Maximizing the Value of Information Communication Technologies (ICTs) and Its Implications on Library Operations in Public Universities in Kenya: Potential and Challenges

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Abstract

The advent of information age has significantly changed the environment in which libraries operate in the 21st century. Technological encroachment has forced librarians to adopt various technologies for their continued existence in line with the constant changing information seeking behaviors of varied readers and development in education and research. The purpose of this paper was to examine the value of information communication technologies (ICTs) and its implications on library operations in public universities in Kenya: Potential and Challenges. The objectives of the research were to: Establish the efficiency of emerging ICTs in public university libraries in Kenya, determine the application of ICT on performance of duties in public university libraries and evaluate the effects of ICTs on access and retrieval of information. The study employed survey research design in collecting data from 31 public universities in Kenya. The respondents were university librarians. The data was collected by use of questionnaires which was later analyzed with the aid of SPSS software (version 22). The findings of the study showed that the application and usage of information communication technologies (ICTs) had significant impacts on library service provision such as circulation, E-books, internet services, OPAC and increased work output. The study recommendation indicated that there is need for adoption of a comprehensive ICT policy to create an enabling framework for the application and development of ICTs in libraries and, train both staff and information users on how best to apply ICTs features in accessing, and retrieving information materials. The study, if adopted will enhance information provision and service delivery in university libraries.

Key words: Value, Information communication technologies, Library operations, public universities, Kenya, Information age.

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1. Introduction

The evolution of information society in the current modern world has been necessitated by the presence and availability of information communication technologies (ICTs). The ICT concept implies the combination of hardware and software application for information passage and worldwide community linkage by infinite technological communications protocols. This involves: Information communication technologies equipment and services, internet provision services, mass media broadcasting, network-based information services, information providing centers and other related communication processes (Anie&Achugbue,2009).The hasty realization of information technologies worldwide has changed and continues to change in all areas of our life (Ramzan,2004).Various sectors such as health, research and education among other development sectors are highly affected with these technological changes. The application and usage of ICT in education has brought new ways of teaching, content dissemination and instruction among learners through the delivery of digital contents. ICT usage helps in information acquisition, processing, retrieval, storage, searching, viewing, synthesis, information handling and preservation. The major role of ICTs is to ensure availability and accessibility of the accurate information to the consumer at the right time for appeasing his/her thrust of knowledge and information needs. In a nutshell, ICTs have brought remarkable change in conventional workings of the libraries and other information providing set ups.

According to Kannabiran and Dharmalingam (2012), information communication technology (ICT) adoption research has received massive universal thought with interest across diverse systems and applications in different contexts. Studies in this area of ICT adoption in academic libraries are significant because education is important in driving socio-economic growth and ICT is used as strategic tool that creates integrative and collaborative community culminating to lucidity, value-added knowledge sharing, network externalities, operational effectiveness and improved competitiveness (Ongori, 2009).

ICT usage in developed countries has helped institution of higher learning to be boundless academically; in emerging information economies such as China and India, it is fast gaining much attention and momentum however in developing countries like Kenya only very little attention goes to it.Maxymuk (2007) alludes that the presence of technology has forced libraries to assume interactive online medium for their continued existence, on the other hand, Kavulya (2004) argues that although ICT is integrated in the management of universities libraries in Kenya, there is significant need for university libraries to adopt a strategic plan in all the sections of the library for them to remain feasible and important sources of information. It is of the essence for universities libraries in Kenya to make use of contemporary technologies so as to aid better access to both local and universal information. To maintain up to-date levels of expertise and to help university libraries cope with rapid evolving ICTs, continuous professional training is important and needed for information professionals (Abdurrahman, 2009).

Keralapura (2009) argues that the application of ICTs in libraries has influenced operations and changed the information seeking behavior of users. With advert of technologies, functions such as: Electronic circulation of information materials, on-line cataloguing process, online public access catalogues (OPACs),electronic acquisition and serials control, electronic distribution of commercial publications, electronic availability of raw data, digital or electronic collections, multimedia information delivery systems and electronic resources are now viable with a higher degree of user satisfaction (Ajayi,2002).

The radical change which is taking place in information technology world has remarkable effects on how universities both public and private carry out their mandate of teaching, instruction and research, particularly on creation, dissemination and application of knowledge (Cholin, 2005).Various factors that have strengthened and encouraged integration of ICTs into academic institutions settings include a swift need for efficacy in terms of program and content delivery and opportunities for flexibility and efficient delivery of digital content. The use of information technologies offers viable learning environments and transforms the learning instructions process as well as enhancing research for learners to deal with knowledge in an active, self-directed and constructive way. The inventive use of information technologies is believed to have notably strengthened higher education systems and addresses the three essential pillars in academic institutions of higher learning that is teaching and learning, research and change in society.

However, the propagation and application of new technologies in institutions of higher learning libraries opens up numeral challenges. The critical area include: Inadequate ICTs infrastructural facilities, low bandwidth and internet downtime. The application and usage of ICTs in African institutions of higher learning is not very well utilized mainly because of: Poor communication networks, inadequate access to ICT equipment, sluggishness from the government's/parent institutions to provide adequate funds to run the libraries, lack of enough well-trained staff, lack of theoretical and foundational knowledge on ICTs, lack of computer culture among other factors (Siddike et al, 2011; Moropa, 2010& Kamba, 2011).

1.2 Statement of the Problem

The usage and application of technologies in various library functions requires library practitioners who are professional and skilled in both conventional library operations and computer literacy and more significant, librarians who are ever ready to adopt and engage in sustainable reasoning and dynamic complex situations. Chinwe (2011) noted that libraries in developing countries have not been given much attention they merit in terms of budget allocation therefore restraining their ability to meet targeted requirements of supporting learning processes positively.

The unmanaged information technology makes performance of duties more difficult, costs a lot of time, resources and money, making them susceptible to security breaches, prosecution and embarrassment. In ungoverned and unmanaged library facilities, librarians spent more time looking for information instead of automating the system. This problem will and shall exist unless libraries adopt use of information technologies to ensure good practice and productivity in the library environment. This paper therefore examined the value of using information communication technologies and its implication on library operations in public universities in Kenya.

1.3 Purpose of the Study

To examine the value of information communication technologies and its' implication on library operations in public universities in Kenya

1.4 Objective of the Study

The study was guided by the following objectives:
1) To establish the efficiency of emerging information communication technologies in public universities in Kenya
2) To determine the application of ICTs on performance of duties in university libraries
3) To evaluate the effects of ICTs on access and retrieval of information

2.0 Review of Related Literature

2.1 State of ICT Facility Utilization on Library Operations

Information from the World Bank Institute survey (2006, pg 23) indicates that the state of ICT infrastructural platforms in African universities can be summed up as "too little, too expensive and poorly managed." Oliver (2002) also notes that the impact and significance of ICTs application in institution of higher learning has not yet been felt and discovered fully. Inadequacy of technological infrastructural platforms to support the assimilation of ICTs in the library operations has been cited by several scholars as one of the major challenges that academic libraries visage. Kamba (2011) opines that, application of ICTs in African institutions of higher learning is not very well spread and utilized due to: Poor or lack of communication networks, limited access to ICT equipment (hardware and software), inadequate or lack of ICT policies, poor internet connectivity, poor supply of electricity or power, limited number of personal computers (PCs) among other aspects. Institutions of higher learning libraries just like other departments are obliged to sufficient resources in order to purchase or acquire contemporary ICT amenities such as servers, computers, scanners, photocopiers, software as well as subscribe to online/offline resources such as electronic journals, e-books/digital books among other relevant resources in their jurisdiction. In an academic institution, information communication technology has a greater impact on teaching, instructing, learning and research activities. Academic institutions have libraries where ICT is greatly used to simplify acquisition process, classification and arrangement, storage, retrieval and usage of information materials.

According to Nwalo (2005), some of the ICT facilities being utilized in the management of library resources include: DVDs, CDs, computers, internet and telephones. This sentiment was echoed by Dewalteville and Gilbert (2000) but adds the following: Digital cameras, webcam, smart card, scanners, E-books, printer, electronic journals, OPAC, email, CD-ROM and RFID technologies. The advert of ICTs has led to the realities of digital information sources where digitized resources are being seen inform of electronic books, electronic journals and electronic commerce. The availability of ICTs in academic libraries has enabled library stakeholders who are the users to have access to diversity of content in internet platform and other online services across the world. In the 21st century libraries' efficiencies will not be measured by their physical collection but by the level of library automation in terms of operations in different capacities. Institutional repositories are online platforms for capturing, collecting, preserving and disseminating content in digital formats, specifically in academic institution to be utilized by researchers. This digital content found in institutional repositories include: Research articles, dissertation (thesis), administrative documents and learning objectives.

Social media in different categories are offering an important platform in academic libraries through various ways such as: Networking, current awareness, library promotion and knowledge dissemination. Users are interested in sharing information on the web and working jointly through ideas on the topics via commenting to seek response. Blogs as an example of social media platform used for instance to promote library services and operations especially in academic institution because it's quickest and affordable means of communication. Blogs are further used to network with users of libraries and give out instruction. Hicks (2012) points out that, social media forms part of the huge environment of research and scholarship, therefore, librarian's needs to put into practice such technological devices.

Online database utilized in academic libraries is a computerized store of information which is retrieved through the main server in a networked environment; this implies that the information user can scan through the database from a remote computer on a system called "online information retrieval system." ICT utilization facilities in the libraries is not restricted to library clients alone, literature has proved that library officers like any other library clients can also benefit greatly from the availability of ICT amenities in their possession.

According to Mathew (2011), the impact of ICT utilization in libraries in relation to professional development showed that the librarians have affirmative approach towards utilization of ICT facilities on library operations hence there is need for library professionals, users and researchers to build up their skills and competencies to match this concept. In order for libraries to enhance the use of ICT in their operations, there is need to develop and train personnel in a technological advanced world and much emphasis must be given to developing competency in ICTs application and library management. A study by Adekunle, Omaba and Tella (2007) on the attitude regarding ICT utilization in information providing services, the findings showed that the attitude towards ICT utilization was majorly influenced by training and competency in ICT usage in library operations therefore adequate training and knowledge of ICT related services are significant in encouraging libraries and users to have a positive mindset.

Shidi and Ape (2011) in their study on X-rayed ICT facilities and skills level of the staff in universities in Benue state with the aim of establishing ICT facilities available in university libraries and their utilization, the findings showed that ICT facilities were not evenly spread across universities. One of the Universities i.e., Federal universities of agriculture had greater number of ICT facilities. The study recommended that academic libraries should be helped and funded by the government, private donor agencies or spirited individuals in order to have enough ICT facilities to enable library staff and users have enough skills to access information materials on their own.

Another study by Igben and Akobo (2007) on the state of ICT facilities in libraries in River state, Nigeria revealed that 75% of the libraries under study made use of computers in their operations. The study concluded that the internet as one of the ICT facilities was mostly utilized on library operation in academic institution in Nigeria. Mwakama (2003) emphasizes that for proper utilization and application of ICT in academic institution, librarians must have prerequisite skills to be valuable in the expectation of what ICT application has to offer; in these regard libraries need ICT for a numeral reason. The new and dynamic working environment has become aggressive and therefore many players are involved in offering information services which include: Internet café, mobile communication, and ICT staff among others (Witner, 2001). Librarians therefore are required to have necessary skills that are significant for the adoption and application of ICT for the management of library

operation and information resources to enhance its utilization. Training of information professionals on ICT application facilities in libraries is critical in the modern times in meeting users' expectations and needs, growth of information related occupations; embedding information literacy skills, influence of modern technology among others hence improving   performance and productivity.

2.2 Performance and Productivity of Using ICTs on library Operations

In many university libraries, a couple of system have been developed and embraced to function in various sections, chores and more nonetheless are being designed and subtle as a result of the science of big scale integration. In keeping with Ogunsola (2004) argument, these are referred to as microcomputers which are intended to control any of the library procedures and functions like acquisition of the library materials, cataloguing of information materials, serials manipulation, circulation control, bibliographic manipulation or selective dissemination of information. It is applied to the operation of libraries and knowhow centers to make sure that knowledge delivered is opportune, precise, distinct and significant. The notion, library computerization consequently grew to be popular, because the usual manual library approach, staff participates in quite a lot of tasks required to undertake each operation but a laptop can be used to participate in some processing operations such as the acquisitions, organization, storage and dissemination of information in libraries through automation system.

Bazillion (2001) argues that academic libraries are constituent of education systems; the application and use of information technologies in libraries has proved to provide positive results therefore contributing in equally measure in education processes in diverse ways. The availability of technologies has led to better ease of access to electronic information sources, helping academic staff in teaching, instructions and researching, and finally helping students for their search in electronic sources and web pages. Nakhoda (2005) argues that, enlarged library clientele, the need for information materials inside and outside of libraries environs, the growing number of published materials, changes of the studying materials for instance the use of compact discs, online databases and electronic journals, the emergence of new and cheaper computers, automation and other related issues. For these reasons academic libraries should empress technology and create awareness to their users through; library websites, library orientations, newsletter and by providing current awareness services.

ICT a**s** practiced has changed private and public industrial sector with an array of improved products and services; the power and wealth of a county or nation directly dependent on the strength of ICT facilities. According to Salau (2010), information communication and technologies has greatly impacted positively and changed the focus of every economy in the world whose existence is no longer measured on the basis of human capital or natural resources, but on the state of technology. Anansi (2005) adds that ICT usage is categorized in to four categories: Communication technologies, display technologies, capturing technologies and storage technologies, while Gupta and Ansan (2007) argues that information communication technology is linked to four technologies for instance Computer hardware technologies; telecommunication technologies; network technologies; data resource management technologies and software technologies.

In regard to value   associated with application of ICTs in libraries, the benefits include : Provision of access and availability of unlimited , and current information from different information sources; increased operational efficiency and services in library

operation ; provision of fast, speed and easy retrieval of information; ICT enables clients to have self-education through multimedia system among others.

According to Satpathy and Maharana (2011), ICT tools are being used in libraries to facilitate easy management of libraries and cater for clients/users' needs effectively in terms of information. The author further argues that the significance of ICT in libraries cannot be hidden as there is no segment in the library sector that has not been reshaped and changed with the arrival of ICTs. Ezeani and Ekere (2009) adds that ICT is a channel through which quality services in the library and other information providing centers can be offered and achieved while Nwalo (2000) emphasized that librarians have a duty to implement and adopt ICT in their operation due to their multiple effect and to be relevant in post- industrial society.

3. Methodology

Survey research design was adopted with online administered questionnaires. The total target population of the study was all 31 public university librarians in Kenya. The university librarians were chosen because of their expertise, they are the overall managers and chair of all committees related to library matters. Care was put to ensure that all the public universities were represented. The primary data collected was systematically organized and analyzed by the assistance of statistical package for social sciences (SPSS, version 22).

4. Finding and Discussion

(a) Efficiency of Emerging Information Communication Technologies

The study sought to find out the efficiency of emerging information communication technologies in library environment. The study results are shown in table 1 below:

Table 1: Efficiency of Emerging Information Communication Technologies

Items	Response in % Agreed	Disagreed
Monitoring circulation of books	17(55.8%)	14(44.2%)
Assist in recalling overdue	19(61.6%)	12(38.4%)
Provide the link between vendors, authors and publication	28(89.1%)	3(10.9%)
Enhance sharing of digital information	28(91.1%)	2 (8.1%)
Provides platform for sharing and making critics among Scholars	29(92.3%)	2(7.7%)

Source: Field Survey (2021)

From the findings as shown on table 1 above, 55.8% of the respondents agreed that ICTs help in monitoring circulation of books, while 44.2% disagreed. The findings also showed that 61.6% of the respondents were of the view that ICTs is critical when it comes to recalling the over dues while 38.4% disagreed. On the aspect of liaising with book vendors, authors and publishers, 89.1 % of the respondents stated that ICT has played a key role in this process while 10.9 % had a contrary opinion. The study also found out that 91.9 % of the respondents indicated that the application and use of ICT enhances the sharing of digital information both within and without the library environment with 8.1% objecting. Furthermore 92.3 %

respondents stated that ICT usage in library operations offers a platform for scholars to share ideas, critics and make suggestions on certain issues, while 7.7 % were of a different opinion.

From the findings above, majority of the respondents indicated that the application and use of ICTs in the library operations have critical role in monitoring and circulation of books, renewal of materials and payment of fines which is mostly handled at the circulation desk. The study also found out that most of the respondents were of the view that information communication technologies assist in liaising with book vendors, authors and publishers to make purchase of modern and revised books.

ICTs also help in providing the relevant information on how to locate and purchase cheaper books in advance from known authors both locally and internationally. The findings further showed that ICTs enhances the sharing of the digital information through internet; the ease access of information resources by information users; popularity of electronic books (E-books) and electronic-journals (E-journals) which has helped in transforming peoples reading culture. This assertion was supported by Thamaraiselve (2009) who argues that with the advent of ICTs, librarians now use various types of technologies to aid and assist in the services provision to the stakeholders and information consumers. The impact of new technologies is felt by libraries in various aspects such as communication technologies, computer technologies and mass storage technologies which continuously develop hence reshaping the way libraries and information centers acquire, retrieve, manage, manipulate and distribute/disseminate the information to its clients.

(b) Application of ICTs on Performance of Duties in Library Environment
The study sought to examine the effects of ICTs application on performance of duties in library environment and the findings are shown in the table below.

Table 2: Application of ICTs on Performance of Duties in Library Environment

Items	Response in %	Agreed	Disagreed
Increased work output among employees		24(78.8%)	7(21.2%)
Minimizing confusion in monitoring books and digital information		25(80.9%)	6(19.1%)
Motivating employees to increase performance		27(86.5%)	4(13.5%)
Reduction of work anxiety & stress		23(74.9%)	8 (25.1%)

Source: Field survey (2021)

Of the respondents shown on table 2 above, 78.8% stated that the effects of ICTs application on library operations increased work output of employees, while 21.2 % had contrary opinion. In regard to minimizing confusion in monitoring of books and digital information, 80.9% of the respondents were in agreement with this statement, while 19.1% disagreed. Furthermore, 86.5% of the respondents indicated that the use of information communication technologies in library environment motivates employees to increase performance in their daily duties while 13.5% disagreed. Finally, 74.9 % respondents stated that the application of ICTs on performance of duties in a library environment reduced work anxiety and stress however, 25.1% indicated otherwise.

From the findings, majority of the respondents were of the view that the application of ICTs in library operations increased work output of employees, motivates employees to increase performance, minimizes confusion when monitoring books and digital information

and finally reduces work anxiety and stress. The application of modern ICTs has reduced work bulkiness and stress to library attendees hence efficiency in service delivery. The technology has also increased the number of clients being served per day and minimized time spent when offering the services among other values. The findings were in agreement with O'Reilly (2005) who opined that the emergence of ICTs has brought a remarkable change in the use of internet which offers numerous tools and features that allow easy interaction and participation from the users hence increasing work outputs and other associated benefits. Public learning institutions should develop campus wide information system which will make accessing library information material easier and faster hence convenience to all.

(c) Effects of ICTs on Access and Retrieval of Information
The study sought responses on the effects of ICTs on the aspects of accessibility and irretrievability of information materials by the clients and the library staff. The measures were on: Ease location of information materials, reduction of time wastage, information management and lastly simplification of retrieval operation. The study findings are shown in the table below.

Table 3: Effects of ICTs on Access and Retrieval of Information

Items	Response in % Agreed	Disagreed
Ease location of information materials	28 (90.4 %)	3(9.6%)
Reduction of time wastage	26 (82.7%)	5(17.3%)
Information Management	30(96.2%	1(3.2%)
Simplification of information retrieval operation	30(95.4%)	1(4.6)

Source: Field Survey (2021)

From the response on table 3 above, 90.4 % of the respondents stated that ICT had an effect on accessibility and irretrievability of information due to ease location of information materials, while 9.6% of the respondents had a contrary opinion. The findings also showed that 82.7 % of the respondents stated that the use of ICTs reduced critically the time wastage when accessing information materials by users and library staff, while 17.3 % disagreed. Data from the findings revealed that 96.2% of the respondent further noted that ICTs facilitated management of information in the library environment while 3.2 % had a different opinion. On the issue of simplified retrieval operations, 95.4 % stated that ICTs has led to drastic changes on matters pertaining to information retrieval and large percentage lies on the positive aspect on reduced time spend on accessing and retrieving information materials, however 4.6% had different opinions.

From the findings, the study deduced that the effects of ICTs on accessibility and retrievability of information has led to ease location and retrieval of information by the use of print, online public access catalogue (OPAC) and database management. This has enabled the information user to search and locate quality information from an array of credible sources in the library. Therefore, the library should not only be storage of documents/information materials but rather formulate ways by which the contents of such materials can swiftly and effectively transmit to the users.

Capron (2000) agrees that, the internet utilization has revolutionized access to business information in the world; information providing centers; academics and research and in individuals. The most popular applications include: Electronic mail, World Wide Web

(WWW), File transfer protocol (FTP), Usenet and Telnet. The applications of these technological devices are critical to the conception of globalization. The provision of the internet and its technologies continues to have weighty effects in propagating information sharing culture especially in academic world, making speedy transactions in business and supporting universal partnership among organization and individuals.

(d) Effects of ICTs on Productivity in the Library Environment
The study sought to assess the general productivity in the use of ICTs in the library environment. The assessment was done based on: Increased information self-service in the library and reduced cost of operation and maximization of human resource. The study findings are shown in the table below.

Table 4: Effects of ICTs on Productivity in the Library Environment

Items	Response in %	Agreed	Disagreed
Increased self-service in the library		20(63.3%)	11(34.7%)
Reduced cost of operation		26 (82.7%)	5(17.3%)
Maximization of human resource		25(81.2%)	6(18.8)

Source: Field survey (2021)

From the findings, 63.3 % of the respondent stated that the application and use of ICT in the library has enabled many clients to access information on their own without constant assistance and inquiries while 34.7% maintained that they still offer much assistance to their clients. In regard to operational cost reduction, 82.7% of the respondents' view was that ICTs has drastically reduced operation cost, however 17.3% of the respondent had contrary opinion. On the issue of maximization of human resource, 81.2% agreed that human resource was maximally utilized with the presence of information communication technologies application in the library, while 18.8% disagreed.

Majority of the respondent were in agreement that the trend of use of ICTs showed a high degree of productivity due to evolution of technologies which has undoubtedly increased the diversity of information resources accessible in libraries today. This has been echoed by Oni (2004) who observes that the functionality of information communication technologies has drastically changed from the previous cohort of text abstract retrieved using special purpose public terminals from a single large central computer center to the present cohort of multimedia documents retrieved using multimedia technologies and other general purpose personal computers from multiple small distributed file servers hence increased productivity in the library operations.

5. Conclusion and Recommendations

Adoption of information communication technologies in a library environment has a lot of benefits as deduced from the study findings. It is clear from the findings that the application and usage of technologies has helped in monitoring and circulation of books, enhanced sharing of digital information, increased work output of employee and eased the location and information retrieval among others benefits. There is significant need for a comprehensive and adoption of ICT policies which creates an enabling framework for the application and development of ICT in universities libraries in Kenya. The policy would provide proper guidelines on development of ICT in libraries. Finally, University management and other relevant expertise possibly from members of the specialized and relevant committees need to be involved and engaged in this process.

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