoices which were usually posted to your office no longer had anyone to receive, scan them in and process them. The ease a system brings to day-to-day duties and the overall benefits of the streamlining of business processes have been amplified (Millward 2020:1).

In as much as Covid-19 pandemic has brought about records management challenges, it has also created opportunities for organizations to benefit more from the use of information and communication technologies especially the adoption of document management systems. In Africa the effects of Covid-19 pandemic have clearly been observed in the lack of accountability and transparency in the utilization of resources especially in the use of donated funds from the West which were aimed at procurement of medical equipment and drugs. A study by Aikins (2022) from the Institute of Security Studies in South Africa revealed that while Covid-19 pandemic had been less deadly in Africa than elsewhere in the world, African economies had suffered a double blow due to graft in the high echelons of power especially in the procurement of protective equipment and medicines. Citing several cases drawn from African countries, Aikins (2022:1) reported that:

Corruption related to COVID-19 has been reported from all over Africa, mainly in procurement. In Cameroon, a 2021 audit revealed the misuse of about US\$333 million meant for the pandemic response in 2020. South Africa's health minister at the time was placed on leave while irregular contracts to the tune of US\$10 million were investigated. There was also public anger in the country over the suspected inflation of government contracts for the purchase of medical supplies worth US\$900 million.

Malawi's government revealed that some of its officials colluded with the private sector to misspend US\$1.3 million of COVID-19 funds through procurement and allowance irregularities. The Kenya Medical Supplies Authority allegedly pilfered about US\$400 million

meant to buy medical equipment, and the country's Ethics and Anti-Corruption Commission revealed further irregular expenditures of about US\$71.96 million. The Auditor-General's report on COVID-19 expenditure exposed the misuse of over US\$69 million.

In Nigeria, the Federal Ministry of Health allegedly bought 1 808 face masks for US\$96 000. In Uganda, four top officials were arrested for allegedly overpricing COVID-19 food relief items, leading to a loss of US\$528 000. Zimbabwe's health minister was dismissed reportedly for inflating the cost of medical equipment by illegally awarding a multimillion-Dollar contract. His Ghanaian counterpart was found to have purchased the Russian Sputnik V vaccine at a unit price of US\$19 instead of the US\$10 factory price (Aikins 2022:1).

Aikins (2022:1) concluded that 'the continent has not made real progress in uncovering graft through proper audits of COVID-19 expenditures by governments and their agencies. These audits are vital and must be followed by investigations and prosecutions that enable the recovery of state money'. In the case of Botswana, the Report of the Auditor General (2021) on the Preparedness of the country towards Covid-19 Pandemic and Management of the Relief fund raised concerns regarding the completeness and availability of documentation relating to the use of relief funds from the government. In one instance, the Auditor General reported that 'there was no supporting documentation such as quotations and invoices from the service provider for payments to be processed. Instances were also noted where suppliers claimed to have rendered services but without any documentation as evidence of services provided' (p. 37). Elsewhere, in the same report, the Auditor General observed poor records keeping practices in one of the offices involved in the Covid-19 response programme. The Auditor General reported that 'there was no centralised system designed for the storage of records. For instance, appointment letters of officers were found without the required documents such as evidence of certificates and applicant's profiles as evidence of their suitability for appointment' (Auditor General 2021:69). Cases of this nature were also reported in South Africa.

The need to create and maintain authentic and reliable records during the Covid-19 pandemic was stressed by the Working Group on Archives and Human Rights of the Latin American Archives Association (ALA) and the Archives and Human Rights Section of the International Council on Archives (ICA) when it stated that 'Perhaps at this time, as never before, we recognize

Records Management and Archives as public goods and as key elements for the fulfilment of SDG 2030 in relation to access to information’.

The need to uphold and strengthen records management practices during Covid -19 pandemic was perhaps best emphasized in a joint statement that was issued by International Council on Archives , Co-Data, UNESCO, Research Data Alliance, World Data Systems, International Conference of Information Commissioners, and Digital Preservation Coalition (2021), when they posited that:

- (a) Decisions must be documented. This principle recommended that adequate records should be created and maintained in all aspects of government activities and programmes as this will be the only way of bequeathing future generations with legacy records on how the current generation dealt with the pandemic, the decisions that were made and the challenges it went through especially in as far as the management of recorded information is concerned.
- (b) Records and data should be secured and preserved in all sectors. Covid -19 Pandemic has resulted in the creation of large amounts of data which are now held in different data banks. For this reason, the joint statement urged all stakeholders to ensure that information held in different data sets should be preserved in order to protect the rights and entitlements of all those who in one way or other were affected by the pandemic. The joint statement further argued that ‘The existence of proper documentation practices will enable not only business continuity, research and innovation, but also the evidence of how this crisis was managed for future generations. Archives are the custodians of the 1918 influenza pandemic records, which are being studied by scientists around the world and these institutions will eventually be the stewards for records related to the COVID-19 pandemic’.
- (c) The security, preservation and access to digital content should be facilitated during the shutdown.

On the other hand, Quintana and Nazar (2021) acting on behalf of the Working Group on Archives and Human Rights of the Latin American Archives Association (ALA) and the Archives and Human Rights Section of the International Council on Archives (ICA) in their recent declaration on ‘The role

of archives in the COVID 19 crisis: a perspective from the protection of Human Rights’ stressed the important role played by archives and the need to create and preserve records during the pandemic emphasizing the fact that:

- Archives are responsible for the preservation and maintenance of records, an essential service during this pandemic.
- The information must be properly managed and solid electronic administration infrastructures must be built to guarantee good management and the rights of citizens.
- Access to quality information is key to combat fake news in times of such uncertainty.
- Transparency facilitates the control of government acts by society, including its responsibility in the protection of individual liberties and the exercise of social rights in the context of the fight against the virus.
- Likewise, working towards greater transparency contributes to enhancing the confidence of citizens in institutions.

Based on the above observations, it can be concluded that , even in the times of crisis such as that of Covid-19, the need to create. or capture, maintain and preserve records should not be ignored. Failure to do so may result in lack of transparency, accountability and the protection of individual rights and entitlements and the flourishing of corruption and other malpractices associated with poor governance.

8 Records Management and the 4th Industrial Revolution

Information and communication technologies have resulted in what is commonly known the 4th Industrial Revolution or simply 4IR, in which traditional records keeping practices are being rendered ineffective as records are now being created, stored, retrieved and disposed of electronically While these technologies have enhanced the capabilities for handling large volumes of information, their management requires the acquisition of new skills and knowledge which are often lacking amongst traditionally trained records managers and archivists. The 4IR revolution is characterised by the use of the

Internet of Things (IoT), Blockchain, Big data and robotics. Ndung'u and Signe (2020:1) aver that the 4IR technologies are having a great impact in Africa. Citing examples drawn from West Africa and Kenya they argued that 'block-chain has enabled efficient verification of property records and transactions, and expanded access to credit in some previously informal sectors of the economy'.

In order to harness the opportunities that have been brought about by the 4IR, Mullon (2019) observed that most records managers were uncomfortable with the use of information and communication technologies, an indication that if they failed to embrace these technologies they may be unable to capture and manage large volumes of data (big data). Mullon (2019) therefore urged African records managers and other information professionals to embrace the following recommendations:

- a) Build closer relationships with IT;
- b) Build closer relationships with business;
- c) Really understand classification (beyond file plans);
- d) Move towards Information Governance (IG) and think 'IG by Design';
- e) Add value to business processes (Capture records early);
- f) Get the physical records house in order;
- g) Understand electronic records (and documents); and
- h) Understand digital preservation (Mullon 2019:1).

Failure to embrace the changes that have been brought about the 4IR may result in archivists and records managers becoming irrelevant as they will be unable to act their roles effectively under the changed work environments. On the other hand, senior management support is a pre-requisite if archivists and records managers are to make the transition smoothly into the 4IR and be able to play their role as information providers effectively. Clearly, the 4IR has created opportunities for records managers to go through a major paradigm shift in the manner in which they process, store and retrieve records. Unfortunately, many records personnel were ill-prepared for the paradigm shift and continue to apply traditional records keeping practices.

9 Challenges Inhibiting Effective Utilization of Records in Africa

In comparison to archival services in the West, archives and records management services in Africa are ineffective and inefficient. A survey of ar-

chival situation in Africa indicates that many archival services are faced with the following challenges.

- Weak legislative frameworks relating to the management of records and information;
- Lack of trained records managers. In most African countries, records management institutions are unable to attract and retain trained managers due to the poor image that is attached to records management work, poor remuneration, absence of clear schemes of service etc.;
- Poor storage facilities for records;
- Inadequate retrieval tools;
- Low utilization of information technology, difficulties in identifying appropriate hardware and software, and untrained staff in the field of information communication technologies;
- Large volumes of unprocessed materials;
- Absence of retrieval tools;
- Poor records tracking mechanisms for monitoring the movements of records within the organization;
- Lack of support from senior management;
- Absence of records procedures manuals, records retention and disposition schedules, file classification schemes;
- Absence of records security classification schemes; and
- Lack of disaster preparedness plans for records etc. (Mnjama 2006; Katjiveri, Mnjama & Oladokun 2013).

Some of these challenges may be attributed to the placement of these archival institutions within government ministries. Some national archives such as Botswana, Kenya and Zimbabwe are placed under the Ministry of Home Affairs whereas in Namibia the national archives is under the Ministry of Basic Education and Culture. In Tanzania the national archives fall under the Civil Service Department. In South Africa the National Archives falls under the Ministry of Arts and Culture. The placement of the national archival within ministerial arrangements has major ramifications on its relationship with other departments in the governments. Where the national archival institution is placed under a ministry with wide inter-ministerial responsibilities, it is able to access better funding from the national treasury and thus provide guidance and

direction on the management of public sector records nationally. The opposite is also true in that where the archival institution is placed under say, a ministry with cultural responsibilities access to adequate funding is limited and its ability to influence the management of public sector records is also undermined. It is however disheartening to note that most archival and records management institutions in Africa are yet to embrace the 4IR and continue to operate with out-dated and traditional manual records keeping practices. Failure to embrace 4IR technologies in their operations may render them irrelevant in the coming years as their roles as information providers may effectively and efficiently be performed by this who embraced the 4IR technologies.

10 Recommendations

In order to enhance good governance, accountability and transparency, African governments are encouraged to be more proactive in addressing the challenges that have been presented above.

First and foremost, African governments are encouraged to formulate records management policies and procedures that will guide the management of records in specific environments. Without such policies and procedures, the management of records and information will continue to remain a neglected resource.

Secondly, there is need for the enactment of Freedom of Information legislation, or where enacted, a critical amendment to encompass electronic records and the effects that have been brought about by the outbreak of the Covid-19 Pandemic need to be included. At the continental level, recent initiatives to introduce greater access to information in Africa include African Commission on Human and Peoples' Rights (2002). Resolution on the Adoption of the Declaration of Principles on Freedom of Expression in Africa 2002 which states that:

Public bodies hold information not for themselves, but as custodians of the public good, and everyone has a right to access this information subject only to clearly defined rules established by law.

The right to information shall be guaranteed by law in accordance with the following principles:

- Everyone has the right to access information held by public bodies;

- Everyone has the right to access information held by private bodies which is necessary for the exercise or protection of any right;
- Any refusal to disclose information shall be subject to an appeal to an independent body and/or the courts;
- Public bodies shall be required even in the absence of a request, actively publish important information of significant interest;
- No one shall be subject to any sanction for releasing in good faith information on wrong doing, or that would disclose a serious threat to health, safety or the environment, where the imposition of sanctions serves a legitimate interest and is necessary in a democratic society;
- Secrecy laws shall be amended as necessary to comply with freedom of information principles; and
- Everyone has the right to access and to update or otherwise correct their personal information, whether it is by public or by private bodies (Declaration of Principles on Freedom of Expression in Africa 2002).

To date, not all African countries have enacted freedom of information legislation, but even in those countries where access to information legislation is in place, the citizens are not able to benefit fully from this act due to inadequate policies, disorganized records, lack of records security classification systems and lack of harmonisation of different acts and regulations touching on access to information.

Apart from freedom of information legislation, there is need for African nations to develop comprehensive data protection laws which aim to protect personal data held in various data banks, enact electronic transaction and communications Act to regulate transactions conducted electronically, pass electronic records evidence act which will enable records created or received electronically to be acceptable in courts. Above all, there is need to align national archives laws with recent information management laws which promote greater access to government held information.

Despite these efforts, several African countries are still operating without Freedom of Information laws. It cannot be overemphasized that access to information including access to information data sets held by the government is critical in enabling citizens to hold their governments accountable. Similar sentiments were expressed by Wamukoya (2013: 118) who asserted that ‘a key component of open government revolves around the principle of the proactive disclosure of government-generated information to citizens to enable them take

greater ownership of, and participate more fully in their government's decision-making processes and activities'. He further argued that:

Without the auxiliary process of records maintenance, since much of the information generated and maintained by any government exists in the form of records. Unfortunately, to date, much of the work of OGD has concentrated on data sets (i.e. data files, or a group of related files usually found on websites) and related computer applications that generate and provide information about government activities and mandates, such as websites, and has paid little or no attention to government records or record-keeping processes.

Thirdly, the chapter has also revealed the low utilization of ICTs in the management of records and information. It is therefore recommended that African countries should adopt various information and communication technologies in managing their records including document management systems. Arguing in support of document systems, Millward (2021) argues that document management systems offer organizations several benefits, including increased security which has been identified as major challenge resulting in compromising issues of accountability and transparency. Millward (2021:1) emphasized the fact that 'Document management systems reduce the occurrence of physical security breaches. With respect to sensitive information, storing this in a secure network can stop this information from getting into the wrong hands, including office break-ins or even accidentally by employees. These systems can also leave an audit trail of who viewed a document and when, and record if anything was modified, providing further control'.

Fourthly, there is need for African archivists and records managers to go through formal and informal training programmes in order to enable them to discharge their duties and responsibilities effectively in the 4IR. Failure to do so, archivists and records will be side-lined as their duties and responsibilities will increasingly be performed by those with the requisite ICT skills. To augment the importance of training for archivists and records managers, The International Council on Archives (1996) advised that 'Archivists should pursue professional excellence by systematically and continuously updating their archivist knowledge and sharing the results of their research'.

Lastly, the chapter has shown that the management of records in the 4IR requires collaboration and support beyond the spheres of records alone.

This is an issue that the International Council on Archives in its Code of Ethics acknowledged when they cautioned archivists ‘to promote the preservation and use of the world’s documentary heritage, through working co-operatively with the members of their own and other professions’. This does not suggest in any way that archivists and records managers should abandon their roles of formulating records classification systems, records security classification schemes, records retention and disposition schedules, undertaking appraisal of records and in preserving the worlds documentary heritage.

11 Conclusion

This chapter has demonstrated that good record keeping practice enhances good governance, accountability, transparency and the protection of rights and entitlements by citizens. The chapter has also demonstrated that poor records management creates opportunities for corruption to thrive resulting in poor service delivery, wastage of public resources. The chapter has also shown that the use electronic records management systems where managed well can significantly improve records keeping practices, but where poorly managed, they can easily be manipulated and result in the loss of public funds. The key recommendations arising out of this study include formulation of appropriate records management policies, an elaborate training programmes for archivists and records managers capable of managing records in different environments, top management support, and adoption of information and communication technologies, collaboration with IT professionals and digitization of large volumes of records held in paper formats.

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Chapter 10

Records Management and Knowledge Management: Pathways to Gaining Competitive Advantage towards the Achievement of Sustainable Development Goals

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Abstract

This Chapter uses literature review to investigate the relationship between records management and knowledge management with particular focus on how that translates into competitiveness for a business organization. The chapter further examines the role of records management in the attainment of sustainable development goals. This chapter uses the qualitative approach to address the research questions being: what relationship exists between Knowledge management (KM) and Records management (RM, what is the link between knowledge management, records management, and competitive advantage and what is the role of records Management in the attainment of Sustainable Development Goals (SDGs). The Literature review was based on knowledge management, competitive advantage, records management as well as sustainable development as search terms. Data was collected and analysed in accordance with themes derived from the identified research questions. This chapter has established that there is a symbiotic relationship between KM and RM which should be acknowledged and embraced by organization as pathways for organizations to gain competitive advantage and the achievement of SDGs.

The chapter has also established that organizations that have competitive advantage and hence successful are those that excel in managing their business records and knowledge thereby reducing undesirable risks. The chapter showed the crucial role played by RM in the implementation and attainment of SDGs as quality data are crucial to all organisations to make informed decisions and to ensure an accurate review of the implementation of the 2030 Agenda. Furthermore, the chapter identified some challenges which have a negative impact on the attainment of SDGs with regards to RM and KM such as lack of awareness on the importance of RM and KM in organisations, inadequate use of the information and communication technologies as well as people-related issues. The chapter recommends that organisations adopt and implements RM and KM as guided by acceptable standards and practices; use of relevant technologies to manage information and change management for the implementation of new processes in both RM and KM.

Keywords: Competitive advantage; Knowledge; Knowledge management, Sustainable Development Goals; Records, Records management

1 Introduction

Knowledge can be defined as the facts, skills and understanding that one has gained, especially through learning or experience, which enhance one's ability to evaluate context, make decisions and take actions (Awad & Ghaziri 2004; Tserng and Lin 2004). Knowledge combines information with experiences, organizations that manage knowledge can provide their people with the ability to find and use methods and procedures that were created or used by others previously to solve similar problems, including learning from past experiences, whilst maintaining the newly created experiences for use in the future (Tiwana 1999). Knowledge needs to be managed for it to have some usefulness. That is where Knowledge Management (KM) comes in. According to Gerami (2010) KM refers to the process of making relevant information available quickly and easy for people to use productively.

Knowledge has been mainly classified into explicit and tacit knowledge (Semertzaki 2018). Expressed mainly in formal and systematic language, explicit knowledge can easily be transferred, and shared to other entities in the form of data, specification, technical specifications, drawings or designs, manuals

and is documented (Nonaka, Toyama & Konno 2000). It can be found in plans, projects, patents, and databases in an enterprise. It can easily be downloaded and applied, but it has also been incorporated into products, technical specifications, drawings, or designs. An enterprise, that can quickly transfer explicit knowledge through the organization, and creates competitive advantage over the rivals that have a slower transfer. Ahmad (2010) opines that explicit knowledge is easy to capture, retrieve, share, and use because it can be expressed in words and numbers. As for tacit knowledge, it is personal, resides in the heads of individuals and shared through experiences, observation, and imitation (Mohajan 2017). It includes knowledge, experiences, intuitions, ideas, visions, skills, abilities and values of employees and managers in an enterprise. It is very difficult to articulate as it is not formal and is undocumented, making it even more difficult to articulate, express and transfer to others. For tacit knowledge to be passed on to the next person, it becomes necessary for the person holding such knowledge to agree to share it. Nonaka (2007) says one way of utilizing tacit knowledge is by using methods and tools that encourage and facilitate collaboration and knowledge sharing among the people of the organisation, such as applying electronic messaging and electronic meeting tools.

Duranti (2012:246) defines a record as ‘a document made or received in the course of a practical activity as an instrument or a by-product of such activity and set aside for action or reference’. The implication attached to this definition is that records are first documents before they become records and that they exist as information affixed to a particular medium. This definition of a record is influenced by North American thinking where public sector information (PSI) is not considered a record until it has been declared, as opposed to the Australasian perspective where PSI is a record at the point of creation. According to Stoks (2012), this division in thinking is because of the Lifecycle Model of records management, which represents records in an insular, linear process from creation to disposal. The Lifecycle Model largely influenced North American recordkeeping practices. Conversely, in Australasia the Lifecycle Model has been superseded by the Records Management Continuum Model (Frings-Hessami 2021) in which records can exist anywhere in a matrix of time and space. The Continuum Model was developed in the 1990s by scholars at Monash University who viewed the traditional Lifecycle Model as inadequate for managing the growing volume and complexity of electronic records. Secondly, the definition implies that records are a special kind of documents as they are a product of some action that has been performed and so

they serve as evidence of that particular action upon which subsequent activities can be based. According to Bwalya, Zulu and Sebina (2015), a record is the basic unit of any knowledge management endeavor as it presents a tangible resource for both explicit and tacit knowledge. It can be arguably stated that an organization which has a legal framework and proper monitoring mechanisms recognizing a record as a basic unit of knowledge is better placed to promote a culture of knowledge transformation thereby providing a podium where tacit knowledge can easily be managed as an organizational resource, through its documentation and managed as records.

2 Research Problem

Although Knowledge Management (KM) and Records Management (KM), are distinct, they are related as knowledge exists in records in terms of explicit knowledge (Nonaka & Takeuchi 1995; Duranti & Xie 2012). However, there are organisations that do not recognize this relationship. Poor management of records and knowledge in organisations is fertile ground for lack of the basis for good decision making. This is risky and may lead to unnecessary risks and losses. According to Mintar, Gabir, Aloo and Ofori (2022) records management is essential in identifying risks and mitigating against them, and thus provides a strategy for the formation and administration of a successful business. The overall purpose of KM is to maximize the enterprise's knowledge related effectiveness as well as to maximize returns from its knowledge assets (Kipchumba, Chepkuto, Obaraand & Nyaoga 2010). According to Law and Ngai (2008), business organizations need to take stock of their operations and carefully think about the capabilities critical to sustaining their competitive advantages in their core businesses as implementing KM processes can give them a competitive edge.

In terms of sustainable development, information should be available and accessible through well managed records for the creation, generation, and application of new knowledge. A review of the United Nations' Sustainable Development Goals (SDGs) reveals the importance of accessible data and information for better planning, monitoring and evaluation (United Nations 2015). However, it has been observed by Murphy (2018) that in many cases, records have been found to be incomplete, inaccurate, inaccessible, or lost completely resulting in flawed data derived from the records. It is, therefore, evident that unavailability of data and information has a negative impact on the

ability of accounting officers to report and make informed decisions on the progress and implementation of the SDGs. Hence, this chapter seeks to examine the role of records management and knowledge management as pathways for organizations to gain competitive advantage and the achievement of SDGs.

3 Research Questions

The aim of this chapter was to examine the role of records management and knowledge management as pathways for organizations to gain competitive advantage and the achievement of SDGs. The specific questions that the chapter sought to address are:

- What relationship exists between Knowledge management (KM) and Records management (RM)?
- What is the link between knowledge management, records management and competitive advantage?
- What is the role of records management in the attainment of sustainable development goals?
- What are challenges contributing to RM and KM not contributing effectively to the attainment of Sustainable Development Goals?
- What measures need to be put in place to enhance the contribution of RM, and KM in the attainment of Sustainable Development Goals?

4 Research Methodology

This study used the qualitative approach to address the research questions in examining the role of records and knowledge management as pathways for organizations to gain competitive advantage and the achievement of SDGs. The search terms for the literature review were ‘knowledge management and records management’, ‘competitive advantage and knowledge management’, ‘records management and competitive advantage’, ‘sustainable development and knowledge management’. The Google Scholar search engine was used to search for literature. Data collected was analysed thematically as guided by the findings from the research questions.

5 Findings and Discussion

This section presents the findings of the study, inclusive of a brief discussion of the same. The findings have been turned into themes as derived from the study research questions.

5.1 Relationship between Knowledge Management (KM) and Records Management (RM)

To establish the relationship between knowledge management (KM) and records management (RM), it is crucial to understand the meaning of each. Jashapara (2004) defines KM as the effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to enhance an organization's intellectual capital and performance. The International Records Management Standard, ISO 15489-1(2016:3) defines RM as 'a field of management responsible for the efficient and systematic control of the creation, receipt, maintenance, use and disposition of records including processes for capturing and maintaining evidence of and information about business activities and transactions in the form of records'. In a simpler definition, Duranti and Xie (2012) define RM as the systematic design, implementation, and administrative control of a framework that ensures efficiency and economy in the creation, use, handling, maintenance, and disposition of organizational records.

Although Duranti and Xie (2012) argue that KM is a field based on multidisciplinary input and contribution, and distinct from RM, the authors agree that the two concepts are closely related. This close relationship between KM and RM was illustrated by Nonaka and Takeuchi (1995) using the knowledge Socialization, Externalization, Combination, Internalization (SECI) model. The model is the first KM model, and it has been influential in the dissemination of the concepts of tacit and explicit knowledge (Dalkir 2011). In agreement, Duranti and Xie (2012:246), explains that 'the SECI model contains four processes that can be repeated whenever the need arises: Process 1, from tacit to tacit (i.e. socialization, such as peer-to-peer coaching/networking), Process 2, from tacit to explicit (i.e. externalization, such as capturing and sharing), Process 3, from explicit to explicit (i.e. combination, such as organizing and classifying), and Process 4, from explicit to tacit (i.e. internalization, such as understanding and learning)'. KM processes as depicted in the SECI Model such as capturing, sharing, organization and classifying information are also

evident in RM as seen from the definition of RM by the Records Management Standards (ISO 2016).

Duranti and Xie (2012) are of the view that the convergence between RM and KM occurs when an organization applies externalized knowledge (documenting tacit knowledge) in such a way that it fulfills its duty in a record-keeping system. The relationship is transformative in that amongst the four processes, Process 2 (from tacit to explicit) and Process 3 (from explicit to explicit), there is a production of tangible knowledge assets, which are potential records according to RM. At the point of creation, such knowledge assets exist as recorded information but become records when they are used for business decision making as reference points hence the assertion by Ndenje-Sichalwe, Ngu-lube and Stillwell (2011) that business records serve as the corporate memory of an organisation and provide a mechanism by which organisations can be held accountable for the actions and transactions executed. Duranti and Xie (2012) does acknowledge that knowledge assets created through externalization may initially be managed in a system designed specifically for KM purposes, but their relationship with RM will be established when they participate in and become an integral part of a business activity of the organization. For Duranti and Xie (2012), the function of RM is to document entire business processes in the form of records, and that includes the capture of identified knowledge assets. By capturing a business activity, a deliberately captured knowledge asset is by such action transformed into a record. Such a record is then classified in an enterprise-wide records classification scheme designed in accordance with business activities and functions and managed in a recordkeeping system.

Apart from being transformative, the relationship between KM and RM is inclusive (Duranti & Xie 2012). For RM, Processes 2 and 3 are business activities of the KM function in a similar an organization's business activities are organized into distinct functions such as financial management, human resource management, materials management, or marketing. On the other hand, it is best practice for organizations to classify records of business activities in accordance with the mandate as found in organizational functions which can be organized into activities, sub-activities, and transactions (ISO 15489-1, 2016). Duranti and Xie (2012), further explain this by indicating that records are generated at the point where a business objective necessitates documentation to produce consequences or evidence of its fulfillment. The principal aim of KM systems is to create, codify, collect, store, integrate, share, and apply knowledge (Alavi & Leidner 2001). Knowledge exists in documents such as minutes of

meetings, messages, research reports, lists of system functional requirements, system metadata schemas, contracts with vendors and consultants are needed for the implementation to take place. Duranti and Xie (2012) observed that all these documents are records as they are the results of the performance of business processes. The records accumulate over time naturally and become an organization's entire records holdings that constitute its written or documentary heritage. The back-and-forth relation between KM and RM means that every KM undertaking is part of the RM organizational business activity schema (New South Wales State Records 2003) and each KM system is part of the technological context in which digital records are created. Essentially, for RM, 'a KM system is not different from any other business information system such as a digital assets management system used by a marketing unit, or a web content management system used by a communication unit' (Duranti 2012:248).

5.2 Knowledge Management, Records Management and Competitive Advantage

The literature reviewed in this area shows that organizations that manage their records and knowledge stand a better chance to be competitive over others as they use records and information to make informed decisions. Yusuf and Chell (2005:12) point out that 'records contain information about evidence of organisational functions, policies, decisions, procedures, operations and other activities'. Records thus include all the documents that organisations or individuals create or receive while executing organizational transactions. For Chinyemba and Ngulube (2005), the proper management of business records gives an organisation a competitive advantage because employees can utilize information resources to make effective decisions. In agreement, Bwalya *et al.* (2015) aver that the effective organization of institutional resources, especially tacit knowledge, stands to give an organization a competitive edge. In addition, Nonaka (2007) indicates successful organizations are those that excel in managing the creation of new information and capture it in business records. Valid, precise, and current information is needed by managers to make informed decisions and such information is often obtained from documents created by the organisation itself.

To further expound the importance of records, McLeod, Hare and Johare (2004) observe that information is a key business resource, and many

organizations now recognize that strategic management of their internal (proprietary) information, often captured in the form of records, contributes to maintaining or creating competitive advantage, in both the public and private sector. KM plays a crucial role in enabling organisations to attain a sustainable and comprehensive competitive advantage in a business organisation (Chikati & Mpofu 2013). As a result, a business reaps organisational performance improvements due to KM and organisational learning (King 2006). To give organizations advice on how to utilize KM and RM for competitive advantage, Nonaka *et al.* (2000) posit that a firm must continuously create knowledge through research and development which facilitates the acquisition of both internal and external knowledge (Hall & Bagchi-Sen 2002). The acquisition of external knowledge means that organisations must survey research work that has previously been published (English, Solomon, Goldsmith & Davey 2005). For example, research on previous products enable organisations to gain valuable insights about products and excel from gathering information (benchmarking) with industry leaders. Organisations can also acquire external knowledge about the market from their customers and distributors.

In showing the role of Information and Communication Technologies (ICTs) in KM, Krstic and Petrovic (2012), posit that access to information through information systems accelerates the flow of information and, in that way, it can increase operational efficiency. This then calls for investments to be made on the development of effective and high-quality information technologies and systems that can reduce the risk of unwanted loss (even to competitors through imitation) of knowledge from an enterprise. The protection of such explicit knowledge can be done in the form of intellectual property (Krstić 2009). One challenge with tacit knowledge is that as an organizational asset, it can be lost when the holder leaves an enterprise. This may have significant consequences on the functioning of an enterprise. The solution to this problem is, to some extent, in the codification of tacit knowledge. In other words, tacit knowledge becomes explicit knowledge by activities of codifying. Tacit knowledge, which an individual takes from an enterprise can be protected when declared a trade secret or by a contract between the employee and the employer. This contract prohibits employees who leave from working in competitive organisations and establishing business in the same industry. Due to the knowledge of employees being a result of their experience and practice in an enterprise, it is not easily collected, shared, and used by an enterprise (Von Krogh, Nonaka & Aben 2001).

For Duranti and Xie (2012), to effectively manage explicit knowledge in the form of digital records in IT systems, the first and most important step is to exercise RM control over the creation of records. A clear understanding of an organization's business activities (activities that create records in RM) in terms of their objectives, processes, and the technologies employed is crucial. In view of the arguments presented in the existing literature, this chapter contends that RM and KM should be prioritized by organizations as pathways to gain competitive advantage in the industry. There is evidence that organizations which have competitive advantage are those that manage their knowledge and information

5.3 Records Management and the Attainment of Sustainable Development Goals

To illuminate the role records management can play in achievement of the SDGs; this section explores the issues of data and information management with respect to the SDGs. The 2030 Agenda for Sustainable Development was adopted at the United Nations Sustainable Development Summit on 25 September 2015. It is a plan of action for people, planet, and prosperity. It seeks to strengthen universal peace to be implemented by all countries and stakeholders, acting collaboratively (United Nations 2015). The United Nations (2015) identifies the following seventeen (17) SDG goals as:

- Goal 1. End poverty in all its forms everywhere.
- Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture.
- Goal 3. Ensure healthy lives and promote well-being for all at all ages.
- Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
- Goal 5. Achieve gender equality and empower all women and girls.
- Goal 6. Ensure availability and sustainable management of water and sanitation for all.
- Goal 7. Ensure access to affordable, reliable, sustainable, and modern energy for all.
- Goal 8. Promote sustained, inclusive, and sustainable economic growth, full and productive employment, and decent work for all.

- Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
- Goal 10. Reduce inequality within and among countries.
- Goal 11. Make cities and human settlements inclusive, safe, resilient, and sustainable.
- Goal 12. Ensure sustainable consumption and production patterns.
- Goal 13. Take urgent action to combat climate change and its impacts.
- Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
- Goal 15. Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
- Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels.
- Goal 17. Strengthen the means of implementation and revitalize the global partnership for sustainable development.

All the SDGs seventeen (17) goals require the availability of data and information for proper planning, monitoring and evaluation as well as informed decision-making processes. Sustainable development and records management are concepts that are used daily though understood and considered on parallel basis. While SDG indicators, are a means for countries to monitor and report on their progress towards SDGs goals and targets, there is need for them to be quality driven, accessible, timely, reliable, comparable (Cerilli 2016). Records management on the other hand include processes for capturing and maintaining evidence of and information about business activities and transactions in the form of records (ISO 15489-1, 2016). Not only that, these records, regardless of form or structure, should possess the characteristics of authenticity, reliability, integrity and usability to be considered authoritative evidence of business events or transactions and to fully meet the requirements of the business. Although decision making processes are entrenched in all the 17 goals, the availability of information for evidential and compliance purposes are mostly required in some which this chapter has picked that explicitly requires records or information management as highlighted in Table 1.

Table 1: Goals, targets and indicators that specifically relates to information and data collection

Goal	Information/Data mention
Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture	<i>Target 2.c</i> Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information , including on food reserves, in order to help limit extreme food price volatility.
Goal 3. Ensure healthy lives and promote well-being for all at all ages	<i>Target 3.7</i> By 2030 ensures universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes.
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	<i>Indicator 4.5.1</i> Parity indices (female/male, rural/urban, bottom/top wealth quintile, and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated.
Goal 5. Achieve gender equality and empower all women and girls	<i>Indicator 5.6.2</i> Number of countries with laws and regulations that guarantee women aged 15-49 years access to sexual and reproductive health care, information and education.
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	<i>Target 9.c</i> Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.
Goal 12. Ensure sustainable consumption and production patterns	<i>Indicator 12.4.1</i> Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement.

	<i>Target 12.6</i> Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle
	<i>Target 12.8</i> By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature.
Goal 14. Conserve and sustainably use the oceans, seas, and marine resources for sustainable development	<i>Target 14.5</i> By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information .
Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable, and inclusive institutions at all levels	<i>Target 16.10</i> Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements.
	<i>Indicator 16.10.2</i> Number of countries that adopt and implement constitutional, statutory and/or policy guarantees for public access to information .
Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	<i>Target 17.18</i> By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to significantly increase the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts.

Source: UN 2015

The importance of records and data management in the implementation of SDGs is underscored in the United Nations (2017) report which acknowledges that quality data are vital for governments, international organizations, civil

society, the private sector, and the public to make informed decisions and to ensure an accurate review of the implementation of the 2030 Agenda. Moreover, tracking progress on the SDGs requires the collection, processing, analysis, and dissemination of an unprecedented amount of data and statistics at subnational, national, regional, and global levels, including those derived from official statistical systems and from new and innovative data sources (UN 2017). As the field of records management is concerned with ensuring an efficient and systematic way of managing records to enable decision making as and when the records are required, the above statement points to a meaningful action records management can play within the SDG framework.

The United Nations Development Programme UNDP (2012:31) report cites Statistics Botswana as experiencing notable challenge with the available data which was not up to date except for only a few ministries such as that of Transport and Communication, and Education. The report observed that the situation made decision-making more into guesswork on such important matters, for example, trend analysis for the horticulture sector which may influence important requirements and investments on water resources, and policies on trade and imports. In explaining the challenge further, the report noted that some sectors were not submitting data on a consistent basis as most of them worked on manual systems (UNDP 2012). This scenario can be attributed to a gap in the management of records as the consequences of not having in place an effective means for managing information undermines the ability of organisations to deliver their programs and services and meet their accountability requirements.

5.4 Challenges Contributing to RM and KM as Barriers to Effective Attainment of SDGs

The attainment of SDGs is related to the availability of records and information. One of the challenges towards an effective attainment of SDGs is the failure by organisations to prioritize records management to achieve SDGs. This results in situations whereby records and information are inaccessible for decision making processes, planning and reporting purposes. This challenge is also observed by Murphy (2018) who acknowledges that ineffective RM processes often lead to flawed data. For KM to thrive, its knowledge assets should be used in an organisation through information management and organisational learning. Often, challenges related to KM hinder its ability to inform good

decision making, which in the context of this study, would be the attainment of SDGs. These are obsolete technology, employee motivation and information being difficult to find, time barriers, awareness barrier and culture barriers (Huettich 2020; Trees 2021).

Technology keeps evolving and becomes obsolete quickly. According to Huettich (2020), older systems that relied on a decentralised architecture result in the situation where nobody knows the exact location where information is stored, as it can be on the network drives, the cloud or in several databases. Secondly, employee demotivation is another key challenge to KM in organisations. The value derived from KM systems is dependent on employees sharing knowledge. For example, if projects are successfully completed but nobody creates a 'lessons learned' document afterwards, there would be no lasting benefits to an organisation. Successful KM practice relies on employee acceptance but if they find KM tools difficult and tedious to use, out-dated and time consuming, acceptance plummets (Huettich 2020). If Information is difficult to find, including expertise and resources required to actualize KM, there will be no benefits accrued from a KM system. Difficulties in finding information are due to incomplete, out-dated, or irrelevant search functionality. This can be resolved with the right KM tools, hence the need to invest in well-designed KM tools and systems that enable storage and retrieval of information that can give an organisation a competitive edge in business (Huettich 2020).

Other challenges identified by Trees (2021) include time barriers, KM awareness barriers and culture barriers. These are people related challenges. If employees are not aware of KM is, they are not likely to practice it. Many KM programmes are not well known because they are poorly marketed. That is why a KM programme needs a cohesive and a good communications strategy. When marketing the KM programme, it should be done early prior to implementation and the right language and format understood by employees are key to effective implementation. Well marketed KM programmes tend to be accepted by employees (Trees 2021). The same author argues that time becomes a barrier to effective KM when employees think they are too busy to get involved in KM activities. Such activities may include attending long meetings as part of learning to use the KM tools to be used. In addition, if employees do not see the benefits to be derived from doing KM, they will not dedicate time to support its activities. Cultural issues may work against the KM programme. The underlying assumptions, attitudes and unwritten rules influenced by some culture may lead to employees being not free to ask questions or share knowledge. Some

may be suspicious about how the knowledge they share will be used while others may downplay their contribution thinking that it will not make a difference. Basically, the silo mentality that may obtain organisational functions and units may it difficult for a cross-functional KM to thrive (Trees 2021).

6 Conclusion

This Chapter has established that there is a symbiotic relationship between knowledge management and records management. As such, organizational knowledge should be captured in the form of records to enable it to be understood and shared by everyone in the organization for continued business operations even when ‘knowledgeable workers’ have long left. An application of RM principles and rules will ensure that business knowledge/records are safeguarded from uncontrolled access, and this can be done through the implementation of information technologies. Records in manual form may also be digitized for easy tracking and access. Through research and development, more knowledge is gathered and documented as records. The interplay between KM and RM in practice thus becomes a pathway to gaining competitive advantage for a business organization. This chapter has also established the crucial role of records management in the achievement of the SDGs as it is a vehicle for the provision of data and information necessary for planning, monitoring, evaluation, and decision making.

7 Recommendations

Based on the review of literature, this chapter suggests some recommendations which when implemented will enhance the relationship between RM, KM and the attainment of SDG’s as follows:

- a. Adoption and implementation of RM and KM processes guided by acceptable international standards and best practices.
- b. Implementation of ICTs to manage information for quick access and controlled access to information.
- c. Change management in organisations for the acceptance of new ways of doing business by employees.

- d. Advocacy for RM and KM as functions that can jointly contribute towards business competitiveness if records and knowledge are managed properly.
- e. Cultivation of a culture of knowledge sharing to promote continuous use and application of knowledge in organisations.

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Chapter 11

Botswana Examinations Council (BEC) Readiness to Implement an Electronic Document and Records Management System (EDRMS) – Action Officers’ Perspectives

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Abstract

This chapter establishes the Botswana Examinations Council’s (BEC) readiness towards the implementation of an Electronic Document and Records Management System (EDRMS). The research utilized a combination of questionnaires and interviews to gain insights into the perspectives of the EDRMS users. Both qualitative and quantitative data were collected from 123 action officers via online means. The study was anchored on factors outlined by Mukred, *et al.* (2016) and partly guided by the IRMT e-readiness assessment tool. The findings of the study revealed that BEC is not ready for EDRMS implementation due to the lack of top management support, absence of change management strategy implementation, failure to engage with users in SOUR development, non-existence of international standards on digital records management, and lack of a training programme for users. The findings also revealed that the BEC’s records management programme lacks a business continuity strategy, as evidenced by the absence of a disaster preparedness plan and preservation strategy. The major recommendations arising from the study are; BEC should start by developing a change management strategy specifically for EDRMS deployment – outlining communication and training plans; Lobby for top management

support and advocate for adequate budget. BEC should consider EDRMS implementation as a major stand-alone project not a sub-project of BNEPS; there is need to develop a business case and sour documents specific to EDRMS.

Keywords: EDRMS Implementation, Botswana Examination Council (BEC), Change Management, User Awareness and Organizational Readiness, and Technology Readiness

1 Introduction

In the current world characterized by Covid-19 and the Fourth Industrial Revolution technologies, industries are being revolutionized and are undergoing through digital transformation. Despite the negative impact brought by Covid-19 on the economic development, there is a positive turn around that has forced most industries to undergo transformation as a way of reducing physical contact. In that light, there is positive impact on information and knowledge management for social, economic and political development. The attainment of sustainable development goals greatly depends on knowledge sharing and knowledge transfer. Thus, effective and efficient management and dissemination of information is crucial to inform decision making and actions that will impact on social and economic development.

Many organizations have become aware that efficient control of information flow leads to effective management, increased productivity, transparency and accountability (Alshibly *et al.* 2016). Moreover, the implementation of Electronic Document and Records Management Systems (EDRMS) have become popular as most organisations use them to manage their records, information and knowledge assets. According to the Provincial Archives of Saskatchewan (2016: 3), an ‘EDRMS is a software application that is used to manage digital information. The software provides a framework for the capture, maintenance and accessibility of records over time’. The system has the functionalities to manage both documents and records. The efficacy of these systems is appealing to most organisations compared to traditionally based methods for managing records. Therefore, ensuring successful implementation of the EDRMS is critical as the system plays a vital role in the management of records that are required by key stakeholders for decision making. For it is with timely access to the right information, in the right format, that policymakers and

relevant stakeholders are able to make informed and impactful decisions, aiding in innovations and actions that support national development. Hence, the need to establish how Botswana Examination Council (BEC), is preparing a conducive environment for implementation of recordkeeping systems that aid in increasing organization efficiency and productivity.

2 Motivation of the Study

Increase in the use of information and communication technologies (ICTs) in both the private and public sector has resulted in the creation and proliferation of electronic-records (Matangira 2016; Mutsagondo 2017; Sigauke 2014). In a study by Nengomasha and Chikomba (2018: 252), it was revealed that:

President Bill Clinton transferred 20 million email records and four terabytes of e-records at the end of his administration. His successor, President George W. Bush, transferred 200 million email records and 80 terabytes of e-records They all, however, lament challenges in the management of these e-records with recommendations to adopt e-records management systems (ERMS) to enhance their management.

As a result, various government agencies and private sector organizations are adopting EDRMS in order to deal with the various challenges of e-records management (Manikas 2015; Nengomasha & Chikomba 2018). Richmond (2010), as cited in Manikas (2015), identified the following factors as having contributed to the implementation of EDRMS in organizations: preservation of corporate memory, supporting of better management decision-making, controlling the creation and destruction of records, reduction of operating costs, improving efficiency and productivity, assimilation of new records technologies, minimization of litigation risks and compliance to regulatory frameworks.

On the other hand, literature has revealed that many initiatives to implement EDRMS especially in developing countries have failed, despite the huge costs invested in procuring the systems (Abdulkadhim *et al.* 2015; Mosweu *et al.* 2016). The reasons for the implementation failure have been identified as resistance to change, inadequate budget, lack of required knowledge and skills, lack of policy and procedure, lack of top management support (Aziz *et al.* 2018). Aziz *et al.* (2017) revealed that in Malaysia, organizations

faced difficulties in implementing the Digital Document Management Systems (DDMS) as they were not guided by appropriate guidelines or policies resulting in the high rate of users rejecting the implementation of DDMS. In Botswana at the Ministry of Trade and Industry, Mosweu *et al.* (2016) established that negative attitudes to computers, computer anxiety, the complexity of Document Workflow Management System (DWMS) and its incompatibility with current working practices influenced employees' unwillingness to adopt and use the system. Other challenges identified by Mosweu (2016), and Shonhe and Grand (2020), were that change management was poorly handled; lack of adequate training and motivation of change champions, top management support was partially lacking; a records classification scheme was hastily developed and training of system users was inadequate.

To achieve maximum efficiency of the EDRMS, several critical factors must be considered before and during the implementation process. This therefore, calls for an in-depth assessment of the prevailing environment in order to determine the readiness of the organisation before it can adopt an EDRMS. The operating environment must be conducive for easy adoption and adaptation of a new strategic system to achieve its intended role. Moreover, the present actions and recordkeeping practices affect access to records in the future. Similarly, the actions taken in implementing an EDRMS will affect its adoption, utilization and overall efficiency. Hence, the need for this study at BEC.

3 Case Description – Botswana Examination Council (BEC)

The BEC was established in June 2007 as a semi-autonomous organization and is mandated under section 5 of the BEC Act 11 of 2002 which was later amended by Bill No. 14 of 2019 to manage, conduct examinations and assessments in general education and technical, vocational education and training and to award certificates in respect of the said examinations and assessments (Botswana Examinations Council 2021). The BEC inherited the responsibility to conduct national examinations from the then Department of Examinations Research and Testing Division (ERTD) of the Ministry of Education and Skills Development. The BEC has six departments under the Office of the Executive Secretary - which are: Directorate of Examinations, Administration and Certification, Directorate of Research and Policy Development, Directorate of Human Resources, Directorate of Information and Communications Technology, Directorate of Corporate Services, Directorate of

Product Development and Standards. The establishment of BEC by the Botswana Government was aimed at improving the local national examinations processes. As a result, in the process of executing its duties, BEC creates and manages vast amount of records concerning students and the examination process as a whole. For this reason, records management has become an important part of BEC. Furthermore, there are several Botswana legislative requirements that BEC must comply with, such as the Electronic Records (Evidence) Act (2014), Data Protection Act (2018), Public Service Act (Act No. 13 of 1998), National Archives Act (No. 37 of 1978, as amended in 2007), and Cybercrime and computer related Crimes Act (2018) etc. In order to improve its records management processes and information flow, BEC found it necessary to implement an EDRMS that will enhance access and transparency to students' records and examination processes. The EDRMS is a subproject executed under the Botswana National Examinations Processing System (BNEPS).

The BNEPS programme is used for the capturing of candidate and examiner's information' and the administration of payments and receipts relating to examinations, as well as other software acquired by BEC (Botswana Examinations Council 2015). BNEPS project is being implemented in phases. Phase I includes the following subprojects; Malepa, Business Intelligence and Document Management. The Malepa application made up 90% of the BNEPS project and it is the heart of the examination processing system currently used by BEC (Botswana Examinations Council 2015). The Malepa application within BNEPS, enabled BEC to process all examinations locally and exercise more control over processes which led to reduced dependency on Cambridge International Examinations (CIE). The BNEPS Phase II project (which started in 2015) has three major subprojects; Business Process Management (BPM), Electronic Document and Records Management System (EDRMS) and Information Assurance System. BNEPS Phase II project was a continuation of BEC's efforts to attain the automation of those processes that were not automated by the introduction of Malepa (Botswana Examinations Council 2019). BNEPS Phase II aims at improving process consistency and efficiency, avail information and documents in a centralized storage for easy accessibility and increased security (Botswana Examinations Council 2019). As a result, assuring a high quality and secure examinations environment. It is no doubt that BEC took the right decision to implement an EDRMS to achieve the aforementioned goals.

As of 2019 BEC annual report, the BNEPS project status was at 71%

since the inception of the phase II. Achievements regarding EDRMS subproject are as follows; the project completion was at 53% (Botswana Examinations Council 2019). Significant progress was made in the implementation of the Document management system on SharePoint and the development of the Records policy and retention plan. In addition, to assure quality management of BNEPS processes and sub-systems, 'BEC was certified against the ISO 9001:2008 standard by Botswana Bureau of Standards (BOBS) in February 2017 and the certification expired on 22nd September 2018. Subsequent to this certification, BEC commenced work on a transition programme from the ISO 9001:2008 to the new ISO 9001:2015 standard' (Botswana Examinations Council 2019: 13).

BEC started the process of implementing an EDRMS in 2018. Yet, till to date the system has not been procured, despite the BWP6000000 initially allocated to BNEPS project in 2018 (Botswana Examinations Council 2019). According to preliminary investigation, an informal interview revealed that, since 2018, BEC has advertised a call for tenders about four times, yet the system was never procured. The main reason was that some bidders had quoted an amount which was above ICT budget. This implies that BEC was not financially ready for EDRMS implementation as this was resourced under BNEPS as the main project. Accordingly, other than financial readiness, this study sought to investigate what other factors are likely to continue hindering procurement of the system at BEC; by conducting a basic organizational readiness at a small scale level. Thus, based on the above premise, it is significant to establish what strategies have been put in place; and what actions have been taken by BEC to ensure successful implementation and adoption of the EDRMS. This includes assessing employee's awareness, involvement and training needs towards the EDRMS implementation.

4 Objectives of the Study

The main purpose of this study was to assess the organisation's readiness towards the implementation of an EDRMS. Consequently, the specific objectives of this chapter were:

1. To establish employee's awareness and involvement in the EDRMS implementation process.
2. To establish employee's ICT skills and training needs for the utilisation of an EDRMS.

3. To assess the current records management tools available at BEC.
4. To investigate the overall perspectives of employees on BEC records management program and its readiness status.

5 Literature Review

This section discusses the concept of organizational readiness and the factors that should be considered in preparing an organization for project implementation.

5.1 Organizational Readiness

For successful implementation of an ICT solution, organizations should fully prepare the environment and organizational culture. Ensuring the organization is ready right from the pre-implementation stage increases the success rate of the EDRMS implementation. Thus, organizational readiness refers to employees shared resolve and beliefs in their capability to effectively adapt to the new changes and also the availability of a conducive environment (policies and ICT infrastructure) to transition into a new phase. According to Shea *et al.* (2014: 2) organizational readiness ‘refers to the extent to which organizational members are psychologically and behaviorally prepared to implement organizational change’. Kabukye *et al.* (2019) and Weiner (2009) opines that readiness is a multifaceted and multilevel abstract construct encompassing individual and organizational aspects, which makes it difficult to assess. Hence the need to assess various readiness tools/ factors in different contexts. Additionally, the researchers are of the view that, organizational readiness is influenced by change management. This is also supported by Taiwo (2019: 26) who averred that ‘organisations that successfully implement new systems control the disruption by managing the transition closely along the way, not just at the beginning or at the end’.

5.2 Organizational Readiness & Recordkeeping System Implementation

Successful implementation of an EDRMS mandates an organization to be ready in different dimensions. This requires an organization to prepare numerous guiding documents such as a business case, Statement of User Requirements (SOUR), change management strategy, and updated records management tools

or policies and procedures relevant for the digital environment. However, majority of the studies show that most organizations' e-readiness status is low (Asogwa 2012; Kalusopa & Ngulube 2012; Mutula 2005). For example; Mukred *et al.* (2016) revealed that in Yemen, higher professional education institutions' ERMS readiness was low and evolving, as demonstrated by the slow adoption of ICTs, low records management standards and practices, and little integration in the national e-readiness framework. In Tanzania, Botswana and eSwatini, public sector agencies were also found to be lagging behind as their e-records readiness and efficiency levels in support of e-government were low (Kamatula & Kemoni 2018; Tsabedze & Kalusopa 2018). The major drawbacks identified in the latter studies were: weak, and disjointed regulatory framework on e-records; lack of skills; slow progress in the implementation of envisaged EDRMS, slow adoption of ICTs, and low capacity building among records management staff. Similarly, a study by Moatlhodi & Kalusopa (2016: 1) that sought to assess electronic records (e-records) readiness at the Ministry of Labour and Home Affairs (MLHA), in Gaborone, Botswana; revealed that:

the level of e-records readiness at the MLHA included: inadequate legal and regulatory framework; average adherence to records management procedures, tools and standards; low awareness among staff of the records management programme and the national regulatory framework and on the NARMS pilot project; limited space for records management; slow progress in the implementation of NARMS and low capacity building as records management staff is rarely taken for training.

According to Jones (2008), the most significant barrier to successful EDRMS implementation is one of culture rather than cost is the acceptance of the system by the individuals and teams in an organisation who create, retrieve, and use electronic documents and records and will be the principal users of such system. Implementation of an EDRMS is vital as it can have a lasting and beneficial impact on the quality of e-records management. Therefore, ensuring organizational readiness is of outmost importance in the implementation process. As noted by Shea *et al.* (2014: 2) 'when organizational readiness is high, members are more likely to initiate change, exert greater effort, exhibit greater persistence, and display more cooperative behaviour, which overall results in more effective implementation of the proposed change'.

5.3 Organizational Readiness Factors Adopted in this Study

Hamid (2018) and Irfan *et al.* (2018) opines that organizational readiness involves ensuring that people, policies and technology are all in sync during the implementation process. These factors were previously identified by Mukred *et al.* (2016) who proposed an ERMS readiness framework for higher professional education institutions in Yemen. The framework includes the following factors: policy, financial support, top management support, IT-Infrastructure and training. Hamid (2018) stressed that when implementing electronic systems, policies ought to be updated so as to cater for management of electronic information. The human aspect involves training and raising awareness of the system to be implemented thereby increasing the chances of regulatory compliance and system utilization. The technology factor demands that adequate budget be solicited for improving the ICT infrastructure to meet up with the current demands. Consequently, Hamid (2018) assessed variables such as employee involvement as records management champions, training, existence of policies and availability of resources. Thus, solidifying the need to consider these three factors (people, policies and technology) when implementing an IS project. Similar factors were earlier articulated by IRMT (2004), however, the factors were specific to e-records readiness. The factors included: (1) Policies and Responsibilities for Records and Information Management; (2) Tools and Procedures for Records and Information Management; (3) E-Records Management Products and Technologies; (4) Resources and Training for Records and Information Management Personnel; (5) Internal and Public Awareness of Records and Information Management and; (6) Compliance with Records and Information Management Policies and Procedures.

Another study by Taiwo (2019) and, Yusof and Aziz (2015) established that leadership style, funding/budget, human factors (staff resistance to change, unfamiliarity with computers, fear of computer and lower education levels) and ICT infrastructure; are organizational factors that determine their readiness to accomplish change. Cinite *et al.* (2009) and von-Treuer *et al.* (2018) further emphasizes leadership as a factor that can affect the adoption of change initiatives. This shows the importance of leadership commitment and support to project initiatives. In addition, a study on e-health readiness in Botswana also investigated and established that the following factors are critical components for successful implementation of any new initiative in a work place; infrastructural readiness, aptitudinal readiness, and attitudinal readiness (Mauco 2014). All these factors can effectively be managed to prepare for change only

when there is a change management strategy that lays down a clear agenda or vision for project implementation. Formulating a clear agenda or vision towards a change initiative is one of the critical aspects highlighted in change management theories such the Kotter's Eight-Stage Process for Successful Organisational Transformation (1996) as cited by Galli (2018).

Thus, this study examined BEC's readiness to implement an EDRMS partly guided by the IRMT e-readiness assessment tool and factors outlined by Mukred *et al.* (2016). This is done based on the following factors; employee's awareness and involvement, ICT skills/knowledge, training needs and records management tools. While one may think these factors are limited, it is important to note that this paper is sequel to a study titled 'Proposal of a Framework for Successful Implementation of an EDRMS: Based on Insights from BEC Records Managers'. Thus, the current chapter presents the findings based on the action officers' perspectives whereas the sequel paper provides findings based on the critical success factors (IS CSFs: technological readiness, top management support, training and involvement, resource availability, system-related factors, and work environment and culture) from the records managers point of view.

6 Research Methodology

The study was conducted at BEC-Gaborone between March 2021- February 2022. The total population of the study was 205 as of April 2022. Purposive random sampling was adopted to select action officers who are involved in creation and use of records, thus leading to a total sample size of 179. Office cleaners, drivers, switchboard operators, receptionists and security guards were excluded from this study as they are not directly involved in the records creation and use of records. The case study adopted a pragmatic approach where both qualitative and quantitative data was collected using document review, questionnaires and interviews. The study utilised a semi structured questionnaire which included open and closed ended questions. An online questionnaire (Google Forms) was distributed via WhatsApp and corporate e-mail. Similarly, interviews were conducted online via Microsoft teams. Quantitative data was imported from google forms to Microsoft Excel for further analysis, whereas, qualitative data was analysed manually. In some instances, qualitative data was grouped into themes whereas other data was presented as single excerpts to support the quantitative findings. Ethical considerations such as request for

research permit, avoidance of harm, non-violation of research participants' privacy, and non-discrimination were all taken into account.

7 Presentation of Study Findings and Discussion

This section presents the findings based on the data collection tools. First, the participants' characteristics are presented, followed by qualitative data from interviews, then the quantitative data from action officers.

7.1 Respondents Demographics

Out of 179, a total of 123 BEC employees responded to the online questionnaire resulting in 69% response rate. Nulty (2008) has cited different authors such as Babbie (1973), Baruch (1999) and Richardson (2005) who all agree that response rates above 50% are considered good. Hence, the current study's response rate is considered good and acceptable for an online survey which tends to have lower responses as compared to paper-based surveys (Shih & Fan 2009; Yetter & Capaccioli 2010).

Table 1 presents the respondents' demographic details. As can be seen from the results most (n=39, 32%) of the respondents were from the Examination Admin and Certification, followed by Product Development and Standard (n=27, 22%). This is not surprising as the two Directorates have the highest number of employees (54 and 38 respectively) in the entire organization. With regards to gender, the study findings revealed that BEC is dominated by females (n=67, 54%) than males (n=56, 46%). These findings imply that there are more females than males working at BEC.

Table 1: Respondents' Characteristics (n=123)

	Count	Frequency
Name of Directorate		
Office of the Executive Secretary	9	7%
Human Resources	6	5%
Corporate Services	19	15%
Examination Administration and Certification	39	32%
Product Development and Standard	27	22%

Information Communication Technology	9	7%
Research and Policy Development	14	11%
Gender		
Female	67	54%
Male	56	46%
Age		
18-34	9	7%
35-54	72	59%
55 and Above	42	34%
Qualification		
Certificate	0	0%
Diploma	9	7%
Bachelor's Degree	75	61%
Postgraduate	39	32%

Source: Field data (2022)

As pertaining to age distribution, majority (n=72, 59%) of the respondents were between the age of 35-54 years, whereas those above 55 years were 42 (34%). The 18-34 age category had the least (n=9, 7%). These findings may imply that BEC employees are mostly within the young adults' category, who are likely to be more active and receptive to technology. Lastly, on this section, respondents were asked to indicate their level of qualification. The findings as shown on Table 1 above indicates that majority (n=75, 61%) of the respondents hold a Bachelor's Degree, followed by those with Postgraduate degree (n=39, 32%) and Diploma (n=9, 7%). None of the participants holds a certificate qualification. It is praiseworthy that the majority of the employees at BEC hold a bachelor's degree and higher. This is likely to put BEC at an advantage, as implementation of an EDRMS is likely to be accepted due to the employees' educational exposure. The following section presents and discusses the findings from the interviews.

7.2 Data from Interviews

Interview data was collected from four (4) Heads of Departments at BEC. Interviewees were asked five questions and their responses are presented

according to the questions asked. The first interview question was ‘What informed the decision/ motivated the need to implement an EDRMS?’ Responses received were as follows:

Nowadays the trend is to migrate from manual systems to electronic format. BEC should not be left behind in terms of automating its processes, so that we don't lose their records because in paper format records can be easily lost. (Interviewee 1).

This is the direction in which developments are heading. If we don't act, BEC will be left behind and become the laughingstock of the economy (Interviewee 2).

The motivation for me stemmed from the difficulties in managing non-electronic records, especially the challenges of retrieving a specific record from hard copies. Even now, when I urgently need a record, like the letter I required yesterday, finding it became uncertain as it was filed ambiguously. However, with electronic records, a simple search function would have sufficed. For me, the ease of retrieving records serves as the primary motivation. (Interviewee 3).

According to my understanding EDRMS is Botswana National Examinations Processing System (BNEPS) phase 2 project. So, I know purpose of BNEPS phase 2 project was to enhance the examination process through improved core and interfaced process with structured electronic management of documents and enhance information security. That was the aim of BNEPS phase 2 projects. And I think EDRMS is one of them. (Interviewee 4).

Based on the responses obtained from the interviews, it is evident that the motivation to implement an EDRMS was based on the following factors; (1) Keeping up with the trend; (2) Fear of losing paper records; (3) Easy retrieval of records; (4) Improve operational efficiency and effectiveness; and (6) Enhanced information security. These findings are similar to what was presented by Manikas (2015) in which it was observed that respondents in Greek companies were of the view that the EDRMS is capable of improving efficiency, controlling costs, protecting records and improving overall company's

environment. Similarly, this is also supported by Nengomasha and Chikomba (2018), who stated that the implementation of an EDRMS in the public service of Namibia was driven by the need to enhance records management in the public service. This depicts that EDRMS implementation must be driven by a business need.

The second interview question sought to collect data relating to the budget allocated to the implementation of the EDRMS. Some of the responses received were:

The budget is basically inadequate from what we have seen. But in terms of figures, EDRMS was budgeted P 1.8 million, just for the records part. (Interviewee 1).

The budget is classified; I can't tell you that. (Interviewee 2).

If I recall, because this project started long time ago, I don't know if it is still relevant If I recall well, I think they were budgeted around 3 million or so. As a project of BNEPS phase 2, so I don't know how they allocated funds for different sections. (Interviewee 4).

It is praiseworthy that BEC understands the importance of records and took the decision to implement an EDRMS. Though the overall budget for the EDRMS implementation was not clearly revealed, it is clear that records management module was put on the forefront and given a considerable budget (1.8 million out of the supposed 3million); unlike in other institutions where the IT department would be given more budget as the EDRMS implementation is usually considered an IT project only. Forgetting that, before the actual implementation there are numerous processes (business requirements analysis, developing business case and the SOUR document etc.) and other tasks that need to be complemented by records managers before IT purchases the software. On the other hand, as shown from the above interview excerpts, BEC undermined the costs of implementation, that is why the system has not yet been procured.

The third question was 'which department is responsible for the implementation of the EDRMS and why?' Responses established that BEC understands the need for assigning responsibilities to the appropriate office which is the Records Management Unit (RMU). The BEC RMU is fully responsible for the EDRMS. The interviewees acknowledged that the ICT

department is there to support and facilitate with the implementation process. Some of the response supporting the above view were;

The department responsible is Records [Office] which is under Human Resources, because they are the ones who are responsible for records, they are the [information] managers, and they will be assisted by the Information Communication Technology. (Interviewee 2).

While in my view the department that is responsible or that is supposed to be responsible is corporate services through its records management unit. For me this is like we just automating a process that is already there and it doesn't mean we need to change the process owner when automating. (Interviewee 3).

... ICT is supposed to support so that the system is available. Get me clear, to support. After the system is implemented it will be under Human Resources. The Records Management Unit is the one to implement the EDRMS, and SharePoint will be for different directorates because they choose what to share to the whole of BEC. The EDRMS should be under records management unit as they are the rightful place, where information should be. (Interviewee 4).

The fourth interview question sought to collect data relating to change management initiatives. For this reason, interviewees were asked to indicate the change management strategies that had been put in place to ensure that employees were on board. Responses to this question were as follows;

The office of Strategy Management is assisting in terms of the change management. They have put up a change management strategy, they also do what is called change Fridays, where employees are familiarised about projects. BEC also have the change champion in different directorates or units, who drives the change in those units. There is also communication strategy that we also comply with, where employees on regular basis should be or are informed about what is going on regarding the project. (Interviewee 1).

BEC has a global way of implementing change which is managed under

the strategy department. So, what this means is, once the system is identified and awarded, change agents for the system will be identified, and they will be trained and they will be able to impact change on the rest of the employee.s (Interviewee 2).

So far really, they are no strategies that are in place to ensure change management. My thinking is perhaps the approach that we are taking, is that we get the solution. And when the solution is there, we take employees on board so that they see it live and probably they appreciate it from that perspective. But they were no strategies before prior to deciding to go that route. (Interviewee 3).

The project began in 2014. Since then, I've gathered bits and pieces of information from various committees. Management, I believe, is informed as they receive updates from these committees. However, as an organization, we seem to lack comprehensive awareness. Employees are left uninformed; they are not kept in the loop. For instance, during a SharePoint demonstration, I inquired about the EDRMS, and I was informed that it is still under evaluation. But I've heard these words repeatedly. (Interviewee 4).

As presented on the excerpts above, the findings show that there is divided opinion. Interviewee 3 and Interviewee 4 were of the view that change management is lacking at BEC as some employees were left lagging behind. While Interviewee 2 was of the view that change management was yet to be conducted once the system is implemented. Thus, implying that efforts towards change management are insignificant. This might be true as none of the interviewees indicated if there is prior ICT training before EDRMS implementation. Moreover, a search for a documented change management strategy did not yield any results. Nonetheless, some interviewees revealed that there are some activities conducted to ensure that employees are on board and aware of what is happening in the organization. The specific strategies employed include;

1. *Communication* – through ‘change Fridays’, where employees are familiarised about projects; and,
2. *Forming a coalition and User engagement* – through establishment of change champions who drives the change in their different units as narrated by interviewee 1.

The last interview question sought to establish if BEC had formulated a clear agenda for EDRMS implementation. The responses were as follows:

The clear agenda is there, because BEC have deliverables and milestones. So, I will say yes, there is a clear agenda because we know what to deliver to the organisation. (Interviewee 1).

The problem is that it took long to award this tender, now probably it will need to be reviewed, to be aligned to current trends. (Interviewee 2).

I am not aware of any formulated agenda for the implementation of this solution. This might explain why, as mentioned earlier regarding change management, it seems that the current approach involves bringing employees on board after acquiring the solution, rather than having a predetermined plan. We understand the necessity, but I have yet to come across any specific implementation agenda. (Interviewee 3).

I cannot determine the clarity of the agenda as it seems to rely on various structures. I am unsure whether there is effective communication between these structures. The project has been ongoing for a considerable period, and there is a possibility that the budget might be surpassed due to unforeseen events. (Interviewee 4).

Once again, the responses captured above show that there are divided opinions as there were three (3) interviewees who were not aware of the existence of the implementation agenda. A search for the implementation agenda yielded no results, as some documents were classified and deemed confidential. It can therefore be concluded that BEC lacks a change management strategy. If top management such as the directors interviewed in this study are not aware if there is a clear agenda for EDRMS implementation, then the implication is that majority of the employees at BEC have not been communicated to, clearly with regards to the intended changes. Lack of communication prior implementation has a negative impact on system acceptance, adoption and utilization.

The next section presents the findings from the online questionnaire (both quantitative and qualitative responses).

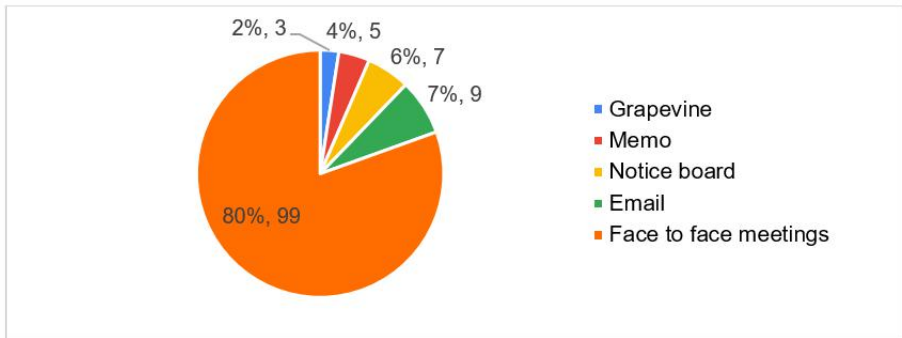
7.3 Data from Questionnaires

The data presented here, aims to establish the action officers' awareness about EDRMS implementation and their perceptions towards the BEC readiness to implement the system.

7.3.1 User Awareness and Engagement

A key issue that the study sought to establish relates to user involvement and engagement during the preparatory stage. Hence, the study participants were asked if they are aware that BEC is in the process of implementing an (EDRMS). Majority (n=113, 92%) said 'yes' while 10 (8%) respondents said 'No'. Respondents were further asked to indicate how they were made aware of the decision to implement the EDRMS.

Figure 1: Communication Method (n=123)



Source: Field data (2022)

The findings as shown on Figure 1 above, indicates that BEC utilizes face to face meetings (n=99, 80%) to convey important information. This is so as 80% (n=99) of the respondents alluded to the fact that they were made aware of the change initiative via face to face meetings. On the other hand, 7% (n=9) said that details concerning the change initiative was communicated to them through email, while 6% (n=7) said it was conducted through written notice boards.

Respondents were also asked if they were consulted when the Statement of User Requirements (SOUR) document was formulated. Majority

(n=96, 78%) of the respondents said 'no' whereas 27 (22%) respondents said 'yes'. Amongst those who said 'yes' that they were consulted during the development of SOUR document, they expounded that they specified the following system requirements: *The system should be user-friendly and easy to navigate with guidance available, have embedded retention/ archive requirements for records with notification automatically sent and have controlled access for confidential records* said respondent No 12.

It is commendable that BEC values face-to-face communication as it is the most effective way of disseminating information and ensuring that all the intended recipients have received the message. However, it is disheartening to note that majority of employees were not consulted when the SOUR document was formulated. This is the most critical stage of involving users in order to understand their views on the type of system they are expecting and to know their business requirements in the various units. This implies that, the system to be deployed by BEC is not based on employees' requirements as the end users were not surveyed. It was crucial for BEC to collect system requirements from the end users so as to understand how they have been interacting with current systems and what functionalities they wish to continue with. This would help BEC to properly plan for integration and customization. Failure to do this may result in the system not performing at its best, thereby failing to meet the initial intended business needs. Thus, leading to fragmented information and bottlenecks in information flow.

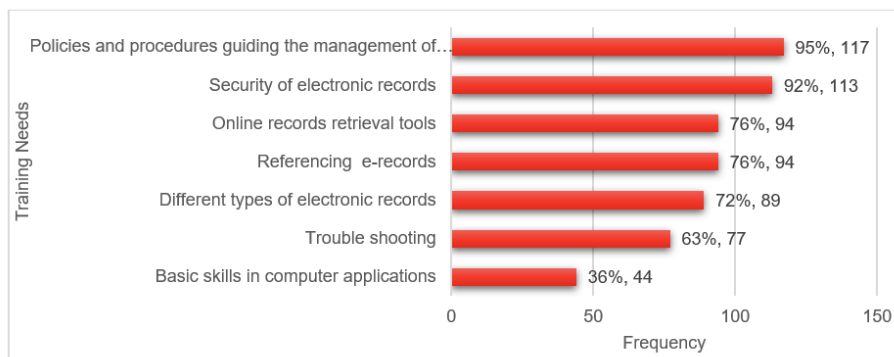
7.3.2 Skills and Training

Another aspect that the study sought to establish was whether respondents had adequate technological skills needed to create, name and share electronic records. The findings as shown in Figure 2 below revealed that 76% (n=93) of the respondents have basic skills to interact with e-records whereas 24% (n=30) said they don't have.

Secondly, on skills and training, the study sought to identify the areas which employees felt they need more training. Therefore, respondents were further asked to indicate the areas in which they would like to be trained in, so as to improve their technological skills with regards to e-records.

As shown in Figure 2 below, the results indicated that BEC employees have basic skills in computer applications as only 36% (n=44) highlighted the need for training in this area.

Figure 2: Skills and Training Needs of Employees at BEC



Source: Field data (2022)

Nevertheless, the majority of the respondents indicated that they need training in the following areas:

- (1) Policies and procedures guiding the management of e-records (n=117, 95%);
- (2) Security of electronic records (n=113, 92%);
- (3) Online records retrieval tools (n=94, 74%);
- (4) Referencing e-records (n=94, 76%);
- (5) Different types of electronic records (n=89, 72%); and
- (6) Trouble shooting (n=77, 63%).

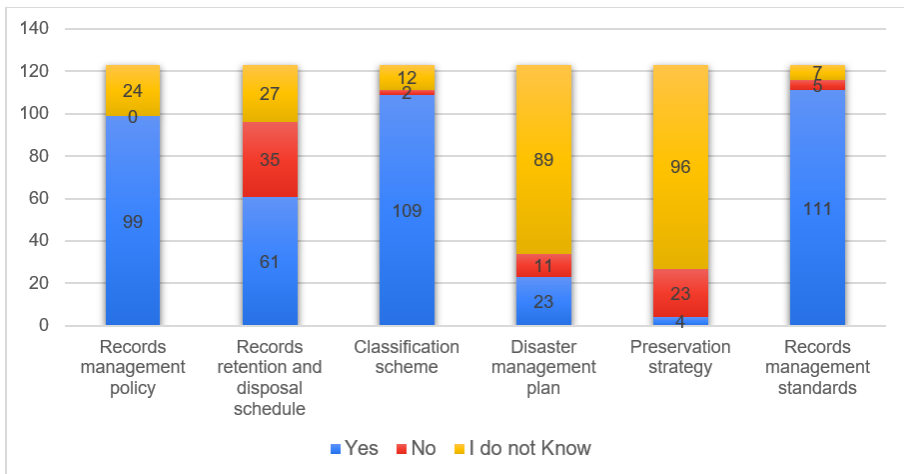
7.3.3 *Records Management Tools*

The study further sought to establish if BEC is ready for an EDRMS implementation, especially with regards to policy documentation guiding both physical and digital records management. The respondents were asked to indicate the records management tools that are in place at BEC. Majority of the respondents indicated that the following are available:

- (1) Records management standards (n=111,90%);
- (2) Classification scheme (n=109,89%);
- (3) Records management policy (n=99,80%); and
- (4) Records retention and disposal schedule (n=61, 50%).

On the other hand, majority of the respondents indicated that there are not aware of the availability of preservation strategy (n=96, 78%) and disaster management plan (n=89, 72%). On the negative side, only a few respondents indicated that there was no retention and disposal schedule (n=35, 28%) and preservation strategy (n=23, 19%). These findings are demonstrated in Figure 3 below.

Figure 3: Records Management Tools at BEC



Source: Field data (2022)

A document search for the above records management policy documentation was done to ascertain their existence at BEC. The search revealed that the Records Management Policy (RMP) was available and it was implemented in 2019. This RMP makes provision for both physical and electronic records. Additionally, no other standards were found related to digital records management or EDRMS implementation. On the other hand, document review established that a retention and disposal schedule was still under development, while searching for the preservation strategy and disaster management plan yielded no results. Finally, document review also established that the Business case and SOUR document were not specifically developed for the EDRMS, rather they were developed for a main project called BNEPS.

Study participants were also given an open -ended question to state their view about the current records management programme at BEC. Some respondents indicated that the programme is good as they are able to retrieve files and also there are records management policies in place. However, most of the participants indicated that the programme needs improvement as there were problems in the following areas:

- a. **Delayed or inefficient retrieval of records:** this is evidenced by respondents who noted that the records management programme is still manual and goes against Covid-19 protocols. Respondent 112 further explained that *the current system is cumbersome as it is so manual. Sometimes files cannot be located for a long time.* In addition, ... *it is not secure as files are always lost*
- b. **Lack of management support:** respondent No. 76 highlighted that *there is need to implement an electronic system to deal with the current problems we have in our manual system, however, the implementation progress is very slowly, and there seems to be less interest from some people who are supposed to be in the forefront embracing the program.* This comment indicates the likelihood of lack of support by some top managers in the organization. As already indicated from the interviews above, some top managers interviewed were not certain of the implementation strategic vision or agenda and the budget allocated to the project. This shows lack of engagement on their part.
- c. **Problematic tracking of files:** respondents lamented that the current records management programme entails manual processes which makes it difficult to track files. Respondent No.14 alluded that *tracking of files is still problematic*, while respondent #34 added that *the current system is labour intensive and too difficult to trace a file.* Respondent No. 56 further concluded that *our hope is in the new system.*

Finally, respondents were asked to indicate their views towards BEC's readiness to implement an EDRMS. There were mixed opinions with regards to this statement. Some respondents said 'yes' that BEC is ready as it has the necessary resources, produces a lot of e-records and has adequate policies and procedures in place. Respondents No. 112 stressed that 'I believe so because

the idea has been welcomed and the solution is seen as a necessity so I believe BEC is ready. The timing is also appropriate as BEC is transforming ... and records cannot continue to be managed manually'. Respondent No. 45 also believes that BEC is more than ready for the EDRMS implementation. The respondent confidently argued that,

Yes BEC is very ready to implement [an] EDRMS because Covid-19 has taught us that e-records are very important. Hence, the fact that the organization is already producing a lot of electronic records it is a sign that it is ready for an e-records management system.

On the other hand, participants who felt that BEC was not ready for EDRMS implementation, were of the view that BEC is still facing challenges with the current manual system and lacked required skills. This is evidenced by respondent No. 33 who noted that,

If the manual system is giving us so many challenges what more of the electronic one. Personnel in charge of the manual system is reluctant to assist fully and procedures in place are often not followed. Where areas for improvement are identified no action is taken. Infrastructure is also another challenge for implementation of the system.

In addition, respondent No.12 also alluded that *BEC is not yet ready, because there has been no change management conducted yet*, while respondent #16 also alluded that *I don't think [BEC] has the resources to carry through this assignment; in terms of finances and (Internal) requisite skills needed to progress this project*. Lastly, respondent No. 91 opined that *I am not sure if the office has the right skills required, it really depends how the new system will be resourced*.

8 Conclusions

This study aimed at assessing organizational readiness and to analyse the employees' perspectives towards the implementation of an EDRMS at BEC. Overall the study established that BEC is lagging behind in its preparations. This is evidenced by lack of top management support, lack of a clear implementation agenda, lack of training, lack of user involvement and lack of documented

change management strategy. BEC failed to plan financially for the EDRMS as the business case that would have projected the actual costs required for the implementation was never done. BEC depended on the SOUR and Business case developed for a bigger project called Botswana National Examinations Processing Systems (BNEPS). This explains why, BEC has failed to procure the system till date because they have been considering EDRMS implementation as a sub-project. In addition, BEC's records management programme lacks a business continuity plan as the organization is yet to develop a preservation strategy and disaster management plan. BEC's records management environment is not fully prepared for an EDRMS. Because, challenges in the physical environment will definitely be escalated in the electronic environment. If this happens, then information flow, effective control of records creation, service delivery and job productivity will be affected. Lack of proper information management in organization indirectly affects socio-economic development. For the basis of sustainable development is partly based on the ability to access the right information, at the right time, in the right format so as to make informed decisions. Therefore, this study findings serve as a benchmark for other organizations and influence policy and decision making relating to EDRMS implementation. Based on the findings of this study, BEC may be able to avoid cost implications arising from implementing systems without considering all the necessary factors necessary for successful implementation.

Finally, it is praiseworthy employees' opinions depict a positive and receptive mind towards the implementation of the EDRMS. Employees see the need for the systems and seem to be willing to move into the digital era so as to avert problems such as delayed access to information and problematic file tracking. However, BEC has failed to satisfy employees needs by denying them training and not implementing the system at the time employees are eager and looking forward to the new solution. Thus, despite the fact that majority of the respondents indicated that they have basic technological skills needed to create, name and share electronic records, many are still yearning for further training in areas pertaining to policies, security, retrieval tools, referencing techniques, types of e-records and trouble shooting skills. This shows that BEC has not put much effort in preparing the employees for the EDRMS, especially in terms of training. This finding therefore, concurs with the interviewees opinion that change management is lacking. The EDRMS not only offers a new concept of document and records management but also instigates a cultural shift within the affected businesses. Hence, it is important to note that lack of skill to use the

systems produces laggards. This study therefore, concludes that BEC is not yet ready for an EDRMS implementation.

9 Recommendations

Based on the above findings, the researchers recommend that BEC strategy development office should develop the change management strategy specifically for the EDRMS project, raise awareness to employees and ensure that the action plan is followed. Though the system has not yet been procured, BEC need to engage end user in vigorous training to prepare their minds and equip them with the ability to operate and interact with e-records especially with regards to the areas of training indicated above. The Records Management Division also need to undertake thorough research on the international standards and policies relating to EDRMS implementation, then embark on reviewing of current records management tools and policies to pave way for successful EDRMS implementation. Lobbying for top management support is also critical as it enables provision of adequate resources for the project. Lastly, BEC should formulate a specific SOUR and business case directed to the EDRMS implementation.

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Chapter 12

Knowledge Acquisition for Development in Selected Public Service Training Centres in Zimbabwe

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Abstract

The chapter focussed on the role of training centres towards achieving knowledge for development purposes in Zimbabwe public service sector. Anchored by the interpretivist paradigm, both qualitative and quantitative research approaches were used. Questionnaires with open-ended questions and interview guides were used to gather data from principals and training officers. The findings indicated that training centres are using Information and Communication Technologies infrastructure like computers and the internet as enablers for knowledge acquisition, creation and dissemination. Knowledge is generated and disseminated during socialisation, mentoring, training, education, workshops, seminars, refresher courses and through research, collaboration and, training of trainers. The study recommends that the Public Service Commission (PSC) should establish knowledge managers' posts; a culture of learning organisation and collaborations with other training institutions outside the PSC for enhanced knowledge sharing in order to improve service delivery. The study also recommends the adoption of the four pillar approach of a knowledge economy as a step towards achieving knowledge for development.

Keywords: Knowledge, knowledge-based economy, knowledge for development, service delivery

1 Introduction and Background

Knowledge is a critical resource which, when acquired and used promotes proficiency in organisational performance in knowledge-based economies (KBE). A KBE is one that allows organisations and people to create, acquire, disseminate and use knowledge for social and economic development (Shrestha, Regmi, Dotel, Bhattarai & Adhikari 2016; Roztock, Soja & Weistroffer 2019) and it is modelled around education for a skilled workforce, science and technology, and innovation; information communication technology infrastructure, and policy and regulatory environment (Salem 2014; Oluwadare 2015; Asongu & Nwachukwu 2017; Hadad 2017). This study sought to determine knowledge acquisition strategies, and the value of knowledge generated at PSC training centres in contributing towards a knowledge-based economy. Through learning, organisations acquire new knowledge to attain competitive edge. Organizational learning is the process through which an organization adapts and improves its policies, products and processes based on feedback and evidence from experience, evaluation, or research (Argote & Miron-Spektor 2011). Senge (1990) portrays a learning organisation as one shaped by the learning of its members. Learning of employees helps in knowledge creation, transfer and retention.

Training and development organisations play an important role in knowledge impartation, transferability, dissemination and diffusion for socio-economic development. Training is the basis of an organisational developmental dream, and is crucial to retain professional standards of conduct and performance (US Public Service Academy, n.d). Corporations and organisations spend a lot of resources on staff training and development, anticipant of producing competent, highly skilled, committed, and accountable cadres in pursuit of building a rich knowledge base. Training institutions including universities and training centres have become ‘knowledge industries’ (Salem 2014: 1049) while infrastructure is a pre-condition for economic development, alongside education for skilled labour force (Tyson 2017). Mupa, Chabaya and Chiome (2011:99) are of the view that, ‘Institutions of higher learning are the largest repositories of certified knowledge ... as possessing specialised skills and knowledge which societies need for their advancement’. Developed and developing economies have shifted prioritisation to developing human skills through training and education and as such training centres play a pivotal role in knowledge acquisition, sharing, retaining and dissemination. There are four pillars or dimensions of a KBE as propounded by international policy makers,

forums, scholars, researchers and practitioners. A KBE is modelled around four pillars namely: education for a skilled workforce; science and technology, and innovation (others call it research and development); information communication technology infrastructure; and policy and regulatory environment (Asongu & Nwachukwu 2017; Hadad 2017; Oluwadare 2015; Salem 2014).

There are thirteen Public Service Training institutions in Zimbabwe (instituted under the Public Service Act 1995 (No. 21 of 1995), subsequently revised in 1996 to be [Chapter 16:04]) that are obliged to offer training, development and consultancy services to the public sector, in respect of the national, provincial and district needs and setups. Of the thirteen training centres Domboshava, Highlands and Elangeni fall under national category while Alvord, Chinhoyi, Senga, Rowa, and Esikhoveni belong to provincial category and, Bikita, Inyati, Toronto, Murehwa and Thuli are district training centres. The study surveyed only four of these training centres, 2 national and one each from the provincial and district categories. From the training centres public servants acquire requisite skills, knowledge and attitudes that ensure high quality performance which is in sync with the PSC motto: 'Quality People; Quality Performance; Quality Service' (Public Service Commission 2018:4). The PSC training centres exist to impart technical and vocational skills in carpentry, building construction, motor mechanic, electrician, food and nutrition and garment design and construction. Today enrolment statistics at these training centres has since waned, with an average intake of fifty (50) students per institute between 2010 and 2015, comparative to the previous years where an institute would post plus or minus three hundred students per intake (Domboshava Training Centre 2019; Ministry of Public Service, Labour and Social Welfare (MPSLSW) 2015). The declining statistics in student admissions to the training centres had been raised in succeeding reports (2007; 2010; and 2011), to the Senate Sub-Committee on Associateship/ Affiliate Status (SSAAS) by Zingura in 2010 and 2011; and by Tarisayi in 2007.

2 Objectives of the Study

The purpose of this study was to establish the role of the Public Service training centres in facilitating knowledge acquisition to civil services through training, development and consultancy services. Specifically, the study sought to answer the following questions:

1. What are the knowledge acquisition strategies used in PSC training centres?
2. How are PSC training centres exploiting available ICTs to create, acquire and disseminate knowledge for the purposes of development?
3. What is the role of training centres in knowledge generation in solving development challenges?
4. How valuable is knowledge generated at PSC training centres in contributing towards a knowledge-based development?

3 Literature Review

This section reviews related literature under derived themes, namely, knowledge for development, knowledge acquisition strategies, ICT systems and tools exploitation and use, and lastly, knowledge for innovation, research and development.

3.1 Knowledge for Development

Jelenic (2011) argues that knowledge management (KM) supports innovation, encourages free flow of ideas, and increases efficiency and effectiveness in organisations. Igbinovia and Ikenwe (2017) aver that knowledge improves organisation's performance through increased efficiency, productivity, quality and innovation and indeed KM is critical for organisations that seek to ensure sustainable strategic competitive advantage. National economies are now using knowledge for development, particularly Asian economies which are all becoming knowledge based (ADB 2007). Human knowledge is categorised in to tacit and explicit knowledge (Farnese, Barbieri, Chirumbolo & Patriotta 2019; The Knowledge Management Tools (KMT) 2018; Nonaka 1994; and Nonaka & Takeuchi 1995).

Codified explicit knowledge is found in documents and articles, while uncodified tacit knowledge is embedded in informal work processes, embodied in people's mind, and can be exploited through working relationships and an evolutionary path. Tacit knowledge is acquired through experience sharing, discussions and observation in apprenticeship, mentoring, communication, train-

ing (Igbinovia & Ikenwe 2017) and through observation where amateurs learn to do things from colleagues. Alkhalidi and Olaimat (2006:138) conclude that ‘experience is the essential bridge between what happened in the past and what is happening in the present ...’. Observing an expert erect a structure, a tailor working on a garment, a mechanic repair or trainee involvement in a specific context (Nonaka 1994) can enhance one’s knowledge and acquire more technical skills and abilities. Trainees working side-by-side with their mentors and subject matter experts, and, on-the-job training are the keys to acquiring tacit knowledge, not through language but by observation, imitation and practice.

3.2 Knowledge Acquisition Strategies

Firms around the world use various strategies to acquire new knowledge to enhance competitive advantage. Workshops, seminars, conferences, education, training (Dewah & Mutula 2014; Igbinovia & Ikenwe 2017), partnerships, mentoring, storytelling (Swap, Leonard, Shields & Abrams 2015), interviews and use of subject matter experts (Dewah 2012), research and development (knowledge innovation) are some of the strategies which organisations adopt to acquire, create, codify, retain, share, diffuse and disseminate knowledge for efficient organisational performance and development.

In well-established organisations employees with vast knowledge and mastery of concepts, subjects and topics are assigned duties to train, mentor and give advice in organisational setups. Expert employees have abilities and capabilities to solve difficult organisational confrontations, and can share their views, knowledge and experiences about a problem in order to proffer solutions (Igbinovia & Ikenwe 2017). Often, managers consult these expert personnel when making difficult organisational decisions. Before retirement or transfer, it is critical to hold subject matter expert/exit interviews or handover-takeover sessions biased towards knowledge codification through tapping. Dewah (2012: 96) postulates that, ‘Subject matter experts are paired with individuals who have interest and therefore need further training and development in a subject matter area’. Subject matter experts are often given responsibilities to train and educate apprentices, new employees and offer consultancy services upon request. The aim is to equip with requisite and necessary skills and impart knowledge to trainees. Experts provide their expertise through mentoring and training to their subordinates and by so doing, subordinates acquire new knowledge. Succession plans are effected to impart knowledge for future use and application.

Learning organisations and organisational learning are critical for knowledge acquisition, development and survival in the ever changing environment, driven especially by technological exploitation and increased competition (Imran & Tanveer 2015). Organisations create a continuous learning atmosphere for employees to acquire new knowledge, upskill and keep on track with organisational mission and vision (Imran & Tanveer 2015). Musakwa (2021) reckons that culture change is catalytic to individual and institutional performance through a mind-set change, resulting in improved public service delivery. Public sector training institutions set up networks upon which they share views and experiences, and to co-ordinate their activities at regular workshops (Gala & Reed 2017).

Peters and Humes (2003) and Leonard, Swap and Barton (2015) explain deep smarts (experts) as experienced persons, with expertise gained especially through formal education, doing, practicing and yet such know-how has a long shelf life and value in the future. Salem (2014) recognises innovation as a social process in which producers and users actively learn from each other through consistent ‘learning-through-interaction.’ It is against this backdrop that education and training play a critical role in knowledge and skills acquisition.

Education and training offer lifelong skills necessary for individual development and ultimately contributing to national development. Employees need a continuous learning atmosphere or a supportive learning environment (Ghaffari, Fazal, Jadoon & Shah 2011), to keep on track with organisational mission and vision (Imran & Tanveer 2015). An organisation with a learning culture (organisational learning and learning organisation principles) is keen to retain its competence on the market through tapping experience based tacit knowledge into implicit and explicit formal coded new organisational knowledge. Organisations that invest in research and development (Salem 2014) as well as education and continual training of its arsenal (Jelenic 2011) are poised to prosper, and have a competitive advantage as employees continually sharpen their skills.

3.3 ICT Systems and Tools Exploitation and Use

Various ICT tools and systems are exploited in knowledge management for the processes of capturing, acquisition, processing, storing and dissemination of knowledge as critical resources necessary for development (Dewah 2012).

Computer hardware and software, and many other contemporary analogue based facilities like videoconferencing, teleconferencing, telephone and television facilitates knowledge capture, storage, processing and sharing among individuals, communities and organisations. Information Technology (IT) has made knowledge readily available over various platforms (Roztock, Soja & Weistroffer 2019; Shrestha, Regmi, Dotel, Bhattarai & Adhikari 2016).

An increased access to and use of mobile phones, internet and World Wide Web (www) facilitates improved access to and acquisition of knowledge and information. Computers, the Internet, and intranet have become knowledge enablers because of their communication and storage capabilities and through these and other networking facilities, people and organisations can 'connect, share, transfer and '... communicate some of the richness and subtlety of one person's knowledge to another' (Davenport & Prusak 1998: 14). Today's networked environment ensures organisations and people have access to vast information available in databases and on the web, however application and knowledge about processes which is not transferable via the same platforms makes the difference.

3.4 Knowledge for Innovation, Research and Development

Knowledge is a critical resource necessary for development (Kunthi, Sensuse & Tobing 2018), increases the value of a company and its competitiveness (Jelenic 2011), economic growth, and development as long as it finds concrete applications at work. Production of ideas is the source for economic growth, and 'knowledge is now recognised as the driver of productivity and economic growth' (Toscano, Mainardes & Lasso 2017). For these reasons, knowledge continues to be an important aspect in value creation. Jacobs and Asokan (2000:15) posit that 'Development is the process by which human beings become aware of opportunities and challenges, formulate responses, make decisions and initiate organised actions'. Asongu and Nwachukwu (2017:12) also point out that '... lifelong learning is vital in order for workers in particular and society in general to continually adapt to evolving and challenging conditions of the labour market'.

Despite these studies, the role of training centres as potential 'knowledge factories' for the purposes of development has not been explored in Zimbabwe. The study comes in time with the government's vision 2030 mantra of an upper middle income economy. Thus, this study sought to explore

the role of training institutions in general and Public Service training centres in particular, on knowledge acquisition practices aimed at development. The chapter presents the findings of a knowledge acquisition practices that was, for the first time, conducted in selected public service training institutions in Zimbabwe.

4 Methodology

The study focused on four (4) selected PSC training centres - 2 national and one each from the provincial and district categories. The study was underpinned by the interpretivist paradigm, and qualitative research approaches were used with the intention to understand the principles of knowledge acquisition and use for development purposes. Only three principals were interviewed and out of 24 administered questionnaires that were administered to training officers a total of thirteen were returned while content analysis was used to collect primary data and to increase validity through cross-examination. The population of the study comprised of all the 13 principals and 56 training officers at the training centres. Purposive sampling technique was adopted as the researchers targeted information-rich individuals who were able to commit themselves to increase credibility of results. The study sample comprised of four (4) PSC training centres, four (4) principals and twenty-four (24) training officers who were purposively selected based on rich information they were likely to provide to the study. The authors accessed institutional public records including reports, mission statements, photo albums, memoranda, PSC newflashes, circulars, training materials like modules. The integrated results and discussions are presented in the section that follows.

5 Findings and Discussions

This section presents the findings of the study based on the objectives of the research.

5.1 Knowledge Acquisition Strategies

The first research question sought to establish the strategies used in PSC training centres to acquire knowledge for development purposes. In the questionnaire, respondents were asked various questions pertaining to the strategies used for knowledge acquisition.

5.1.1 Exit Interviews Strategy

The majority (9) of participants revealed that subject matter experts interviews are conducted to capture knowledge gained through the years of experience, be it over a short or long duration of service. On the any other section, one respondent indicated that subject matter experts' interviews are to document procedures followed performing specific technical tasks. The results concur with Igbinovia and Ikenwe's (2017) observation that interviews on subject matter experts are critical in order to capture tacit knowledge for codification, and the switching process from one type of knowledge to the other is exceptionally important (Farnese *et al.* 2019). The knowledge conversion model by Nonaka and Takeuchi (1995) is the basis upon which tacit knowledge can be converted into explicit knowledge which is easy to share. Codification of tacit knowledge is extremely important for organisations as Haldin-Herrgard (2000) bemoans that relying on tacit knowledge is risky and its conversion or at least ability to share it is of greater value to an organisation. Although exit interviews create platforms upon which tacit knowledge can be captured, motivation to share is upon individuals, and organisational culture also plays an important role.

5.1.2 Tacit Knowledge Capturing Strategy

Respondents were asked to indicate the methods used to capture tacit knowledge to develop institutional memory. Majority, 8 of respondents indicated documenting procedures as skilled personnel execute their duties. This was followed by observation method (5), mentoring of young employees (4) and recording/ video capturing (2).

5.1.3 Activities Conducted to Acquire Knowledge

The three principals who were interviewed identified training, workshops, seminars, mentoring, research, exchange programs and refresher courses as the main activities conducted to acquire knowledge at the various institutions included in the study. Interviewee 3 stated that, 'Most young talent want to develop their skills through staff development programs because of inability to pay fees for themselves, unfortunately of late, the scheme seems no longer vibrant'. Interviewee 9 remarked that 'Staff apply for Manpower Development Leave and go for upskilling on their own'.

The findings of the study also revealed that training (11), supervision

and mentoring (10) and seminars and workshops (12) were the main activities for acquiring knowledge. These were followed by research and development (8), partnerships and exchange programs (6) and refresher courses (6). Conferences and staff development got 2 responses apiece. This finding is similar to studies conducted by Dewah and Mutula (2014), Igbinovia and Ikenwe (2017), and Swap, Leonard, Shields and Abrams (2015). Accordingly; workshops, seminars, conferences, education and training (Igbinovia & Ikenwe 2017; Dewah & Mutula 2014), partnerships, mentoring, storytelling (Swap, Leonard, Shields & Abrams 2015), interviews and use of subject matter experts (SME) (Dewah 2012) are all activities upon which knowledge can be acquired, captured and retained as organisational knowledge assets.

5.2 ICTs Exploitation for Knowledge Management

The questionnaire results indicate that computers and the Internet/Intranet (13) are the major infrastructure for knowledge creation, acquisition and dissemination in the selected institutions. These were followed by telephones and cellphones (12), projectors (11) and printers (10) in descending order. Interactive boards (6), photocopiers (5) and videoconferencing (3) were least selected. None of the respondents selected fax machines. These results are presented in Table 1.

Table 1: Institutional ICTs infrastructure

ICTs component	Number of respondents
Computers	13
Internet/Intranet	13
Cellphone/Smartphone	12
Telephone	12
Multimedia projectors	11
Printers	10
Interactive boards	6
Photocopiers	5
Videoconferencing	3

Source: Field data 2021

The above findings are similar to those of Roztocki, Soja, and Weistrof-

fer (2019), Shrestha, Regmi *et al.* (2016). Laudon, Laudon and Dass (2010) confirm that technologically equipped organisations with a pool of skilled personnel are likely to have a better competitive edge over their competitors. The various technological infrastructure available necessitates knowledge acquisition, creation and dissemination for effective, efficient and satisfactory service delivery to the citizens.

5.2.1 Influence of ICTs on Quality of Service Delivery

During interviews, participants mentioned that the use of contemporary ICT infrastructure has enhanced codification of rich tacit knowledge embodied in the human minds. Interviewees remarked as follows: Participant 1 opined, ‘Social media platforms enhance communication and clients receive information quickly and easily’. Participant 3 revealed that ‘bureaucratic structures are slowly losing grip when it comes to knowledge sharing, as the use of social media platforms facilitate the spread of information instantly and in viral nature’.

IT infrastructure eases knowledge management practices in capture, creation, processing, storage and dissemination of knowledge. Computers, the Internet and intranets are knowledge enablers because of their communication and storage capabilities. ICTs facilitate collaboration, coordination of activities and sharing of views and experiences (Gala & Reed 2017). For these and other reasons, respondents were quick to mention that ICTs have their drawbacks as well. One respondent decries the overwhelming volume of information available on the Internet and lack of contemporary infrastructure to harness the information at their disposal for development purposes.

5.2.2 Use of Social Media Platforms to Acquire, Create and Disseminate Knowledge

The findings reveal that Electronic mails (11) and WhatsApp (10) platforms were the most used avenues for knowledge acquisition, capture and dissemination in the respective training centres. The findings also indicated that Website (3) and video conferencing (3) were the least used for knowledge acquisition. On the other hand, 6 respondents listed Zoom and Google Meet as platforms ‘used especially when conducting meetings, hence providing the basis to capture and acquire knowledge as subject matter experts and consultants deliver their training.’ It was interesting to note that Facebook,

Twitter and Skype received no responses from participants- a clear indication that they are not used for institutional work.

5.3 Knowledge Generation through Innovation, Research and Development

Regarding innovations coming out as a result of new knowledge generated through research in their institutions, 6 respondents revealed that there is improved service delivery through implementation of new knowledge generated through research, yet other 6 respondents indicated that organisational knowledge management culture changes. Only 3 respondents indicated that there is accelerated speed of knowledge circulation through adoption of research recommendations. Only 2 respondents indicated that institutional procedure manuals are edited to incorporate new ideas resulting from research.

Regarding implementation of knowledge for development generated through innovation and research, interviewee 2 revealed that ‘We often implement new knowledge gained through supervision and conducting lessons in module development’. Interviewee 2 further remarked that, ‘We develop modules which are client focused as a result of discussions and socialisation’. In light of these observations, the researchers realised that training centres create a strong knowledge base useful for young talent in order to improve productivity, performance, efficiency and effectiveness in respective work places. Adoption of research-based knowledge enhances institutional efficiency and effectiveness in service delivery. This confirms Leber, Buchmeister and Ivanisevic’s (2015) observation that newly generated knowledge contributes to necessary diversity for organisational growth and renewal, and the application of knowledge leads to performance improvement and value creation. Organisations with an enabling learning atmosphere for their personnel ensure employees continually grow through learning such that they are better equipped to perform more effectively (Jaber & Caglar 2017).

Interviewee 3 revealed that ‘New knowledge is produced through research, collaborations and exchange programs, refresher courses and training of trainers’ workshops’. The results indicate that institutions promote new knowledge creation, acquisition and dissemination through various mechanisms. The PSC rewards through promotion and encourages employees to upskill and continuously learn to acquire knowledge necessary for improving overall organisational performance. The findings are similar to Leber, Buch-

meister and Ivanisevic's (2015) who found that institutions that allow employees to freely implement new ideas gathered through innovation and creativity positively impact on sustainable development through efficient and effective ways of servicing clients. They (Leber, Buchmeister & Ivanisevic 2015) further noted that when employees are encouraged to be creative and innovative at workplaces, they are motivated to carry out duties successfully and without delays.

5.4 Value of Consultancy Services Offered by Training Centres

When asked to state the value of consultancy services (knowledge) that they offer to the public service, interviewees remarked as follows: Interviewee 1: 'The value is hinged on service delivery improvement, productivity and harmony'. Interviewee 3: 'Trainees are getting promotions and upgrading at their respective work places demonstrating the magnitude of skills and knowledge imparted during their period at the various training centres'. Interviewee 2: 'Consultancy services instil innovation and creativity mentality on trainees'. Interviewee 11 revealed that 'Institutions are helped to achieve goals using limited resources and time. There is generally an improved organisational performance'. Results from respondents are presented in Table 2.

Table 2: Value of consultancy services

Description	Number of respondents
Service delivery improvement	13
Improved organisational performance	13
Promotions and upgrading	12
Achieving goals using limited resources and time	11
Innovation and creativity	7
Increased productivity	1
Harmony	1

Improved service delivery, organisational performance and achieving results with limited resources are achievable within the PSC as she adopts the Work

Culture Change strategy advocated for by the Secretary to Commissions. However, the takeoff for the PSC Strategic Plans (2021 - 2025) could be influenced with the restrictive measures of Covid 19 as most ageing people in the system are techno-phobia and need physical interactions, training and workshops to grasp the concepts of a new PSC system. Nevertheless, consultants add value by transferring knowledge and skills into the client organisation, leaving it better equipped to respond to future challenges, help clients get better results for less money and faster, and they provide specialist knowledge that help clients take better decisions

Regarding the extent to which their consultancies contribute to improved performance in provision of services to the citizens, majority (10) of respondents indicated that to a large extent consultancy services contribute to improved performance in the provision of services to the citizens. Nevertheless, 2 of the respondents indicated that to a lesser extent consultancy services contribute to improved performance while only one respondent mentioned that 'it is difficult to quantify the extent to which consultancy contributes to organisational performance,' and thus chose moderate extent. During the interviews, Interviewee 3 reported that 'On average consultancy services have a bearing on overall organisational performance'. Training centres offer consultancy services in personnel performance appraisal, finance for non-finance managers, training of trainers and induction to the PSC among the many courses. These are aimed at improving employee performance at the various stations.

6 Conclusion

The study has demonstrated that although training centres do not have knowledge management personnel, there are efforts in place consistent with strategies of knowledge acquisition in reviewed literature. Workshops, seminars, discussions, mentoring, use of subject matter experts, education, training, research and development are used as platforms for knowledge generation at training centres. It is concluded that training centres are using ICTs as enablers to knowledge acquisition, creation and dissemination. Training centres engage in training and education for the civil service to acquire knowledge and impart skills for better performance in service delivery. Service delivery in training centres and the public service organisations in general has improved with the use of new knowledge generated through research,

innovation and creativity. More so, training centres are advancing the country's Vision 2030 principles through various knowledge generation practices.

The study focused on four selected PSC training centres, particularly on their capabilities and strategies in knowledge acquisition, generating and harnessing knowledge as a critical development resource. Principals and training officers of the selected training centres were consulted as they were assumed to have authoritative know-how. Delimiting the study to four training centres, and gathering data from principals and training officers, was because involving all thirteen training centres and a large population of the study was going to provide data too large to handle considering the time frame in which this study was aimed to complete. In essence the pillars are a fulcrum of development when adopted and implemented. The current study has some managerial, practical and research implications that should be considered when interpreting the findings. For instance, the study findings can be used as a stepping stone to initialise the implementation of formal knowledge management in the public service.

7 Recommendations

The research study focused on establishing the role of the Public Service training centres in facilitating knowledge acquisition to civil services through training, development and consultancy services. Following the study results and conclusions, the researchers made the following recommendations:

1. **Formal Mentorship Program:** The Public Service Commission (PSC) should consider formalising mentorship programmes such that subject matter experts and skilled employees train, coach and educate those with skills deficiency. The study recommends establishment of communities of practice to facilitate new knowledge acquisition; creating posts for knowledge titled personnel to ensure knowledge is codified for effective utilisation; and that the staff development support scheme be re-established to support continuous learning.
2. **Increased bandwidth:** The training centres are recommended to increase bandwidth to stabilise internet connectivity to ensure training is conducted through ICTs enhanced platforms.
3. The study recommends **training centres to take a pro-active approach in adopting the culture of a learning organisation** in which the

organisation and its employees all aim to continuously learn in order to acquire new knowledge.

4. In view of the value of knowledge generated at training centres, it is recommended that **training centres collaborate with other subject matter experts and experienced consultants** in other line ministries and client organisations when offering consultancy services to ensure that knowledge produced through consultancy services is of value to the client.

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Chapter 13

Exploring the Use of Open and Distance Learning for Socio-Economic Development in Sub-Saharan Africa

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Abstract

This chapter explored the use of open and distance learning (ODL) for socio-economic development in sub-Saharan Africa, involving Nigeria, Kenya, Rwanda and South Africa. The chapter also examined the growth of ODL in these countries and its increasing recognition as a parallel educational route to address the problem of unsatisfied educational demands. It identified various attempts at technological preparedness, and the need to grow the number of students using ODL. While noting the bright prospects of ODL in sub-Saharan Africa, existing ODL institutions are constrained by gross underfunding, lack of ICT infrastructure which is an essential component of ODL as well as inadequate personnel for ODL programmes. Based on the observed limitations of these ODL institutions it was recommended that ODL institutions must be

adequately funded because they are capital intensive; more dedicated ODL institutions should be established; existing ODL policies must be under constant review; while closer collaboration must be established with the Commonwealth of Learning and other donor agencies supportive of ODL. It also advocated further investment in ODL work, and a mentoring role by ODL institutions for the conventional institutions.

Keywords: Open and distance learning, sub-Saharan Africa, socio-economic development, open educational resources, information and communication technologies, COVID 19.

1 Introduction

Although education is seen to contribute to the cultivation of habits and the promotion of culture and norms, it has no doubt been a catalyst for socio-economic development globally (World Bank 2018). In the same breadth, the use of open and distance learning for promoting socio-economic development has been discussed in the literature (Zawacki-Richter & Qayyum 2019; Adekanmbi 2021; Jegede 2016)). ODL use has been a factor in the increase in higher tertiary gross enrolment ratios, the promotion of digitisation of learning across the globe, and the transformation of conventional educational practices and institutions (Zawacki-Richter & Qayyum 2019). ODL is a vehicle for socio-economic development because of its ability to alleviate human resources and economic constraints, build capacity, address teacher education problems, and in view of its spin-off effects on other parts of the economy (Jegede 2016). In response to the COVID 19 pandemic, ODL became the alternative educational route. In a 385-page publication by OECD and The World Bank, edited by Vincent-Lancrin, Romaní and Reimers (2022), the stories of resilience, adaptation, leadership and innovation are seen in the way ODL was used to mitigate the effects of the pandemic, thus contributing significantly to socio-economic development at a time of great need. This pattern of contribution through ODL has been replicated by other organisations and institutions worldwide.

Undoubtedly, ODL capacity to play a key role in providing access to education resonates greatly with Africa. With a population of over 1.1 billion in sub-Saharan Africa, half of which is expected to be less than 25 years old by 2050 (World Bank 2022a), ODL use becomes imperative. Predictions for 2023

and 2024 show that the economy in the sub-continent will grow by 3.9% in 2023 and 4.2% in 2024 (World Bank 2022a). Even then, the sub-continent still has a lot to do to catch up with the developed countries in view of the fact that ‘27% of all illiterate adults lived in sub-Saharan Africa in 2017’ (UIS 2017). Also, considering that one-fifth of the world youth population lived in Africa in 2012 and that they are projected to form one third of the world population by 2050 (African Development Bank 2015, utilising ODL to pursue economic development through education is paramount.

This chapter explores the role of ODL in addressing socio-economic development in sub-Saharan Africa through the lenses of four countries. It focuses on the contexts of the countries, the status of ODL in the countries, the impact of ODL and what its future entails. With the effects of COVID 19 pandemic in many countries on the sub-continent, flexible learning pathways are constantly being sought, and examining the extent to which ODL has impacted socio-economic development becomes vital. In addition, the study highlights some trends in Nigeria, Kenya, Rwanda and South Africa. Nigeria and South Africa are major economic hubs in Africa while Kenya and Rwanda are places where ICT growth is being explored for socio-economic development. The term ‘open and distance learning’ is used interchangeably with ‘distance education’ to mean the same thing in the chapter

2 Nigeria

2.1 The Context

Nigeria’s estimated population for 2022 is 225, 082, 083, with a projection of 392 million by 2050, thus making the country the 4th largest in the world by 2050 (Central Intelligence Agency [CIA] 2022). The country’s literacy level is at 62% for those 15 years and above, youth unemployment is at 18.3%, and a gross domestic product per capita of US\$ 4900 (based on 2020 estimates) is recorded. On the human development scale, Nigeria is ranked number 161 out of 189 countries globally, with a low development status, and is in the same company as Rwanda, Tanzania, Senegal and Lesotho (UNDP 2020). Life expectancy at birth in 2019 was 54.7 years; expected years of schooling for the population was 10 years in 2019, inequality in education within the same period stood at 40.4% while the rural population with access to electricity was 31.0% (UNDP 2020). The gross enrolment ratio for Nigeria in 2018 was 12% at the tertiary level, 40% for secondary education and 87% for primary education

(World Bank 2022b 2022c & 2022d). In 2016, Nigeria had a total of 143 universities with 695, 449 students enrolled (Jegede 2016). However, the number of universities at federal, state and private levels has now grown to 217 (National Universities Commission 2022). On the state of information and communication technology (ICT), in 2018, Nigeria's households with internet access were 17.8%, those with a computer were 27.7% and mobile phone usage for every hundred people was 75.9% of the population (International Telecommunications Union (ITU) (2018).

While over the years student numbers at all levels have grown, a clear gap still remains in general student participation in higher education. For example, Ojerinde (2011) notes that out of the 1,185,579 candidates that sat for the Joint Admissions and Matriculation Board (JAMB) examinations in 2009, only 211,991 candidates were admitted, reflecting only 17.9 percent of the applicants. JAMB, which was established in 1978, exists to conduct examinations for all tertiary institution applicants in Nigeria. It was noted that one-fifth of those who applied were admitted. Similarly, Adesulu (2014) observes that in 2010/2011, Nigeria had 112 universities with a capacity of 450,000 against 1,493,611 applicants. Thus, the admission capacity in all Nigerian universities was 30.13 per cent of the total applicants. JAMB also reports that from 2010 to 2016 out of a total of 11,703,709 applications received; only 2,674,485 students were admitted in the thirty-six states of the federation, and the federal capital. It is notable that Odia and Odia (2017) report that the percentage of those admitted into universities in Nigeria against those who applied in various years in 2010 was 25.12% in 2011, 27.6% in 2012, 23.3% in 2013, and 24.6% in 2014, respectively. In 2018/2019 academic session, out of the over 1,662 762 candidates who wrote the admission examination, 585, 498 were admitted while in the 2019/2020 session, out of the 1, 157, 977 who wrote, 612, 557 were admitted (Ogunode, Akinjobi & Olatunde-Aiyedun 2022). The implication is that ODL is needed to address the shortcomings.

2.2 Status of ODL

The story of the development of ODL in Nigeria is similar to that of many sub-Saharan African countries, where it has come through the use of foreign examinations, activities of foreign correspondence colleges, the work of protagonists in the form of educational entrepreneurs who set up local correspondence colleges, and the direct and indirect participation of governments and univer-

sities. Foremost among the university forerunners are the Ahmadu Bello University, the University of Lagos and the University of Ibadan. Also, the National Teachers' Institute in Kaduna has further promoted teacher education and training.

While commenting on the emergence of open and distance learning in sub-Saharan Africa, Adekanmbi (2021) notes that the:

... emergence, growth and development of open and distance learning in sub-Saharan Africa has been traced to the era of foreign correspondence colleges and foreign examinations, the growth of local ODL entrepreneurs, the involvement of governments and universities, and the gradual development, growth and utilization of technology For many sub-Saharan African countries, dwindling resources, the quest for partnerships, including those tied to franchises, have promoted ODL development and subsequently, opened up room for the emergence of open universities and MOOCs, and the exploration of open educational resources (OER) possibilities. In the process, a gradual merger of conventional offerings and ODL culture is being seen, a situation made bigger by COVID-19, which has led many into ODL 'in a hurry' (Adekanmbi 2021: 166).

Notably, the starting of the Universal Primary Education in 1976 highlighted the gap in teacher education provision (Olakulehin 2008) and was in part responsible for the establishment of the National Teachers Institute (NTI) to upgrade teachers. Also, the National Policy on Education (Federal Republic of Nigeria 2004) noted the following as major goals that ODL must achieve:

- Provide access to quality education and equity in educational opportunities for those who otherwise would have been denied.
- Meet special needs of employers by mounting special certificate courses for their employees at their workplace.
- Encourage internationalization especially the tertiary education curricula.
- Ameliorate the effect of internal and external brain drain in tertiary institutions by utilizing experts as teachers regardless of their locations or places of work (Federal Republic of Nigeria 2004: 5).

Currently, fourteen open and distance learning higher education institutions exist in the country, as dual mode institutions and are referred to by the National Universities Commission as Distance Learning Centres (NUC 2022). The National Open University is the only dedicated ODL institution in the country. Although ODL had been used in Nigeria mostly for teaching related qualifications, a new thrust in its use for a range of other programmes has been seen (Adekanmbi 2021). Beyond commerce and teaching-related subjects that marked ODL beginnings in correspondence education, other areas including science, law, agriculture and social sciences have become part of the programmes now on offer. The National Universities Commission monitors the quality of provision through accreditation and guidelines.

Ayodele, Araromi, Emeke, and Adegbile (2006) lament the low utilisation of ODL in Nigeria, noting that when compared with other developed countries, the intake in Nigeria is low. They observed that the University of Ibadan Distance Learning Centre had less than 7,000 students during its early years whereas in the United Kingdom, 24,000 students were registered in the opening year. The same lamentation was given about the National Open University of Nigeria. As far back as 2016, the National Open University of Nigeria had over ninety programmes on offer and as many as 272,384 students enrolled (Commonwealth of Learning [COL] (2019). In 2018, the university graduated 14,769 students (National Open University of Nigeria 2018).

Underfunding of higher education institutions in Nigeria has also been a major issue. Although UNESCO recommends the allocation of 26% to the overall annual education budget, Nigeria has only, between 2009 and 2018, spent between 4.83% allocation (2010) to 9.94% (Gambo & Fasanmi 2019). To some degree, this also affects the development of ODL, in terms of direct subvention to the dedicated institution and the distance learning arms of the dual mode ones.

2.3 The Impact

The impact of ODL in Nigeria is observable in a variety of ways. The Federal Government of Nigeria enacted relevant policies, starting with the Educational Correspondence Colleges (Registration, etc.) Decree Number 11 of 1977, the Educational Correspondence Colleges Accreditation Decree Number 32 of 1987; the National Policy on Education (1977; 1981; 1998; 2004), the 2002 Blueprint and Implementation Plan for the National Open & Distance Learning

Programmes, and the policies and guidelines aimed at quality developed by the National Universities Commission. A number of universities have set up Distance Learning Centres (DLCs) to enhance focus and promote quality, away from the core conventional settings and contexts. The National Open University of Nigeria (NOUN) has put under its aegis the National Teacher's Institute to help promote quality. Through the National Open University's Regional Training and Research Institute for Distance and Open Learning (RETRIDOL), workshops have been organised for other distance learning providers or aspiring institutions in Nigeria and the region. Recently RETRIDOL started a monthly ODL Discourse for scholars, similar to the one organised by the Southern African Development Community's Centre for Distance Education, from the Botswana Open University.

The emergence of the National Open University of Nigeria in 2002 has helped to increase enrolment figures at ODL exponentially. As far back as 2018, NOUN had 14,769 graduates with over ninety programmes. With only 28% of applicants to Nigerian higher education institutions in 2010-2016, it is clear that the 70% that could not be admitted would rely on ODL. Also, according to the Commonwealth of Learning (COL), in 2016, NOUN enrolled over 272, 000 students NOUN (COL 2019). Considering the number of institutions running ODL programmes in Nigeria today, with just a few participating in the seventies and the eighties, a lot has been done in this regard. A major observation in impact is thus seen in student numbers, use of technology, the establishment of new programmes, involvement in training and research especially through NOUN initiatives and the post COVID 19 experiments seen in the various schools where ODL is being utilised.

While ODL promotion in the country has been observed and is growing, there is still a high level of unsatisfied demand which ODL must address. Also, the level of mainstreaming of ODL into the conventional university system may not have been fully addressed and there are limitations observed in the use of modern technologies in promoting ODL in the country

2.4 The Future

Jegede (2016) examined the challenges and the future of ODL in Nigeria and submitted that twenty institutions of higher learning, mostly universities, are working on exploring the use of the ODL route so that those with a measure of success can serve as mentors to up and coming ones. This practice is similar to

the leadership roles of Botswana Open University in Botswana and the University of South Africa (UNISA). Related to this, a merger of conventional and ODL practices is seen, coupled with the expected post COVID 19 development and the utilisation of technology for teaching and learning. Jegede (2016) also notes the possible growth of the open schooling initiative where schools and technical colleges embrace the open education philosophy. Perhaps it may be added that enhancing partnership and collaboration, especially with the Commonwealth of Learning will be a constant path of growth for ODL providers in the country. To this end, COL's partnership in Nigeria (COL 2022) with agencies such as the Federal Ministry of Education, National Open University of Nigeria, National Teachers Institute, Kaduna, National Universities Commission and the Regional Training and Research Institute for Distance and Open Learning, ODL will continue to grow. The growth of Open Educational Resources (OER) should also be part of this future trajectory. The National Universities Commission's development of a National Policy on OER for Higher Education, concluded by September 2017, further underscores this. On the attraction of more students, ODL institutions may need to broaden their curriculum, create opportunities for flexible payment plans, use user-friendly technology and engage in marketing strategies that can bring the students in. The pursuit of open schooling as a part of the ODL plan may also help.

3 Kenya

3.1 The Context

Kenya has a population of 55, 864, 655 people (CIA 2022), while the World Bank (2020) put Kenya's literacy rate in 2018 at 82%. The gross enrolment ratio for tertiary education was 10% in 2019, 57% for secondary schooling in 2009 and 103% for primary education in 2016 (World Bank 2022b 2022c & 2022d). The Human Development Report (UNDP 2020) puts Kenya's expected years of schooling at 11.3%, HDI ranking at 143 and the Gross National Income per capita at 4, 244 US dollars (UNDP 2020). The life expectancy is put at 66.7, inequality in education at 22.9% and population with at least some secondary education at 29.8% and 37.3 % for female and male respectively, for those 25 years and older (UNDP 2020). Although the figures for schools with access to the Internet in the nation between 2010 and 2019 are not available, the rural population with access to electricity was 71.7% in 2018 (UNDP 2020). On technology, 86.1% of the population had a mobile phone in 2018, while internet

users were 17% of the population; households with internet were 33.7% while households with a computer stood at 7.2% (ITU 2018).

3.2 Status of ODL

Open and distance learning (ODL) is provided in Kenya by a variety of agencies, and its beginnings have been attributed to the work of the Ominde Commission Report of 1964/65 and the Gachathi Commission Report of 1976, also known as the National Commission on Educational Objectives and Policies (NCEOP) (Republic of Kenya 1966; Kitainge 2004). Similarly, the Mackay Report of 1981 as well as the Sessional Paper Number 1 of 2005 were in favour of the provisions of ODL in the country (Anyona 2009). It has been observed that the growing and increasing number of high school graduates who qualify to study in various universities cannot be admitted in conventional universities due to the inadequacy of the facilities to accommodate them (Muriki 2020). In mitigating this challenge, ODL is offered in the country by private and public universities (Nyerere 2016). According to Matara (2020), about eleven universities are currently providing ODL in Kenya.

It would appear that people in Kenya are now less sceptical about the quality of education offered through ODL, as there is no national quality assurance mechanism in ODL in Kenya (Nyerere 2020). Consequently, each institution has its own way of assuring quality for each programme they offer. While there is a lack of a national policy of assuring quality in ODL, the government of Kenya Vision 2030 compels all universities in Kenya to offer ODL to enhance accessibility to higher education by everyone in Kenya (Nyerere 2020).

While the submission by Nyerere (2016) is aimed at ensuring quality across the distance education landscape in the country, it is important to note the work of the Commission for University Education (CUE), which was established under the Universities Act No 42 of 2012 and is serving as the successor to the former Commission for Higher Education. The role of this Commission in regulating and promoting quality is seen in the context of the expansion of the higher education sector and the need to promote quality education. As a result, guidelines and standards are established by the Commission, which must be followed and adhered to by universities or colleges affiliating with others to provide education in the country, including those providing distance education from abroad. Table 1 provides an example of such

affiliations and related accreditation of university programmes with the identification of foreign universities, their local counterparts, the programmes accredited and the dates of authorisation for such.

Table 1: Foreign universities with a grant of Authority to collaborate in offering academic programmes in Kenya

Foreign university	Local institution	Programme offered under collaboration	Date of grant of Authority to collaborate
California Miramar University, USA	The East Africa University, Kitengela, Kenya	Master of Business Administration (MBA) Doctor of Business Administration (DBA)	19 th October 2015
University of Northampton, United Kingdom (UK)	EduLink International College, Nairobi, Kenya	Bachelor of Business Administration (BBA)	14 th April 2016
University of Greenwich, United Kingdom (UK)	Oshwal College, Nairobi, Kenya	Bachelor of Science (Hons) Computing`	18 th October 2018
University of Hertfordshire United Kingdom (UK)	Oshwal College, Nairobi, Kenya	Bachelor of Arts (Hons) Business Administration	21 st November 2019
Beulah Heights University	Daystar University, Athi River, Kenya	Bachelor of Arts (Hons) Business Administration	27 th January 2022

Source: Commission for University Education (Kenya) (2022).

It is hoped that the ongoing work of the Commission on regulation and

accreditation at the university level will serve as a springboard to addressing the entire ODL landscape in Kenya through other dedicated ODL mechanisms.

ODL offerings by several universities in Kenya have had some challenges. While many learners enrol for ODL, the retention of students is very minimal, hence the ratio of students who graduate per cohort is low compared with the ratio of students who enrol and finally graduate in conventional settings per cohort (Waweru & Itegi 2019). Mbugua (2013) in Nyerere (2016) also point out the lack of training on the part of university personnel who are involved in the provision of ODL even though their background to the provision of education in general is very good. Nyerere (2016) also cites the critical shortage of facilities that should support the provision of ODL in Kenya. This lack is seen in the form of:

- Insufficient infrastructure to support ODL;
- Dearth of ICT equipment as well as audio visual equipment;
- Insufficient ODL study materials; and
- Lack of expertise to produce effective ODL study materials.

The current lack of infrastructure to support e-learning is most common among universities that are not situated in urban areas, and equity in the provision of ODL in Kenya is somehow lacking. Institutions outside urban areas are affected by poor internet connectivity (Tarus, Gichoya & Muumbo 2015).

3.3 The Impact

Despite the existence of numerous challenges confronting various institutions in their desire to offer quality ODL, this mode of education is yielding positive impact in Kenya. Due to ODL, university enrolments have been boosted (Nyerere 2016). This implies that more people are accessing university education more than before. The development of skilled workforce will improve learning without incurring great cost since ODL consumes less resources than conventional learning. Conventional learning often requires more facilities like lecture rooms, sanitary facilities, and physical libraries. With ODL, learners can pursue studies in the comfort of their homes and at their own pace while the most needed facilities can also be made available online (Matara 2020).

ODL in Kenya is enabling people who are employed to have access to

higher education. This also includes those who failed to access higher education due to factors beyond their control (Matara 2020). Even those who could not further their education through the conventional system due to work related factors now have the opportunity, since ODL gives learners the opportunity to study when they are free (Matara 2020). Some universities that offer ODL like the African Nazarene University allow learners to pay fees in monthly instalments.

Enrolment of ODL learners by Kenyan universities promotes professional development of employees' skills, leading to a more productive workforce. In addition, employed teachers and university lecturers can further their education and enhance their effectiveness.

3.4 The Future

The need for the government to formulate an ODL policy to facilitate adequate funding of ODL in Kenyan universities is imperative. This will assist the universities in procuring necessary resources to enhance quality. As already discussed, the work of the Commission on university education is clearly noted. However, the country still needs to develop a comprehensive ODL policy which specifically addresses ODL work, programming, and course development and human resource issues.

Another critical aspect of ODL improvement is internet connectivity for learners to access ODL resources from university portals. In addition, there is the need to strengthen the support services for distance learners and minimise dropouts and deferment of admission by learners. These strategies could improve learners' performance and increase the completion rates. The production of effective ODL study materials that are simple and conversational is vital, so that learners do not feel the absence of tutors. This may require employment of experts in instructional materials production and training of existing personnel in that area.

4 Rwanda

4.1 The Context

Rwanda has a population of 13, 173, 730 based on a 2022 estimate (CIA 2022). The literacy rate for the 15 years and above is 73 % while the rural population with access to electricity in Rwanda is 23.4% (UNDP 2020). The country is

ranked 160 on the Human Development Index scale (UNDP 2020), a shift by three places from 2018 when it ranked 157 out of 189 nations globally. Rwanda's GDP per capita was said to have 'more than tripled between 2000 and 2018' while it had also increased by 'more than 100% between 1990 and 2018' (Republic of Rwanda 2019: 11). Life expectancy at birth in 2019 was 69.0 years while the population with at least some secondary education, between 2015 and 2019 was 10.9 years for female and 15.8 years for male. However, the expected years of schooling for the population was 11.2 years in 2019, inequality in education within the same period stood at 29.3% while the rural population with access to electricity in 2018 was 23.4.0% (UNDP 2020). The gross enrolment ratio for Rwanda in 2019 was 6% at the tertiary level, 44% at the secondary level and 13% at the primary level (World Bank 2022b 2022c & 2022d). On technology, 72.2% of the people had mobile phones in 2018, 21.8% used the internet; 9.3% of the households had internet access and 2.5% of households had a computer (ITU 2018).

4.2 Status of ODL

Mukama (2016) has traced the origin of ODL in Rwanda to the initial teacher training initiative to upgrade secondary teachers, reduce teacher shortage and enhance teacher quality, and was funded by the UK Department for International Development (DFID) in 2001. The programme was later taken over fully by the Kigali Institute of Education. Following the merger of the public higher education institutions, it became the University of Rwanda Kigali College Of Education (UR-CE). In addition, three major departments, Tele-Education, Blended Learning and the Centre of African Virtual University ran the distance education programmes. Between 2012 and 2016, the Distance Training Programme enrolled 6059 students in its six diploma programmes; Tele-Education, supported by five Indian universities, enrolled 1069 students; Blended Learning which organises programmes for five Schools of nursing and Midwifery enrolled 2542 students.

In addition to these, UNESCO and the Commonwealth of Learning (COL) have been involved in the ODL activities in the country. In a post by Ivanov (2022), it is reported that the University of Rwanda has integrated the publication by UNESCO titled 'Ensuring effective distance learning during COVID 19 disruption: guidance for teachers' within its curriculum offerings. This has resulted in over 3700 teachers being impacted on the use of information

technology skills. The support of UNESCO and COL is expected to benefit more teachers in the country.

Overall, the running of distance education in the country is the combined work of several agencies including the Ministry of Education, Rwanda Education Board, Workforce Development Authority, University of Rwanda and other higher institutions, the Ministry of Youth, Rwanda Development Board and the Ministry of Health.

4.3 The Impact

One of the ways ODL has impacted Rwandan educational and developmental landscape has been through the enactment of policies, with many of such focused on information and communication technology (ICT). All these indicate the extent to which the nation wants to utilise ODL in promoting educational access. Mukama (2018), in an examination of the interplay of policy and implementation provides a list of thirteen core policies which are one way or the other related to ODL activities. Among the policies are the Vision 2020, SMART Rwanda Master Plan, ICT in Education, ICT in Education Master Plan, ODeL Policy, Code of practice for ODeL Provision, Task Force Report on Open University, Working Group Report on ODL, and others. Notably the Rwandan Higher Education Council has established Standards and Guidelines for Open and Distance Learning (Republic of Rwanda 2014). This shows that Rwanda is committed to ODL promotion. The plan by Government in its 2010-2017 strategic plan is to ensure that 30% of secondary school subjects and 50% of higher education programmes are taught at a distance (Mukama 2018). This highlights the importance and recognition given to ODL as a tool for enhancing access.

While the above highlights impact, there are challenges observed in ODL work in Rwanda. Some of these are related to the need for a specific policy, not existing yet, that addresses the accreditation of e-learning programmes (Sangwa, Manirakiza & Mutabazi 2020). On the other hand, while exploring the challenges faced in the context of promoting nursing education through ODL, Murebwayire, Biroli and Ewing (2015) have noted that the learning management system is often unstable, internet connectivity is inconsistent, there are language difficulties, and the levels of technology literacy of students vary, among others. Furthermore, based on some other studies on Rwanda, there is still a lot of negative perception by learners about ODL i.e.

there is limited access, internet costs are high, content is often unattractive and the learners' information technology skills are inadequate (Sangwa, Manirakiza & Mutabizi 2020).

4.4 The Future

The core component of what should constitute a sustainable ODL in Rwanda and the need to create a dedicated ODL institution have been highlighted. The establishment of a Centre for Open and Distance Learning at the UR-CE should portend greater things for the future. Related to this is the recommendation for building ODL capacity for promoting the MOOCs and OER as well as provision of access (Mukama 2018). In a submission by Nkuyubwatsi (2016) in which the writer critiqued the ODL policy environment in opening up public higher education in Rwanda, part of the future would include having a re-look at the various policies enabling ODL at the University of Rwanda. One goal would be that of 'assessment of open learning for credit, open educational services and other open educational practices (OEP) as well as the use of openly licenced learning resources and open courses' (Nkuyubwatsi 2016: 54). Similarly, and in line with the author's submission, a clear recognition of the contribution of academics in various aspects of ODL promotion and the provision of requisite rewards availed for such, especially in matters related to OER and OEP would be required. Furthermore, just as the collaboration between the University of Rwanda, the Government of Rwanda and the Commonwealth of Learning (COL) has enhanced the policy environment of ODL, allowed for baseline surveys and the development of learner support, further interventions should be geared towards benefitting other sectors, including ODL providers in the private sector as well as other non-state actors.

5 South Africa

5.1 The Context

South Africa has a population of 57, 516, 665 people, based on an estimate (CIA 2022). The literacy level in 2019, according to the World Bank (2020) is 95% while the expected year of schooling is put at 12.8%. The country is ranked 114 on the human development scale and its Gross National Income per capita in 2017 was 12, 129 US dollars. Life expectancy is 64.1 years and inequality in education is put at 17.3% (UNDP 2020). On the population with at least some

secondary education, who are 25 years and older, it was seventy-five for females and 78.2 for males. The rural population with access to electricity was 89.6 in 2018 (UNDP 2020). On Information and Communications Technology, in 2018, South Africans had 162 mobile phones for every one hundred people, the percentage of those with Internet access was 60.7% while the percentage of households with a computer was 21.9% (ITU 2018). The statistics portend an immense potential for supporting ODL activities.

5.2 Status of ODL

The beginning of ODL in South Africa has been seen to be synonymous with the evolution of the University of South Africa (UNISA), the dedicated ODL institution in the country (Prinsloo 2019). This relates to UNISA's early work as an examining body, its transition to a correspondence education institution and the observed activities of various providers who later teamed up to provide a common front in ODL provisions. To this end, the work of Technikon Southern Africa and that of the Vista University's Distance Education Campus (VUDEC) are notable. It is reported that UNISA, Technikon Southern Africa and VISTA later merged in 2004, having a set of clear objectives to promote educational access and serve as a dedicated ODL institution under the aegis of UNISA (Prinsloo 2019). The rationale for this has been described by Badat (2005) as the ability to meet 'national, social and educational need, and where economies of scale can be achieved, (Badat, cited in Prinsloo 2019). The later establishment of the Policy for the provision of distance education in South African universities in the context of an integrated post-school system was notable especially in acknowledging UNISA as a dedicated ODL institution in the country. It should be noted that other universities, apart from UNISA, are also providing ODL in South Africa.

The 2014 policy has in its provisions the enhancement of institutional planning across universities, pursuit of funding assignments, promotion of quality as well as transformation and innovation. It further recognises other role players in ODL apart from UNISA and enables partnership and collaboration. A major goal was to create an enabling environment for an expanded ODL system while promoting future use of ICTs for learning and teaching and the collaborative use of OER. It also has a realisation that cross-border provision of distance education needs to be monitored and regulated through relevant legal provisions (Prinsloo 2019).

5.3 The Impact

One major impact of ODL in South Africa has been in the establishment of relevant policies in the promotion of ODL. Starting with the Correspondence Education Act of 1965, there have been other policies worth noting. They include the 1994 White Paper on Reconstruction and Development, the 1997 White Paper on Higher Education which articulated the key role of ODL in the provision of educational access, the National Plan for Higher Education of 2001, the Department of Higher Education and Training Policy of 2004, and the Policy for the provision of distance education in South African universities in the context of an integrated post-school system. Also, various organisations have enhanced ODL development. The work of the South African Institute for Distance Education (SAIDE) and the National Association of Distance Education and Open Learning in South Africa (NADEOSA) in promoting adherence to quality is notable.

Beyond policies, and while there are other institutions promoting ODL in South Africa, the impact of provisions is best seen from the aegis of UNISA, whose student enrolment figures for undergraduates was 374, 531, with a total of 309, 572 being undergraduate students, and 43, 703 being post graduate students. At the masters and doctoral levels, there were 4.668 masters and 2017 PhD students (UNISA 2019). For some time now, ODL students have formed at least a third of all tertiary education students in South Africa (Adekanmbi 2021). In 2015, 40,046 degrees were awarded in the humanities, the sciences and engineering programmes. In addition, the fact that UNISA serves a wide array of international students from 136 countries (Mishra 2017), made it serve as a mentor to other institutions across in the SADC region. Also, notable has been the use of technology in conducting teaching and learning. On collaboration, COL has partnered with South Africa in its open schooling activities and the use of technology for teaching and learning (Mishra 2017).

There are, no doubt, challenges facing the delivery of distance education in South Africa. Letseka, Letseka and Pitsoe (2018: 133) have noted that one major challenge is the context of provisions itself where the landscape is ‘marked by instability, uncertainty and unpredictability’, with the resultant unequal society being the thrust of ODL intervention. This unequalness thus translates to unequal access to the internet and a related unequal access to computers. Lamenting this disparity for students in the rural areas in South Africa, Aruleba and Jere (2022: 3), note that ‘the idealistic state of digital equity remains far-fetched for inclusive ODL’. They also note that ‘South Africa has

some of the most expensive data on the continent’ (Aruleba & Jere 2022) which is a major problem for ODL students. In a focused study on an ODL institution in South Africa, Joubert and Snyman (2017) also comment on what they saw as generally low participation by students in their e-learning programmes, an observed lack of commitment, inadequate training for tutors and limited interaction between lecturers and tutors. While there are other challenges, it would appear that societal context and ICT usage for e-learning are paramount.

5.4 The Future

South Africa has no doubt shown leadership in the field of open and distance learning in many ways. Three things are key in terms of the future of ODL in South Africa. One relates to the continuing merger of ways between ODL institutions and the conventional education system. In this regard, Prinsloo (2019) has referred to the blurring of boundaries, and his examination of how far the traditional universities have gone in the promotion of online learning. Thus, the second relates to the growth of online learning, which was a major submission of Prinsloo (2019) in his point on the re-imagination of a future for ODL in South Africa. The third relates to partnership which South African institutions can expect, which will also revolve around the work of the Commonwealth of Learning, and that government in providing resources for enhancing the bandwidth and rural electricity for learners.

6 Conclusion

The integration of ODL into the educational system across sub-Saharan Africa is increasing based on the recognition of the socio-economic potentials of ODL, as a strategy for meeting unsatisfied demand in education, especially in higher education. Information gathered on the four countries examined, indicates various levels of development in terms of population, economy, gross domestic product per capita, life expectancy, and literacy levels, among others. While these four countries strive to provide distance learning, South Africa and Nigeria appear to have an edge due to the existence of dedicated open universities, although Nigeria’s gross tertiary enrolment ratio still lags behind South Africa’s and the continental average. To this end, one would expect Kenya and Rwanda to take a cue from the stories of Nigeria and South Africa, for greater impact. An area of strength is the existence of a range of ODL policy

initiatives at governmental and institutional levels which are driving ODL growth. The limitations to the capacity to deliver by existing ODL institutions include underfunding of education, lack of ICT infrastructure that is an essential component of ODL as well as required personnel to man ODL programmes. Therefore, in order for higher education institutions in sub-Saharan Africa to occupy a pride of place in the 21st knowledge economy, they must incorporate ICT in instructional engagement with their students through open and distance learning. Also, the technological platform requires further input by governments with regard to rural electricity provision, and the enhancement of internet connectivity and usage.

Considering the foregoing, ODL institutions will no longer be evaluated only by sheer student numbers, but by the extent to which such institutions can, in addition, mentor and provide guidance and support to conventional institutions desiring to pursue the ODL dream. For the future, the setting up of dedicated ODL institutions, the implementation of existing ODL policies and the pursuit of a merger of practices between conventional and ODL institutions will be vital. Although ODL has a bright prospect for educational advancement in sub-Saharan Africa, based on students' enrolment figure, existing ODL institutions in the sub-continent have underserved the vast number of students yearning for higher education. With further investment put into ODL work and the sharing of experiences through partnership and collaboration, the future of ODL in sub-Saharan Africa is bright.

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