

## Factors challenging research and innovation in tertiary education in Nigeria

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### Abstract

Research and innovation in tertiary education is a key driver of sustainable economic development of any nation. A global reflection from the perspective of Education for Sustainable Development (ESD) clearly shows that global promotion of research and innovation in education is a pivot for knowledge, skills, abilities and attitudes to combat challenges against ESD. Despite these global reflections, Nigeria has continued to be among the third world or underdeveloped countries. Moreover, as research and innovation become more complex globally, Nigerian tertiary education is further constrained by poor sponsorship, out-dated Intellectual Property (IP) policies, and non-sustainable ICT innovations despite her huge human resources and other natural endowments. This study highlights the gaps created by these challenging factors and strategies to close them. A narrative review of prior research that focused on the theoretical underpinnings of vast works of literature that revealed significant information on challenges facing research and innovation in tertiary education in Nigeria and strategies to close these gaps was adopted. Peer-reviewed articles within the last five years from electronic databases, using some keywords such as “research”, “innovation”, “tertiary education”, etc, were also extracted. Results show that research and innovation are crippled by out-dated, non-sustainable or virtually non-existent policies, and poor educational system. Findings from this study may encourage research and innovation in our tertiary education that may positively bring about diversified economy, positive social change, and economic development in Nigerian.

**Keywords:** Research and innovation; Tertiary education; Sustainable development; Intellectual property; ICT sustainability

### 1. Introduction

Sustainable Research and Innovation in Tertiary Education (SRITE) is the back bone of sustainable development of any nation. Sustainable development is a human subject [20]. Education for Sustainable Development (ESD) aims to empower the individuals to assume liability to build a sustainable future through research and innovation [20]. Moreover, sustainable ICT innovations, Intellectual Property (IP) policies, and research database repository are enablers, pivots, and platforms for SRITE for sustainable development. For SRITE to thrive in Nigeria, it is necessary that significant awareness be created on the significant importance of sustainable ICTs, research database repository, IP policies and the effective adoption of same. The major role of tertiary education for sustainable development included, among others, the building of a clear vision in teaching and research, education of decision makers, development and preservation of research and innovation, and effective dissemination of same through excellent research database repository for sustainable development.

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The general IT problem postulated in this study was the gap created by poor adoption of ICT innovations, IP policies, and research database repositories identified as enablers of SRITE for sustainable development. The specific IT problem is that some stakeholders of tertiary institutions in Nigeria lack strategies to identify SRITE enablers, the gaps created by poor adoption of these enablers of SRITE that negatively impact ESD in Nigeria, and strategies to close them. Our purpose in this study was to identify the gaps created by challenges of SRITE that negatively impact ESD in Nigeria, and how to close the gaps.

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## 2. Literature Review

A lot of reviews have been done on how research and innovation in tertiary education can bring sustainable national development. These reviews have greatly improved our understanding of the possible activities of tertiary education in the pursuit of sustainable development. However, little is known about factors challenging SRITE for sustainable development, what these factors are, the impact they created in the pursuit of sustainable development through research and innovation, and how these gaps can be closed or minimized. While many research and innovation platforms in tertiary education majored on examination and communication, case studies within institutional operations and policies or impacts on sustainable development [9], a few have focused on gaps created by IP theft or piracy, copyright infringements, ICT sustainability and poor research database repository towards sustainable development through research and innovation in tertiary education. [17] explains that if the industry played hardball with violators, in the absence of any legal alternative, will become comfortable to adapt at illegally distributing IP content, and may become morally comfortable with them. In essence, the legal prosecution backfired and started more illicit distribution of protected material.

Poor adoption and policies of ICT, IP, and research database repository are major factors or challenges of SRITE in Nigeria [22] and [23]. ICT, IP, and research database repository alone are not relevant explicative variables for social change, but in context, they are good enablers of SRITE for sustainable development [12], and good derivative of social and economic restructuring. In particular, ICT, IP, and research database repository provide impressively great impact in virtually all areas and services that are research and innovation dependent. It takes sustainable ICT, IP and research database repository policies, evident in individual's and people's ability to use, manage, evaluate and understand, to drive the required ESD. One significant setback of ESD through research and innovation in Nigeria is poor adoption, practices, and sustainability of IP, ICTs, and copyright policies, and research database repository that significantly define ESD.

### 2.1. Intellectual Property (IP) Factor

One major factor challenging research and innovation in tertiary education in Nigeria is inadequate enforcement of IP laws, inadequate awareness about copyright piracy and its ills. Researchers, at any time, should be able to benefit from the fruits of their labour. In this information age, it has become difficult, if not impossible, for researchers and innovators, especially in education to attain their ultimate goals or create added value through their work, knowledge, and ideas. This is because there are no adequate rules and regulations created to enforced or protect intellectual activities of research and innovations in tertiary education in Nigeria. World Intellectual Property Organization (WIPO) claimed that intellectual property shall include the rights relating to: literary, research and innovation, and all other rights resulting from intellectual activity in industrial, scientific, literary, artistic fields, and the tertiary education industry [5].

Intellectual Property (IP) is defined as those creations emanating from the human mind in relation to which the state or country confers upon the creators, statutory monopoly for a prescribed term, to prevent their unauthorized exploitation [5]. IP is simply, the creative ideas or innovations that result from intellectual activity and creation [22]. Two branches of Intellectual property exists namely: (i) "industrial property"; and (ii) copyright. As stated by [6], Nigeria is ranked among countries in Africa as a country where IP theft or piracy is highly prevalent. In the years 2007, 2008, 2009, 2010, and 2011, IP theft or piracy were rated as 82%, 83%, 83%, 82%, and 82% respectively. Theft or Piracy in this context include among others, IP distributed or copied without adequate authorization [1]. This unhealthy development does not augur well with ESD through research and innovation.

In Nigeria, causes and motivations for IP theft or piracy are myriad [22]. Causes and motivation for IP theft include ineffectiveness, inefficient standards or efforts of established bodies like Nigerian Copyright Commission, scarcity and high cost of genuine products, abuse of digital technology, inadequate or outright no enforcement of IP laws, inadequate awareness about copyright piracy and its ills, poor distribution of needed creative products, slow judicial system, poor funding of regulatory agencies, and poor or uncooperative attitude of practitioners in the creative industries. Some of these laws are out-of-date in terms of the technology that they were written for. It seems that laws and legislation are

not able to keep up with the fast moving world of technology. Other serious challenges include the simple fact that a lot of people in Nigeria were unaware of Intellectual Property Rights (IPRs) and implications of IP theft. The concept until recently was foreign such that individuals and organizations alike did not appreciate that they could commercially exploit their IPRs or that IPRs are assets of immense value. Also there were very few IP Practitioners in Nigeria and those practitioners had a difficult time convincing the Courts to enforce IPRs.

However, the Nigerian Copyrights Commission (NCC) discerns illegal exploitation of copyright works as crime [22]. The Nigerian Copyright Commission was launched as countermeasures to IP piracy. It deploys three basic intervention components, namely public enlightenment, proactive enforcement and the administration of rights [1]. There are other bodies put in place such as the National Office for Technology Acquisition, Transfer registers Technical Service Agreements, Technology Transfer and Know How Agreements, Intellectual Property Lawyers Association of Nigeria (IPLAN), Nigerian Local Chapter of the International Association for the Protection of Intellectual Property (AIPPI) and Anti-Counterfeiting Collaboration (ACC), Nigeria. The Nigerian Intellectual Property Commission (NIPCOM) Bill also exists, in collaboration with the various international associations, both private and public working together, though currently waiting enactments largely due to efforts of the IP community. There are other IP regulatory bodies such as the Performing Musicians Association of Nigeria (PMAN) and Federation of Intellectual Property Owners (FIPO) that play significant roles in protecting members' rights as well as Collective Management Organization (CMO). These IP-related regulatory agencies also include bodies such as NAFDAC, SON, TM Registry, NBC, and NFVCB. Regrettably, some of these bodies are grossly inefficient in regulating or enforcing reasonable impact on IPRs and IPR related issues.

## **2.2. Research Database Repository Factor**

It is clearly observable that IT availability, operations, and standards with appropriate databases required to enforce IPRs is next to zero in Nigeria. IP policies are not respectfully adopted. In Nigeria, there are evidences of lack of solid and proper implementations of ICT innovations. We witness technology failure all around us regularly. Many ICT technological innovations in Nigeria are mere IT centres that majored on IT adoption while the “information and communication” aspect of ICT are ignored. As a result the entire body of ICT is crippled. In particular, technological innovations out to incorporate “information and communication”, in order to implement the databases required as a platform for effective repositories of research innovation in our tertiary education system. In Nigeria, for instance, traffic lights are not properly implemented and so are not adequately or properly put to use. It is obviously observable in Nigeria where cameras are mounted on the traffic light with no corresponding mechanism or equipment to adequately capture, document and book or fine offenders [3]. Nigeria runs an automated traffic system without proper documentation of vehicles and their owners. There are clear evidences of stupendous waste of human and material resources exhibited with impunity the police and other law enforcement agents with the use of these law enforcement agents to check traffic light offenders, when the traffic lights are embedded or supposed to be embedded with monitoring cameras. This result simply from the fact that there are no authentic documentation of vehicles with the names of their owners. As a result, it becomes difficult, if not impossible, to track those who jump the traffic light though their databases. The same scenario is observable in other establishments such as NRSC, Police, and Ministry of Justice etc. Our ICTs are not adequately implemented or used. Technological innovations are sustained through their adoption or usage [15]. One cannot sustain technology except by adequate usage or adoption. The non-sustainability of ICT in Nigeria is the major reason for non-sustainable technological innovations in our tertiary institutions and poor diversified economy or low economic growth in Nigeria. Except our diversified economic and educational ventures are fully adopting ICT innovations and policies effectively, its sustainability will be grossly endangered, especially now that ICT innovations are widely integrated into ambient or ubiquitous environments.

## **2.3. ICT Sustainability Factor**

To effectively sustain technological innovations requires excellent adoption and usage. Also sustenance of technology is a pointer to the value accorded to it. Sustainability is an indication that the user can use or have used the technology long enough. In line with [11], sustainability, which implies its adoption and acceptance for a reasonable long time, is a measure of the value placed on any technological innovation. One of the major IPR challenge to be tackled is that of providing adequate skills and competent manpower for the administration of IPRs. Again the infrastructure like Information Technology required for the operation of IPR in Nigeria is still largely undeveloped [14], because ICT innovation required to support the delivery of these IPRs for research and innovation in tertiary education in Nigeria is not adequately harnessed or accepted or sustained.

Acceptance is measured by adoption. Sustainable ICT therefore plays an important role in IPR tasks [2]. This is because without effective implementation of ICTs as major enablers of technological innovations, sustainable IPRs will be farfetched [23]. Nigeria should adopt, accept, sustain, and value ICT as key strategic tools in Education for Sustainable Development (ESD), and must genuinely begin to encourage her people to adopt, accept and utilize the ICT technological

innovations because of their impressive and great impact on research and innovation in tertiary education and economic growth in the country. Many developed countries have actualized impressively sustainable development in research and innovation in tertiary education and economic self-reliance because of sustainable ICTs.

Acceleration of ICT transformation is required for ESD [16]. Sustainable ICT is required for triggering any digital transition [13], and the major enabler of sustainable research and innovation in tertiary education of any nation [23]. Sustainable research and innovation in tertiary education is exemplified by sustainable ICT policies that are designed to: (a) simplify and make more efficient decision making with minimized asymmetric information, (b) automate many intangible activity connected with research and innovation, (c) collect, process and use large data sets of various formats obtained from many sources require for sustainable research and innovation in tertiary education, (d) provide immediate and very cheap communication protocols, (e) launch new sales and dissemination channels (e-commerce) for research and innovation, and distribute same products as well.

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### 3. Methodology

Our study adopted a narrative review approach. It involved the review, analysis and synthesis of different and related research findings with the aim of drawing holistic interpretations or conclusions based on the reviewers' own experience, existing theories and models that may enhance IP, ICT, and research database repository sustainability. According to Hill and Burrows [10], a narrative review is adopted where the purpose is to draw holistic interpretations or conclusions, and significant interpretations based on the existing theories, conceptual framework and models. A narrative study approach is most appropriate for a descriptive or explanatory study [4], where results from such studies are of qualitative rather than quantitative in nature [19]. Narrative studies reveal significant strengths because they have ability to provide platforms for comprehension of diverse and numerous understanding around multiple data sources and research findings [19]. They also provide the opportunity to make reflective practice and acknowledgement of researchers' views and knowledge [19]. Researchers with diverse background and views have incorporated the use of narrative reviews or adopted narrative methodology as best suitable for comprehensive studies [18]. Methodological triangulation, a platform for engaging multiple sources of data to gain multiple perspectives, maximize reliability and validity of data, in order to build coherent justification of data interpretation [8], was adopted. The reason for adopting methodological triangulation was to ensure the reliability and validity of data, and justification of interpretations from the reviews.

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### 4. Data Collection

Professional and academic research findings that are relevant and related to our study were reviewed. Many of such findings came from the ProQuest databases, ScienceDirect, Walden University international library databases and peer-reviewed, and other related texts. We also used phrases as such as "research", "innovation", "tertiary education", etc and terms as key search words in the databases for related literature. Our reviews incorporated 23 references. Twenty (87%) of total references incorporated in the study are peer-reviewed, while (55%) are peer-reviewed journals that are within the last 5 years.

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### 5. Findings

Recently, relevant and wide varieties of important policies and protocols that have made tremendous contributions to the understanding of ICT sustainability and its impact on ESD have been put in place [7]. Also, sustainable ICT innovations, Intellectual Property (IP) policies, and research database repositories have been identified as SRITE challenges, and effective technical controls and solutions to impact ESD are being identified [7]. Some of such technological innovations include, among others:

- Good ICT communication skills in SRITE for sustainable development,
- Engagement of trained professionals in tertiary educational institutions,
- Implementation of effective research database repository and IP policies in sustainable development manner,
- Collaboration, networking and coordination among different tertiary educational institutions [7], and other mobile and internet dependent interfaces that are SRITE enablers of ESD [9].

However, these innovation trends are farfetched in Nigerian technological innovations. Despite the existence of ICT innovations in Nigeria, IP and copyright laws, SRITE have remained weak and vulnerable. This is because there is evidence that suggests that corrupt ICT practices, poor adoption of research database repository, and non-adherence to IP policies are increasingly exploiting SRITE, and adversely affecting ESD. Some researchers have also noted varying

challenging factors for non-sustainable ICTs, IP policies, and research database repositories that adversely affected SRITE to include problems associated with corrupt policies and poor usability of ICT systems [21], not according required value to IP policies by researchers [1], and limited perception of the usefulness of research database repository of effective dissemination of research innovations and implementation of IP, copyright and plagiarism laws [15]. There is need for awareness and training in tertiary institutions for researchers to understand and be able to perceive available technological innovations and policies as useful in ESD. This may bring about ESD that will leverage economic development and social change in Nigeria.

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## 6. Conclusion

Inadequate enforcement of IP laws, coupled with inadequate awareness about copyright piracy are the major factors challenging research and innovation in tertiary education in Nigeria by preventing researchers and innovators from attaining their ultimate goals or creating added value through their work, knowledge, and ideas. Poor sustainability of ICT in Nigeria also affect the implementation of anti IP law enforcement which further poses barriers that impede progress related to research and innovation in tertiary education in Nigeria. Study revealed that ICT innovations in Nigeria are not adopted or implemented to leverage SRITE in Nigeria in line with ICT international standards in all facets of the Nigeria education and legal system for standardized behaviours and values towards sustainable IPRs. The result from this study may increase understanding, minimize corrupt ICT practices and encourage trust in ICT innovations that may awaken the Nigerian judiciary and Nigerian Copyright Commission (NCC) in addressing some basic issues on IPRs so as to positively address research and innovation economy especially in tertiary education in Nigeria.

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## Compliance with ethical standards

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### *Disclosure of conflict of interest*

There are no conflicts of interest.

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