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DIGITAL TRANSFORMATION OF ACADEMIC LIBRARIES IN DEVELOPING COUNTRIES IN AFRICA

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ABSTRACT

The concept of digital transformation in academic libraries and academic institutions is pretty new, especially, in developing countries. Digital transformation process is more common in businesses and entrepreneurship, where the focus is on increase of revenue and profits as opposed to academic libraries, where the focus is on user satisfaction and efficiency in service delivery. Digital transformation in academic library focuses mainly on user satisfaction as such, this paper offers valuable information to academic libraries and academic institutions in the implementation of digital transformation processes. The paper critically analyses and explores the digital transformation process in academic libraries and its implementation in developing countries in Africa, it establishes appropriate digital transformation process that academic libraries can adopt so as to ensure a smooth digital transformation process. Using the Disruptive Technology theory, the paper clearly explains and highlights the relationship between implementation of digitalization and the digital transformation processes. From the paper, the importance of digital transformation processes in academic libraries and academic institutions from developing countries is established. The paper concludes by sharing factors and challenges that will enable the implementation of digital transformation process in academic libraries.

Introduction

Academic libraries play a vital role in academic fraternity, they serve the academic institutions by providing resources and services to support learning, teaching and research needs of students, faculty and staff.¹ Academic libraries are undergoing a drastic change; this change has been envisioned since the introduction of internet. Libraries are currently being recognized, not just as a place, but also as a platform. Library services and resources are no longer the same, library users' needs are equally changing. The introduction of internet has brought great strides into the academic library domain, the most important being digitization. With the introduction of digitization, most academic libraries are embracing the concept of digital library services, and they are also being referred to as electronic libraries, hybrid libraries, or virtual libraries, depending on the extent of services the library is offering to its clients. With the inception of the 4th in-

dustrial revolution, which focuses more on digitization of content that is Artificial Intelligence (AI), internet of things, machine learning and block chain technology, we see the academic libraries slowly being incorporated and linked to the 4th industrial revolution and its relevance is being recognized. The academic library is moving from experimental into implementation. For instance, the main potential areas of the Internet of Things used in library services provide directory information and provide access to traditional and online collections.² Block-chain technology is used in smart book management systems in the library,³ while artificial intelligence concepts and technology⁴ are used to influence library services. However, it is important to note that since the inception of the 4th industrial revolution in 2016, it has not been prominent in relation to the academic libraries⁵. This paper is therefore meant to address the concept of digital transformation in academic libraries with special emphasis to the developing countries in Africa.

Digital transformation in academic libraries

The concept of digital transformation has been misinterpreted and misunderstood by many and as such it is noble to have a clear picture on what we mean by the following terms in this study: digitization, digitalization, and digital transformation. Whereas digitization can have a simpler definition as the movement from analogue to digital, it should be noted that digitalization is the use of digital techniques to change an organization model by providing new added value that produce opportunities of generation of revenue.⁶ On the other hand,⁷ digital transformation is a new development in the use of digital artefacts, systems and symbols within and around organizations. Digital transformation is defined⁸ as a change in all job, it involves creation of strategies, application of a flexible management model standing against competition; as well as a process of reinventing a business to digitize operations and formulate extended supply chain relationships. Digital transformation can also be referred to as digitization,⁹ these concept describes a service delivery model that is chiefly driven by changes in new technologies. Digital transformation¹⁰ is necessitated by two factors, that is, the enablers who are the systems developers and technology, and the drivers which includes the users' expectations as well as the market competitions. Digital transformation has also been defined as "a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies."¹¹ It is "a change process based on digital technology that meets the needs of partners and customers in an unprecedented way in terms of business operations, business processes, and value creation."¹² In the academic library environment, for instance, digital transformation can take place in two forms: digital transformation of the product, and digital transformation of the service. Digital transformation of the product is when a library decides, for instance, to digitize all its resources, so the final product will be the digital books, while digital transformation of the service involves

the implementation of digital systems to offer services to the users that ease or facilitate access to information resources. It has been noted¹³ that there are numerous emerging technology trends that drive digital transformation, however, the applicability of technology is largely dependent on the industry and the organization. With the advent of digital transformation, most academic libraries are left with no choice but rather aboard the bandwagon. With the current changes, it has been noted¹⁴ that only the universities which stay relevant, leverage the power of digital, and put in place focused digital transformation, will survive in the digital era. Moreover, digital transformation does not only imply the access of internet content. Digitalization¹⁵ revolves around the availability of digital documents through the internet, using digital library softwares, compact-disks, read-only memory disks, and it also involves repository of journal / magazine articles, e-books, e-papers, images, audio files, and videos which enable library users to have full access to this collection anytime and anywhere through a web portal. Digitalization does not occur in a vacuum; it requires an enabling team of dedicated, competent staff, appropriate technology, appropriate leadership, and support from parent organization. Digital transformation needs leaders with vision, courage, and persistence.¹⁶

Relevance of digital transformation

Digitalization¹⁷ is taking over our entire life and operations, it is emerging in every aspect of our daily life. It is argued¹⁸ that digital and media development has created a tremendous impact on information and business organizations across the globe. We consume and use digital resources on a daily basis; this is seen from our smart gadgets, televisions, computers etc. More so with the advancement of artificial intelligence, machine learning, and business intelligence. As such, companies and organizations need to quickly adopt digitization. These new digital technologies have been referred to as¹⁹ SMACIT – an acronym of (social, mobile, analytics, cloud and Internet of Things [IoT]) technologies. Digital transformations enable organizations to foster more in innovative and collaborative culture in industry and society. It has been pointed out²⁰ that ever since the inception of the term digital transformation in the early 2000's, it has brought about several mixed reactions, misconceptions, and myth in organizations, to a point that there has been resistance among staff to embrace it. The transformation into digital technologies leads organizations to more innovation and more entrepreneurial activities²¹ which, in turn, helps them in the expansion of the economy and the overall well-being of the country. Digital technologies²² have brought great disruption in businesses, making them adopt digital transformation strategy in order for them to survive in business and dominate the market. Many proponents of digital transformation have come up with various advantages / relevance of digital transformation – we can, however, summarize them as follows: digital transformation enables organizations to create and maintain digital communication infrastructures and ensure their governance,

accessibility, quality of service and affordability; it strengthens digital data protection, transparency, autonomy and trust; it improves the accessibility and quality of digital services offered to the population; it enables the implementation of new and innovative business models; it increases income generation, productivity and value addition in economy, it ensures continuity and sustainability of an organization; and last but not least, it improves the regulatory framework and technical standards.

Disruptive technology theory in digital transformation

In order to clearly understand the digital transformation process, this paper adopts Christensen's Theory of Disruptive Technologies to expound and explain the digital transformation model / process. Disruptive technology has been defined as a type of technology that replaces the existing mainstream technology in unexpected ways.²³ Christensen's Theory of Disruptive Technologies argues that the change of technology can easily make big companies and markets collapse and move out of business, that is, if they fail to take and adopt the new technology; the theory argues that small firms can easily make big and giant firms obsolete just by advancing in technology. In justifying Christensen's Theory of Disruptive Technologies in library and book publishing, we are given²⁴ an example of how *Encyclopaedia Britannica* was made obsolete with the entrance of Wikipedia, after dominating the market for over 244 years. It has been indicated²⁵ that disruption is a fact of life that continually occurs whenever new inventions and processes enter the marketplace. Digital transformation has caused disruptive technology in library and information sector, it has affected the ways library users' access, search and utilize information. Academic libraries, academic publishing and universities are facing new business models which could easily make them irrelevant; it has been noted that the introduction of eBooks, virtual services, and electronic publishing are some of the possible competing initiatives.²⁶ The digital world is replacing libraries²⁷ – if libraries intend to remain relevant, they must adapt quickly to the technological challenges; this adaptation demands that libraries compete with various entities that provide desired goods and services in the market. Digital transformation has necessitated disruptive technology in the way businesses perceive and value their customers, the way they compete with products and other competitors, how businesses think about data, how business innovates, and finally how we create value for our customers.²⁸ There are various stages of disruptive technology formation²⁹ which encompasses three simple disruptive technology stages and five stage disruptive technology stages, which are usually interpreted differently by different authors. However, the common stages of disruptive technology involve three stages: idea generation, incubation, and transformation stage. Digital transformation is obviously causing disruptive technology to appear in academic libraries, as library users nowadays are more interested in the fast access

to information as opposed to the process; they are interested in the library as a platform and not necessarily as a place; and are interested in prompt feedback as opposed to procrastinated information. Academic libraries are, therefore, mandated to embrace the emerging technologies which are being envisioned by the disruptive changes. Libraries are complex institutions, and they need to respond to the demands of the present by adapting in a variety of ways.³⁰ In the library setting, disruptive technologies are related to the fact that academic libraries are, gradually, being surrounded by digital transformation needs; for the library to be relevant, there is an urgent need for the academic libraries to transform and adapt the new technology, which will involve leadership changes, competency skills, change of products and service level orientation. Academic libraries should also refrain from structures that do not promote creativity and innovations, but rather they shall adhere to the parent organization principles and practices.

Digital transformation process/models in academic libraries

It is important to note that digital transformation should not be construed as merely the adoption of systems, processes and policies; the transformation process involves a lot of interactions and interventions. Margiono³¹ notes that “digital transformation combines various technologies and processes to ensure better value creation for the benefit of customers and companies”. It has been argued³² that academic libraries have always been ahead in adoption of a new technology in universities, they are considered as pacesetters in adoption of technology, and as such, they are likely to be agents of digital transformers in universities. Just as disruptive technology, the concept of digital transformation processes/model have been used more in the business sector as opposed to academic institutions or even libraries. The authors,³³ in their digital transformation process which they call business model, place more emphasis on revenue generation. Their business model involves the following: benefit dimension-products, i.e., services and values; the value-added dimension which includes the resources, skills, and processes; the partner dimension, including partners, partner channels, and partner relations; the financial dimension, including revenues and expenses. The digital transformation models put more emphasis on business growth and competitors. Digital transformation can be categorized in four domains; these are³⁴ 1) *technology*, which involves appropriate technology to deal with problems and also enhance innovations; 2) *data*, as there is an importance of having the data of the market, the customers and the trending data for future predictions and analysis; 3) *process*, since transformation requires end-to-end mindset and rethinking of how to meet customers’ needs, seamless connection of work activities, and the ability to manage across silos going forward; and lastly, 4) *organizational change*, which encompasses leadership, teamwork, change management as organizational change is important to enhance the human side of changes.³⁵ A digital transformation model called

ADKAR mode was suggested,³⁶ which ideally stands for *Awareness, Desire, Knowledge, Ability and Reinforcement*. The author insists that staff members should be aware of the product, in addition to the willingness to undertake the transformation, acquire the knowledge and skills to conduct the transformation, and lastly, their implication to the implementation in using culture and change within the organization.

In essence, therefore, digital transformation does not only focus on a product; instead, it is a process that an organization endeavors to undertake so as to improve service delivery and enhance customers' satisfactions. For digital transformation to be viable, it is needed to have a competent network of motivated staff, and well laid-out process. It has been argued³⁷ that libraries have the potential to drive the digital transformation in their respective universities, however, only library leaders able to look beyond library automation can achieve these goals.

Figure 1 below gives a summary of the digitalization process. The digital transformation process puts more emphasis on disruptive technology in all the digital implementation stages and has the implication on the importance of disruptive technology in enhancing the successful implementation of the digital transformation process. Another very important component is the user, to be "User Centered". The digital transformation process is meant to satisfy the users' information needs and not the organization. The users' feedback is equally important, as it enhances the improvement and the continuation of the digital transformation process. Competency and skills enable the full implementation and actualization of the digital transformation. In summary, the process can be elaborated as follows:

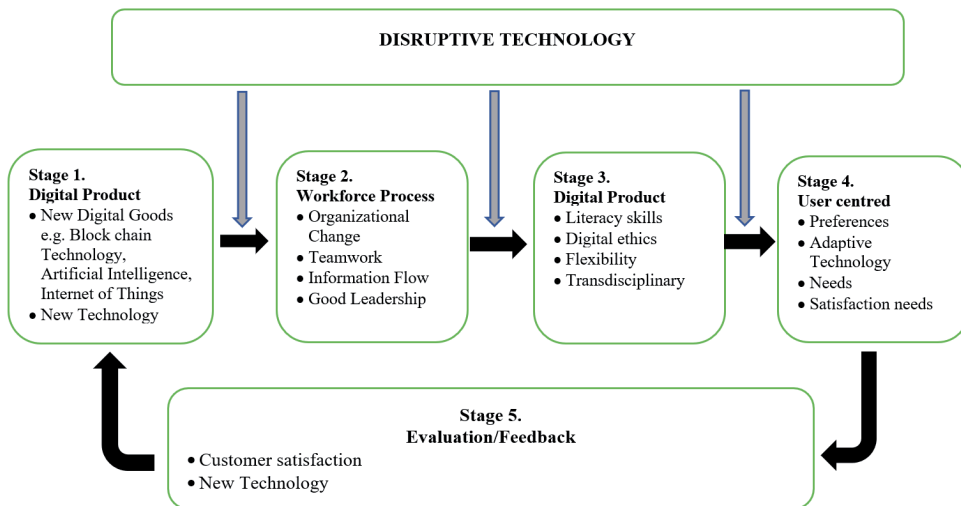


Figure 1. Digital transformation model for academic libraries³⁸

Stage 1. Digital product: This stage of the digital transformation process involves the identification of the digital good or product that is to be transformed or implemented. The digital product should be able to enhance change and value to the organization. For example, the adoption of Artificial Intelligence (AI) in the library will enhance easy content indexing, easy document matching, efficient content summarization, quality of service, and better digital operational efficiency. The digital products vary with organizations.

Stage 2. Workforce process: This stage involves the ability of the organization to change and adapt to the digital transformation that have been necessitated by the new technological product. The library should be able to adjust to the new product, and at the same time, ensure a continuous workflow.

Stage 3. Competency skills: The change of systems and products always disrupts the usual workflow; it disrupts the operation workflow, and, subsequently, makes other positions obsolete and redundant. As such, this stage focuses mainly on the acquisition of staff workforce with the necessary skills in the new digital environment. For example, in the library sector in the digital transformation stage, librarians with adequate digital literacy skills will be very resourceful in providing user education training of a new product, offering digital ethical dimension training to prevent and avoid issues to do with copyright, they will also be able to offer flexibility and adaptability services in case the systems break up, offer a transdisciplinary approach, enable teamwork among members etc. The importance of the possession of competency skills is very important in this digital transformation process.

Stage 4. User: The product should be user focused – that is, the product is meant to be more beneficial to the user than to the organization. This stage involves the user/customer to whom the product is transformed or designed for. The product should be able to ensure the user's satisfaction and an easy accessibility. The product should be able to meet the user's information needs and demands. The satisfaction of the user guarantees the successful implementation of the digital transformation process. N.B.: The digital transformation process can as well begin with the customer, it depends on the product and the user's needs.

Stage 5. Evaluation/Feedback: Feedback is a great component in ensuring survival and also get the users' satisfaction index. The outcome of the customers' reaction from to new product constitutes the feedback. If the product is good, the digital transformation will continue, if the satisfaction is negative, the digital transformation will have to be reinvented with a new product, and the process begins all over again. Feedback in the digital transformation process is a very important component, it ensures the sustainability of the model, and it also enhances frequent checks and the innovation of the process.

Adoption of digital transformation in libraries in developing countries

Technological change is inevitable, innovation is constantly pushing forward the limits of what is possible, while our increasingly globalised world makes the diffusion of

new ideas much more effective (Economist Intelligence, 2018).³⁹ Digital technology has been described⁴⁰ as *a priori*, which implies that digital technology is currently a necessity. In order for academic libraries to experience this digital technology, they need to embrace digital transformation. As mentioned earlier, the digital transformation in developing countries is not rampant, however, this does not necessarily mean that nothing is being done or implemented. It has been noted⁴¹ that teaching, learning, and research in academic institutions are all affected by our collective digital transformation, and to ascertain this, one needs a careful examination of what is happening in today's special collections and archives. However, for effective digital transformation, there is a need to adjust our processes, adopt appropriate infrastructure, and have adequate competence skills. The Economist Intelligence,⁴² the report indicates that South Africa, Tunisia, Morocco, Kenya and Egypt are more technologically ready and prepared for disruptive technology in Africa with a worldwide ranking of 42, 63, 63, 71, and 71, respectively, while Nigeria, Libya and Angola are the least prepared technologically in the African Countries with a worldwide ranking of 80, 81 and 82, respectively.

The concept of digital transformation has not been widely applied in the academic institutions or libraries from the available literature; we are experiencing the application of digital transformation more in the business sectors where the motivation is on customers' satisfactions, so as to increase business revenue generation, win business competition and market sustainability strategies. However, it is observed that although the focus of a business is on customers, while library focuses on users, their ultimate goal is user satisfaction.⁴³ Despite the fact that a few traditional organizations have been able to successfully transform themselves digitally, digital transformation should never be considered as an easy task.⁴⁴ The adaptation of digital transformation in academic libraries in developing countries looks like a noble idea, however, the uptake of this concept depends on several factors.

Factors affecting the adoption of digital transformation in academic libraries

The implementation of digital transformation process in academic libraries is not an easy process, many factors necessitate the adoption, and therefore, they need to be considered so that the process be successful, viable and sustainable. Below are some of the factors that can affect the adoption and implementation of digital transformation processes in academic libraries in the African context.

1. *Universities/parent organizations:* The development of academic library is solely dependent on the parent organization, it is the parent organization that determines the technological advancement that a library should invest in. Academic libraries have external control on administrative and financial areas, which usually limits their innovative approaches.⁴⁵ The universities are the ones in charge of funds allocation, the appointment and recruitment of competent staff, and so to uptake

digital transformation is also dependant on the university. Academic libraries are established together with the parent organization, and as such, they are meant to serve the information needs of their parent organization.⁴⁶ However, the library leaders should also be able to advise and advocate for better resources allocation and services from the university/parent organization. For digital transformation to be effective, there is a need to have the parent organization's support, and that can be made possible through marketing and advocacy by the library leaders to their parent organization. Prioritization of funds will determine the ability of the university to invest in digital transformation. In earlier studies,⁴⁷ it was noted that most universities spend approximately a third of their budgets on personnel and students cost at the expense of putting up decent building, equipping libraries and providing other valuable informational materials and resources in the university. According to this, most universities suffer from lack of proper prioritization of resources.

2. *Policy and regulatory body:* Most countries globally have the regulatory bodies that are charged with the duty of setting standards and guidelines for the establishment of universities, and subsequently, ensuring the adherence of the set standards and guidelines. The regulatory body standards are meant to ensure quality in learning, teaching and access to information. In Ghana, the accreditation body is called the National Accreditation Board of Ghana, while in Kenya and Zimbabwe the accreditation body is called the Commission of University Education of Kenya and Zimbabwe Council for Higher Education, respectively. The regulatory bodies have a great role to play in ensuring that the university adopts and implements digital transformation, and as best practice regulatory bodies they should always encourage universities to adopt new technologies, failure to which most universities are likely to avoid implementation of such noble innovative technologies.
3. *Library consortium:* Consortiums can become excellent facilitators⁴⁸ in the process of collecting, digitizing, organizing and making accessible these new electronic library resources. Library consortiums in Africa have been used immensely in the access and utilization of e-resources, they have been academic librarian avenues for justifying for change and access to a wide range of appropriate technology in the academic libraries in developing countries and also in Africa. A library consortium is a group of libraries that partner to coordinate activities, share resources and combine expertise.⁴⁹ Though globally the concept of library consortium is not new, library consortiums gained entry in Africa in the beginning of the 21st century. Library consortiums are great avenues for collaborating and sharing resources.⁵⁰ Library consortiums in Africa have gained popularity, and other than sharing and collaborations resources, they are also considered as avenues for enhancing inter-institutional organisations, rather than stand-alone institutions. Library consortiums have also been linked as great avenues for seeking funds from donors and well-wishers and non-governmental organizations. For instance, in

Kenya, the Kenya Library and Information services Consortium has benefitted immensely from organizations such as *Electronic Information for Libraries* (EIFL), International Network for Advancing Science and Policy (INASP) through getting subsidized, or rather, free resources. The library consortiums can also play a great role in the enhancement of digital transformation in academic libraries in Africa. In the recent years, we have also noticed some associations like AfLIA (African Library and Information Association and Institutions), which, though not a consortium, has been trying to offer training webinars and conferences in consortium member countries in Africa in a bid to enlighten them on the global trends.

4. *Technical and competency skills:* Digitalization involves manpower, manpower with adequate skills, which are able to drive an organization from the traditional business model to the digitized environment. Due to the disruptive technology during digital transformation, the staff and human resource in an organization are likely to be disrupted. During digital transformation, an organization must implement human resource practices that encourage employee behaviours that are consistent with the organization's strategy.⁵¹ Therefore, universities and academic libraries should ensure that they have staff who are competent enough for a smooth transformation process. To have an able and competency skilled staff, degrees and training programs are also required to equally offer programs and curriculum that deal with the current digitalization and advancement in technology.
5. *Change management and leadership:* For an effective digital transformation process there is a need to have a change in management, and change in the performance of roles and duties. Digital transformation brings about new insights, and as such, where there is a need, a change in management and leadership should be effected. Leadership is a critical factor in the successful implementation of projects in academic libraries.⁵² They prioritize the importance of new skills for new leadership, they give emphasis to top-level management as they play a fundamental role in an organization: they are the ones who define and drive an organization towards achieving the set goals. The willingness to change is one of the main components which makes the institution successful, however, the willingness to change happens if the leaders know and understand the motive behind the change.⁵³ Libraries therefore require leaders who have a wide variety of skills in order to address the rapidly changing needs of the community and the libraries of the future that will serve them.⁵⁴ Most resistance in academic libraries happen due to a fear of the unfamiliarity with technologies and new services.⁵⁵ Employees need to understand why a change is being made, not just the change that will provide the benefits. Currently,⁵⁶ most organizations have taken digital transformation as a priority, the digital transformation is bringing about change in the way organizations are structured and managed.
6. *Clear vision mission of the library:* A library with a clear set of mission, vision, is likely to be able to justify its existence during the digital transformation process. Libraries

need to be guided by a clear set of objectives. Clear objectives also ensure that the library staff's needs are also catered for. The role of a leader⁵⁷ is to drive an organization's vision, mission and objectives. A leader must inspire and motivate employees to accept the organization's visions and missions, in order to achieve the organization's goals as outlined in its strategy. Digital transformation involves vision, strategy, people, processes, and technology.⁵⁸

Digital ethical dilemma in libraries: As digital transformation involves access and utilization of digital content, academic libraries should be aware of the copyright law so as to avoid infringement of the law committed by them or the library users. Copyright plays a significant role in the digital transformation of special collections materials.⁵⁹ Intellectual Property (IP) and copyright questions pose some of the most significant challenges to the digital transformation. As such, the importance of digital ethics should be emphasised; this emphasis moves from the digital products being used in a library all the way to information resources that are being shared by the academic libraries. With the vast availability of infringed copyrighted, digital products and information resources, through avenues such as *Sci-hub*, *the pirate bay*, *Library Genesis* etc., most academic libraries in Africa are faced with the dilemma of denying or not denying the library users' access to the products and resources, be termed as irrelevant or be praised as relevant.

Conclusion and recommendations

Though digital transformation has not been fully embraced in higher institutions of learning in developing countries in Africa, there are, no doubt, pros associated with its implementation that will be of great advantage to our learning institutions. Successful digital transformation in academic libraries will require an enabling team of experts who are technically competent professional librarians, academicians and stakeholders. For institutions of higher education to transform digitally, they will require the transformation of academic libraries. Some of the roles that the library will perform in the digitization include the adoption of learning management systems, the implementation of digital scholarship, digital publishing, library labs to enhance digital content such as podcasts, video and online learning, licensing, purchasing and harvesting the quality digital content for effective learning, just to mention but a few. In essence, the success of digital transformation largely depends on the academic library as a valuable resource center of the organization. However, it should be noted that the digital transformation is never a smooth process, as it has been portrayed in this paper – there are various issues and factors that also greatly hinder the successful implementation of the digital transformation, to be discussed in future research studies.

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