4IR and Right to Education in Nigeria: Synergy between Legal Instruments and STEM Education

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Abstract: Laws and policies have important roles to play in advancing the Fourth Industrial Revolution (4IR) through Science, Technology, Engineering and Mathematics (STEM) research in Nigeria. STEM education and knowledge brings about development by converging scholars across the world with recent research discoveries. In order for Nigeria to reap the maximum benefits from the 4IR, its legal system must come in line with the principles advanced by the 4IR. It is important to state that the laws which have been enacted before the contemporary era are inadequate and obsolete.

Education (STEM education inclusive) which will benefit the most from this new revolution would demand new legal instruments that are adequate and effective to cater for the legal and policy demands of the 4IR by bringing forth a more current and inclusive legal protection for all the relevant beneficiaries. Using doctrinal methodology, this paper examines 4IR and right to education in Nigeria with a view to establishing the relationship between the legal instruments and STEM education with the objective of advancing the agenda of the relevance of all fields of education for the next generation. The paper is divided into six sections and the findings show that, education (STEM education inclusive) is bedeviled with many challenges and the extant laws are inadequate to solve them. Thus, making the goal of 4IR unachievable in Nigeria. To reach the greatest dexterities in all works of life, the paper concludes by bringing the significance of laws and policies that would accommodate free STEM education in secondary and tertiary school levels in order to answer the call for 4IR. It recommends research collaboration across STEM fields for integrated curriculum and an amendment of the Constitution. It also advocates for gender equality and investing more in STEM education for having a transformative shift in Nigeria for the purpose of achieving 4IR.

Keywords: Fourth industrial revolution, Legal instruments, Nigeria, Rights to education, STEM education

1. Introduction

It is generally argued that education is life. It is an anthropological means of development in terms of safety, social, economic and political well-being of any civilized society (Babalola, 2012). It brings about development by converging scholars across the world with recent research discoveries. Arguably, the direction of 4IR encompasses through automation, the discussion of manufacturing technologies that is realizable through STEM education. For any modern society, the relationship between 4IR and model of STEM education is fundamental, and, in this regard, the Nigerian laws and policies must be in consonance with the new transformations embedded in the 4IR. Unfortunately, the existing laws and policies governing education in Nigeria have been promulgated before this recent revolution. Thus, Nigerian education sector would demand reforms of the laws and policies to cater for the new era by providing a robust legal protection for the relevant beneficiaries. In view of the foregoing, the aim of the research is to examine 4IR and right to education in Nigeria with a view to establishing the relationship between the legal instruments and STEM education.

2. Methodology

In order to give a clear view of this paper’s examination of the 4IR and right to education in Nigeria, it adopts doctrinal approach. Reliance was placed on the existing materials in the library and database through primary and secondary data on the laws and policies on education in Nigeria, STEM education inclusive. The paper sourced and analysed the primary data such as the Nigerian Constitution, 1999 (as amended), National Policy on Education Act; the Child Rights Act; the Compulsory Free Universal Basic Education Act; the Education (National Minimum Standards and Establishment Institutions) Act that governs education in Nigeria, judicial pronouncements, African Charters and Convention on education signed, ratified and domesticated by the Nigerian government. The secondary data sourced, studied for review and analysed includes textbooks, journals, articles, law reports, conference proceedings and materials from the internet.

3. A Critical Analysis Of 4IR and Stem Education

4IR is geared towards an “exchange of manufacturing technologies by means of robotics strategies” (Deloitte, 2015) cited in (Adetayo, 2016). In another perspective, 4IR will eliminates or reduces human intervention because it will robotically carry multifaceted tasks by communicating with many devices through smarts mechanisms (Deloitte, 2015) cited in (Adetayo, 2016). Thus, new opportunities will be widely spread around the
globe by unfolding the new revolution. This will bring rapid reforms and advances benefit of new skills and knowledges. While STEM on the other hand is used as an abbreviation for discipline in four independent fields that covers the fields of Science, Technology, Engineering and Mathematics. Gonzalez, & Kuenzi (2012) refer to STEM education as: the knowledge and skill acquired through teaching and learning in the fields of science, technology, engineering and mathematics which extends to educational activities across all grade levels, from pre-school to post-doctorate that can either be formal or informal classroom settings or both.

It is important to state that, the fields of science and technology are regarded as interdisciplinary approach as both are related and relevant to many disciplines such as transportation, agriculture; communication; law; medicine; health and construction which have a positive impact on the society at large (Gonzalez, & Kuenzi, 2012). Education among other crucial services have become intrinsically tied to technological function making science and technology valuable subjects and areas of skilled labour. This has been postulated by Ukeje (1997) thus: Modern technology and modern society cannot be attained without STEM education. For a nation to be developed, adequate attention at various levels of education must be given to the study of science, technology, engineering and mathematics.

Instructively, an examination of the relationship between 4IR and STEM education cannot be over-emphasised. According to Oriafio (2002) cited in Babalola (2012) and Iheonumewku (2006), “a healthy, productive and progressive society can only be achieved through STEM education as it puts man on the highways towards accomplishing some of the society’s basic tasks”. This position was reaffirmed by Adetayo (2016) that, 4IR will enhance global competitiveness and both developing and developed countries will have more economic advantage over the most manufacturing product and raw materials”. In this regard, Janice (2006) cited in (Kennedy & Odell, 2014) identified STEM education as one of the new approaches that can be used in achieving the 4IR because it is “meta-discipline in nature”. According to her, the approach of STEM education to teaching is larger than its constituent parts. She went further to say that:

STEM entails an approach with multidiscipline, multicultural and multi perspective viewpoints which transcends national boundaries in solving problems in daily lives and provides students with a global perspective. In order to advance excellence in the examination of education for the purpose of achieving 4IR, this paper align with the position of Xing and Marwala (2017) where they identified four schemes for attaining a significant transformation in the society. According to them, the four schemes are: “twinning programmes, Franchise programmes; Double/Joint degree and Blended learning”.”Twinning programmes” entails the collaboration between indigenous/local and foreign education providers that develop education system that connects both providers together. Under these Twinning programmes, a qualification award will be given by the foreign education provider after completion of the programmes which will be taken in different locations where course credits are located (Xing and Marwala, 2017).

While ‘Franchise programmes’ are all about authorisation of indigenous/local education provider by the foreign education provider to offer foreign courses/programmes indigenously which at the end, a qualification award is given by the foreign education provider (Xing and Marwala, 2017). Whereas, the understanding of ‘Double/Joint degree’ entails an arrangement between the indigenous/local and foreign education providers to offer a programme jointly with the cooperation that a qualification award is jointly given by the foreign education provider or from either of them at the end of the programme(Xing and Marwala, 2017). Enrollment of students for programmes in different hybrid forms such as e-learning, online learning or on-site learning by indigenous/local and foreign education providers are regarded as ‘Blended learning’ (Xing and Marwala, 2017). It is therefore pertinent to state that, technology as one of the components of STEM education plays a vital role of mechanizing procedures which gives room for sharing of experiences, knowledge and best practices garnered in the classroom among sundries. In a rapid manner, technology is argued as a means of changing the methods and manners that we network and work by connecting the indigenous/local and foreign communities and workers together in a progressive and sophisticated pattern and it also opens up new opportunities.

However, realisation of 4IR in Nigeria has been impeded by some challenges. One of the challenges that hinders Nigeria to compete with other countries is its state of technological structure and scientific industries in relation to STEM education (Adetayo, 2016). For example, in 2018; it was reported that “less than 80% of children from ages 6 to 11 attend school and less than 60% remain in school at ages 12 to 14” (UNESCO, 2018). The implication of this report is that, enrolment of students in schools declined to “less than half at 40% between children of 15 to 17 years of age”(UNESCO, 2018). In the same vein, inequality in education on female gender is also reported as another challenge for full realization of 4IR in Nigeria. For instance, report has shown that “women are yet still underrepresented in the fields of science, technology, engineering and mathematics (STEM) both in number of graduates (especially at the PhD level)” (UNESCO, 2018). To buttress this report is the statis-
tical analysis from the records of the IFUW Policy Update (2015) which revealed that “only 12% of the global engineering work force is female and that only 30% of all science researchers in the world are women”.

Surprisingly, the aspiration of Nigerian government to become one of the top 20 economies in the world by the 2020 will depend on its educational system to transform its youth into a highly skilled and competent work force that are capable of competing globally (Dawood, 2012). However, inadequate budgetary allocation for STEM education in Nigeria (Ogunnyi, 1996) hinders this aspiration and this further complicates the realisation of 4IR as the Vision 20:20:20 and transformation agenda of the Federal Government can only be achieved if STEM education predominates the nation’s educational sector (Ohize, 2017). Study has shown that in spite of the establishment of more Universities, Polytechnics and Research Institutes in Nigeria, funding of STEM education has been reported to be less than 1% of GDP of the Nigerian government budgetary allocation (Ogodo, 2009). This has been evident from the observation of Atadoga(2001) in his study thus:

STEM education is faced with lack of qualified teachers and STEM education is attributed to loss of interest in STEM disciplines by the students who would have become future scientists, engineers and technologies especially when most of the schools’ lack counsellors.

In addition, studies have shown that corruption has eaten deeper into the Nigerian educational system. This has affected the educational administration and management, examination malpractices (Osahon, 1999) cited in (Dawood, 2012) etc. Also, the institutional policy on ‘quota system’, ‘catchment areas’ and ‘less advantage areas’ has promoted bribery, favoritism and nepotism in the admission into Nigerian institutions. The consequence of corruption on educational system in Nigeria has been revealed from the study of Ali (the 2004) cited in (Dawood, 2012). According to Suleiman (2005) cited in (Dawood, 2012), “corruption has led to the decaying infrastructures, inadequate staffing, poor leadership, poor and failing education standards” among others. Poverty has not been left out of the challenges of achieving access to education, STEM education inclusive as it has ripped the process of education apart and deprive most of the Nigerian citizens from getting access to education|Suleiman, 2005 cited in (Dawood, 2012). This may not be unconnected with reason why student loss interest in STEM education as many parents could not afford textbooks and scientific materials on STEM subjects. According to Amartya(1992) and UNESCO (2002) reports, “inadequate education can be considered a form of poverty”. In order words, the effect of poverty can lead to lack of educational resources in poor schools and hinders learning (Bynner and Joshi, 2002). These challenges call for critical analysis of the legal instruments that govern education (STEM education inclusive) in Nigeria which is the discourse in the next section of this paper.

4. Legal Instruments On Right To Education (STEM Education Inclusive) In Nigeria: A Critique

Oxford Advanced Learner’s Dictionary (2018) offers a definition of educations thus: “A process of teaching, training and learning, especially in schools or colleges for the purpose of improving knowledge and developing skills”.

Linking this definition to 4IR, it is imperative to state that the present and future generations of scholars will be productive and ably ready to solve any societal challenges with the knowledge and skills acquired through education especially STEM education. This position is supported by the combined effects of section 1 of the National Policy on Education Act (NPEA), 2013 which postulated that:“education is an effective tool for economic, social, cultural and political transformation and national development”. This position also gains credence in the words of Valerie (2015) cited in (Graham, 2016) when she asserted that “the purpose of education is about learning how to thrive in a transforming world”. Globally, the system of education is designed on models that have been put in place for decades. Many attempts to modernised and reform education system especially in Nigeria have proven ineffective and inadequate in addressing the increasing spaces of demand of contemporary life and the current demand in the labour markets with the conventional system of education (World Economic Forum White Paper, 2017). To achieve the maximum standard obtainable under the sustainable development goals (SDGs) on education by 2030, it was revealed from the study conducted by the World Economic Forum that “additional 26 million teachers will be needed” (World Economic Forum White Paper, 2017).

It is instructive to note that, there is need for transformation of the Nigerian education sector by establishing relationship between 4IR and STEM education. The transformation is needed for the purposes of having inclusive teaching approaches and continual learning experiences for Nigeria to meet up with global aspiration. The identified challenges of today as well as those challenges anticipated in future can be overcome through this transformation. It is therefore argued that acquiring skill and knowledge of STEM education are necessary to “future-proof current and future generations” (The Numbers Game Nature, 2001). It has been revealed in a study
conducted by Ugo and Akpoghol (2016) that “STEM education will stimulate development which will inspire the citizenry to achieve success and experience over ignorance, poverty and unemployment when STEM education is substantially invested”. Thus, promulgation of laws and policies on STEM education will be able to direct the stakeholders to develop, expand and evaluate educational outreach programmes across STEM fields and space that will serve secondary and tertiary school levels in Nigeria.

Interestingly, the reform of education in enhancing economic growth and effectiveness in the society during the second world war ushered in STEM education in Nigeria. This reform produced manpower who are scientifically equipped to meet the demand of the country’s economic situation (Donatus, Cecily & Sylvester, 2011). Thus, the evaluation and implementation of curriculum, planning and development were designed by the science educators in 1963 who were engineered by the government, industry and schools (Fafunwa, 1975; Fafunwa, 1983; Jegede, 1988; Ali, 1998; Yusuf & Yusuf, 2009; NPEA, 2013). Instructively, the 1969 conference on National curriculum led to the formulation of the first independence Policy on education which of course brought in the fundamental transformation in the Nigerian educational system (Fafunwa, 1975; Fafunwa, 1983; Jegede, 1988; Ali, 1998; Yusuf & Yusuf, 2009; NPEA, 2013). Basically, this first independence Policy was formulated to cater for the indigenous necessity of STEM education in Nigeria (Fafunwa, 1975; Fafunwa, 1983; Jegede, 1988; Ali, 1998; Yusuf & Yusuf, 2009; NPEA, 2013). The first indigenous formation of science curriculum development was designed wherein some subjects such as ‘Integrated science’, ‘Biological’, ‘Chemistry’ and ‘Physics’ were introduced at secondary schools (Fafunwa, 1975; Fafunwa, 1983; Jegede, 1988; Ali, 1998; Yusuf & Yusuf, 2009; NPEA, 2013).

The starting point of the Nigerian government to legally recognise education, STEM education inclusive is the Constitution of the Federal Republic of Nigeria, 1999 (as amended) being the grund norm upon which other legal instruments derived their legitimacy. As part of the Nigerian government’s responsibilities under any treaty either regionally or internationally is domestication of such laws and policies. In this regards, Nigerian government has signed and ratified some African Charters on education such as the “African Charter on Human and People’s Rights” (Federal Republic of Nigeria, 2011) (herein refer to as African Charter) which was domesticated and integrated into the Laws of the Federation of Nigeria, 2004 (as amended). The signing, ratification and domestication of the “African Charter on the Rights and Welfare of the Child” and the “Convention on the Rights of the Child” by the Nigerian government also gave birth to the enactment of the “Child Rights Act” (Federal Republic of Nigeria, 2011)(CRA), 2003. As specific legal instruments on education, STEM education inclusive are the reform of the “National Policy on Education Act” (NERDC, 2013)(NPEA), 2013 and the enactments of the “Compulsory Free Universal Basic Education Act” (Federal Republic of Nigeria, 2011) (UBEA), 2011 (as amended) and the “Education(National Minimum Standards and EstablishmentInstitutions) Act”, 2011 (LFN, 2011). These legal instruments were geared toward the realisation and achieving the maximum goals on education in order to protect the right to education of all citizenry at all levels of education be it pre-primary, primary, secondary and post-secondary education.

It is imperative to begin with the provisions of the Constitution in its section 18 which saddled the Nigerian government with the responsibility of directing its Policy towards “ensuring equal and adequate opportunities at all levels of education (Section 18(1), Constitution of the Federal Republic of Nigeria, 1999). The section equally enjoins the government to provide for “free, compulsory and universal primary education” (Section 18(2)(a), Constitution of the Federal Republic of Nigeria, 1999) as well as “free university education” (Section 18(2)(b), Constitution of the Federal Republic of Nigeria, 1999) for all its citizens. The obligation for realisation of the “fundamental social, economic, political and environmental objectives for the common good of the citizens were placed on the Nigerian government within the general ambit of sections 13-20 of the Constitution. However, it is saddened when construing the above provision within Chapter II of the same Constitution despite the integration of all the above international and regional legal instruments into the Nigerian legal regime with the enactment and formulation of CRA, UBEA and NPEA respectively. It is pertinent to emphasise the categorization of right to education under section 18 thereof as secondary right as Chapter II of the Constitution is said to be unenforceable ordinarily in the Court of Law in Nigeria.

Right to education, STEM education inclusive has been made compulsory and as guaranteed right to every Nigerian citizen when construing sections 1(3)(d) of NPEA without hindrance neither from “gender, social status, religion, colour, ethnic background nor any peculiar individual challenge” In the same vein, section 1(8)(e) of NPEA has emphatically created an enabling “special provisions and incentives at all levels” of education with respect to science subjects in Nigeria. The section mandated the Nigerian government “to take all necessary measures in ensuring the realisation, availability, achievement and acquiring the skill and knowledge in science subjects which are integral parts of STEM education. Arguably, this legal foundation for STEM education under section 1(8)(e) of NPEA gets more complicated as the formulation of NPEA gets its legal flavor under Chapter II.
of the Constitution which has been argued above not to be ordinarily enforceable in the Nigerian Courts. For emphasis, Chapter II of the Constitution is regarded as “fundamental objectives and directive principles of State Policy” (DPSP) and it is my contention that the directives principles or objectives enshrined under the DPSP are not individual or group’s existence of legal rights as same is always subjected to jurisdiction of the court (Okere, 1983).

Section 15 of CRA like NPEA provides for “right to free, compulsory and universal primary education” and the Nigerian government is enjoined to provide right to education. Section 2 of UBEA also confirmed this position when the Nigerian government is saddled with the responsibility of ensuring that the Nigerian children access quality education. This CRA further provides for punishment on any erring parent or guardian who debar his/her child from attaining this “free and compulsory education” provided by the government (Azubike and Abdulraheem-Mustapha, 2018; Section 2(12) NPEA, 2013). However, these provisions are in theory and not in practice.

Aside the NPEA, CRA and UBEA is section 3(36) (b) (c) of the Education (National Minimum Standards and Establishment of Institutions) Act which has diversified the educational curriculum in the secondary school level. The diversification is made towards enhancing STEM education by making provision for trainings in the skills of “applied science, technology and commerce atsub-professional grade” levels. The diversification also accommodates differences in “talents, disposition, opportunities and future roles”. The diversification under this Act provides space for classification of subjects at secondary level into four fields. The first field is science and mathematics, follow by technology as second field. Humanities and business studies (Section 3(37) NPEA, 2013) were in the third and fourth categories respectively. It is important to note that STEM education falls within the first classification (science and mathematics).

Surprisingly, STEM education is meant for students that are science and technology oriented and this has negative consequences on 4IR as students outside the first field of study will not be able to key into the new revolution. It is therefore my contention that to achieve 4IR in Nigeria, the barrier of classification of subjects should be removed by making all subjects freely accessible in secondary school level so as to provide for free STEM education in Nigeria.

The position in this paper is in line with section 5(b) of the Education (National Minimum Standards and Establishment of Institutions) Act which provides thus: “One of the purposes of secondary education is to equip students to live effectively in the modern age of science and technology”. It is therefore submitted that, advocating for free STEM education will open more frontiers of knowledge and will create enabling space for more science and technology-oriented students that will key into 4IR.

However, the argument of this paper is on the classification of rights into two considering the context of the provisions of the Constitution, Chapter II in particular. The two classifications impliedly connote that the first is “Fundamental Human Rights” which are enshrined under Chapter IV and regarded as enforceable rights. Unfortunately, right to education is not inclusive. Instead, it is classified as socio-economic right under Chapter II which is not ordinarily enforceable.

Despite the fact that African Charter, CRA, UBEA NPEA were all enactments from National Assembly like the Constitution, it is pertinent to state that these enactments cannot override the provisions of the Constitution being the grundnorm that gives legitimacy to any other enactment. For instance, section 1(3) of the Constitution provides that “any law that is inconsistent with the Constitution shall be declared null and void to the extent of its inconsistency”. This subsection shows that the Constitution is supreme to any enactment be it from the National Assembly or State Houses of Assembly in Nigeria. It is therefore argued that there is conflict between the provisions of the laws and policy from the foregoing analysis. The conflict can be deduced from the contents of all the enactments. For emphasis, Article 17 of the African Charter provides for enforceability of right to education and the Charter has not classify any right as important than the other rights. Also, the Charter has not provided for any theoretical distinction on how these rights should be implemented (Purohit and Another v. The Gambia, 2003 AHRLR; Viljoen, 2007). The justification for the position in the Charter was dated back to 1948 and 1993 when all rights have been recognised as indivisible rights and interdependent rights under the United Nations Declaration on Human Rights and Vienna Declaration (Vienna Declaration and Programme of Action, 1993). More important justification is the decisions of the Supreme Court in the cases of Abacha v. Fawahimi (2000, FWLR pt. 4; Ogugu v. State (1994)9 NWLR pt. 336). In the former case, the Supreme Court held that “…the African Charter which is incorporated into our municipal law becomes binding and our courts must give effect to it like all other laws falling within the judicial powers of the courts”. And in the latter case, it was held by the same Supreme Court that: the provisions of the African Charter on human rights including right to education are
applicable and enforceable in the same manner as those provisions in Chapter IV of the Constitution that deal with fundamental human rights by the ordinary rules of court in Nigeria.

To compound the conflicting position of the enactments is decision of the Supreme Court in another case of Archbishop Anthony Olubunmi Okogie & Others v. Attorney-General of Lagos State (1981) 1 NCLR where it was held that: the directive principle of state policy as enshrined in Chapter II of the Constitution have to conform to and run subsidiary to the fundamental rights provisions in Chapter IV of the Constitution and that the said directive principles are subject to the legislative powers of the State.

From the above decision of the apex Court, it is my contention that the provisions under Chapter II of the Constitution can be argued to be interpreted as ‘cosmetic provisions’ to decorate the Constitution and an amendment of the Constitution is advocated in order to incorporate right to education under the enforceable rights enshrined in Chapter IV. This will enable the Nigerian citizens acquire skill and knowledge in the field of STEM education. In so doing, the 4IR will be realised and achieved. It is also advocated in this paper that courts in Nigeria should act forcefully in ensuring that right to education is adequately protected and the courts should not be subdued and static. They should move from over-adherence to the older system of adjudication in order to meet up with international best practices (Gubbay, 1997). This position conforms with the Supreme Court decision in the case of Damish v. Speaker House of Assembly of Benue State (1983 NCLR) when the court held that: the provisions under Chapter II of the Constitution are not ordinarily enforceable but they contained guidelines which the courts can rely on when confronted with the problem of interpretation of the Constitution.

Apart from the above contention, another interesting confirmation of this paper’s contention can be garnered from the provision of section 6(6)(c) of the Constitution. This subsection declaresthe Directive Principles and State Policy enshrined under Chapter II which is unenforceable not to be sacrosanct. This section 6(6)(c) is to the effect that, if the Constitution provides otherwise in another section or if any law in force makes any provision under Chapter II to be enforceable. Such section or provision will be interpreted in such manner as enforceable by the court. Further interesting provision of the 1999 Constitution is item 60(a) of the Exclusive Legislative List under the Second Schedule to the Constitution. In this provision, responsibility was placed on the Nigerian government at federal level when it states thus: Federal government is to establish and regulate authorities for the federation or any part thereof in the promotion and enforcement of the observance of the Fundamental Objectives and Directive Principles contain in the Constitution.

The cases of Attorney-General of Ondo State v. Attorney-General of the Federation & 35 Ors (2002) 9 NWLR pt. 722) and Federal Republic of Nigeria v. Alhaji Mika Anache & Others (2004) 14 WRN applauded the above position when the Supreme Court held that: the non-justiciability of section 6(6)(c) of the Constitution is neither total nor sacrosanct as the subsection provides a leeway by the use of the words ‘except as otherwise provided by this Constitution.

The above provisions change the equation of enforceability of Chapter II of the Constitution to some extent and by implication, the National Assembly is enjoined to promulgate separate or specific laws for the purpose of giving enforceability status to the provisions in Chapter II of the Constitution. It is pertinent to state that the National Assembly was in the right direction for bringing into bear the enactments of the African Charter and other laws and policy which guaranteed the right to education in Nigeria as these enactments are in line with the provisions of section 6(6)(c) and item 60(a) of the Constitution. By implication, it is argued that, these enactments have remedied the challenges of non-enforceability of provisions of Chapter II of the Constitution. Similarly, it is my submission that the judiciary has moved away from the old precedence and adopts new principles of law by relying on section 6(6)(c) when in 2017, a Federal High Court in Nigeria in the case of LEDAP v. Federal Ministry of Education and the Attorney-General of the Federation (Unreported, 2017) held thus: By the combined effect of section 18(3)(a) of the 1999 Constitution and section 2(1) of the Compulsory, Free Universal Basic Education Act, 2004, the right to free and compulsory primary education and free junior secondary education for all qualified Nigerian citizens are enforceable rights in Nigeria.

Instructively, there is endless meaning to the concept of ‘right’ as many judicial pronouncements have offered a timeless explanation. In the case of Ransome Kuti v. Attorney-General of the Federation (1985) 2 NWLR pt.6), Kayode Esho postulated the nature of “fundamental right” thus: fundamental right is the right which stands above the ordinary laws of the land and which is in fact antecedent to the political society itself. It is a primary condition to a civilised existence.

Also, right has been defined in the case of Afolayan v. Ogunrinde (1990) 1 NWLR pt. 127) as “an interest recognised and protected by the law”. Right was further defined by the Supreme Court in the case of Uwaifo v.
Bendel State (1982) 7 SC as “any advantage or benefit conferred upon a person by the rule of law”. However, without compromising the provisions of NPEA, UBEA, CRA and other legislation on the right to education as compulsory and enforceable; the supremacy of the Constitution hinders their effective implementations. It is therefore argued that right to education must expressly be provided under Chapter IV of the Constitution in order to be clear, explicit and unambiguous. It is therefore my contention that the Constitution should be amended in order to enhance the implementation of NPEA, CRA, UBEA, African Charter and other legislation enacted by the National Assembly. This position will remedy the challenges of non-justiciability of right to education in Nigeria.

Although, another challenge is non-domestication of CRA by some States in the Federation which further advanced this argument as some States are still using the old colonial legislation of the Children and Young Persons Act/Law of 1958. This practice hampers the uniformity in the implementation of CRA. It is important to state that issue relating to children in Nigeria, right to education in particular falls within the “Concurrent Legislative List” and as such, both the National and State Houses of Assembly must decide on the issues. Therefore, CRA which is an enactment of the National Assembly must be domesticated by all the thirty-six States of the federation. It has been reported that thirteen States out of the Thirty-three States of the federation are yet to domesticate CRA and they are still using the old CYPA (https://www.unicef.org/wcaro/WCARO_Nigeria_Factsheets_CRA_pdf).

5. Findings/Results

Teaching and learning of STEM education remain unchanged due to insufficient and ineffective legal instruments in Nigeria. Particularly, the Nigerian Constitution which impliedly categorized right to education as secondary right against the fundamental human rights enshrined under Chapter IV of the same Constitution which are guaranteed (Chapter II, Constitution of the Federal Republic of Nigeria, 1999). Classifying right to education as socio-economic right which is not ordinarily enforceable under the Constitution has been interrogated in this paper. More importantly when Nigerian government has signed, ratified and domesticated many international and regional legal instruments which have not classified any right as important against any of the rights. The findings show lack of implementation of the Convention and Charter signed and domesticated by the Nigerian government. This paper has not lost sight on some cases reviewed that were decided under these international and regional legal instruments, but these cases get more confusing and complicated when considering the supremacy of the 1999 Constitution.

The findings of this paper on the inadequate constitutional legal framework is likely to be an obstacle for realising full knowledge and skill in STEM education which will hinder the achievement of 4IR in Nigeria. Contradictions in the legal instruments revealed in this paper vis-a-vis the Constitution, African Charter; UBEA; NPEA and CRA on the right to education, STEM education inclusive will adversely contribute to attainment of 4IR in Nigeria. The findings also revealed some challenges within the domestic legal instruments especially lack of implementation of CRA and its non-domestication by some States in the federation. These challenges will also hinder the attainment of 4IR in Nigeria. The findings in this paper further revealed the strengthening of the education industry by the Nigerian government with the formulation of policies. However, the legal implication of categorising policies under Chapter II of the Constitution get more complicated considering the supremacy of the Constitution as provided under section 1(3) thereof (Constitution of the Federal Republic of Nigeria, 1999). From these findings, it is my contention that free and compulsory education to the extent of advocacy for free STEM education for meeting up with 4IR in Nigeria calls for the amendment of the Constitution to expressly integrate right to education within the provisions of Chapter IV in order to be guaranteed and having the direct enforceability in the Nigerian courts (Okere, 1983).

It was further revealed in this paper that, the responsibility of the Federal government under item 60(a) of the Exclusive Legislative List in the Second Schedule to the 1999 Constitution has changed the equation of making the provisions in Chapter II, to right to education inclusive to be justiciable when any further legislation is specifically enacted by the legislature to fill in the gap. To enhance the result in this respect is the analysis of section 6(6)(c) of the 1999 Constitution which also gives leeway for making the provisions in Chapter II of the Constitution justiciable when it makes the provision not sancrosant.

The findings also revealed some challenges that hinder the achievement of STEM education in Nigeria and calls for urgent reformation in the education industry. For instance, this paper finds out that teaching and learning of STEM education in Nigeria is still under the conventional educational system approach. It is too teacher-centred where teachers dominate in explanation of concepts thereby making students passive. Corruption, poverty, loss of interest in STEM education by the students, lack of qualified teachers in STEM education, lack of
counsellors on STEM education, gender disparity and inadequate budgetary allocation were also identified in this paper as serious challenges that hinder achievement of right to education, STEM education inclusive.

Curriculum design was also identified as one of the impediments for having free STEM education in Nigeria. In overall, the findings in this paper revealed that STEM education came into existence after the second war world and the findings show the relationship between STEM education and 4IR. The paper advocates for free STEM education which will enhance the realisation of 4IR as it is identified as one of the new approaches that can be used in achieving the goals of 4IR. The findings also show the importance of four schemes identified by Xing that can enhance the quality of educational services which if adopted in Nigeria will go a long way to make 4IR achievable. The findings finally show that STEM education can contribute to realisation of ‘Vision 2020’ strategy designed by Nigerian government especially in the manufacturing sector.

6. Conclusion and Recommendations

Nigeria has not prepared its citizenry for the 4IR as the legal instruments on education (STEM education inclusive) has been revealed from the findings in this paper to be inadequate and effective. Education is seen as the only mechanism that can be used to attain 4IR in Nigeria.

However, the inadequacy and ineffective legal instruments on education, STEM education inclusive have been seen as challenges. The learning and acquisition of knowledge in Nigeria are based on old theoretical models which cannot solve the real-life problems. This paper therefore calls for reformation of the legal instruments on education industry in Nigeria. To have an excellent educational industry in Nigeria, it is instructive to encourage free STEM education that will advance 4IR. This will enhance productivity and cohesive interaction in all fields. It will further enhance the attainment of comprehensive optimisation and reduce expenses in investments.More importantly, it will create more employment opportunities and high level of flexibilities because there will be industrial solution to any challenge that may be encountered in future.

In order to close the preparedness gap between the conventional education system and the demand for new modern life with new labour market as the world enters the 4IR, individual learner in Nigeria must understand the imperativeness and ready to face the reality and comprehensive change that 4IR is embodied. This paper recommends body of research on early childhood as an intervention that can bolster investment on quality education.

In addition, clamouring for amendment of the legal instruments must also take into cognisance, the schemes identified by Xing in order to achieve 4IR in Nigeria. Law and policy must be formulated to legalise some services in order to impact knowledge and skill that have purchase in the modern workplace for future-ready education system in Nigeria. Further, curriculum must be designed to legally accommodate these four schemes identified by Xing. Instructively, this paper recommends interconnecting between the new inventions embodied in 4IR such as “robots and smart sensory human-machine interfaces” with humans in order to achieve the maximum results or output (Spacey, 1998) cited in (Adetayo, 2016). This interconnectivity together with collaborations among disciplines, intellectual capability and modern approaches with effective communication skill will enhance development and at the long run foster the achievement of 4IR in Nigeria. The achievement of 4IR cannot be divulged from human interconnectivity as combination of the two are relevant keys to creation of employment. It is therefore not gainsaying that any person relying on just one skill set or narrows his/her expertise will not likely sustain himself/herself a long-time career in economies of the future giving the rapid evolution of the job market which 4IR is driving at.

Similarly, this paper recommends for enactment of law and formulation of policy that will enhance research and development to be adaptable to the new digital economy. Further, Nigerian government must release more funds and grants on research as these will allow programmes and trainings of scholars in STEM education and acquisition of other necessary skills while creating an enabling environment in which 4IR can thrive (Vincent, 2001). This paper advocates for interdisciplinary and multistakeholders’ approach to education system in Nigeria. For example, the government may create inter-ministerial coordination on education issues by strengthening governance, management and financing of education. This at the long run will cumulate to a comprehensive national skills strategy which will ensure continuity of direction and stability.

Further, it is recommended that the Nigerian government should invest more on STEM education through law and policy which should be embraced by all the thirty-six States in the federation in order to meet the overall objectives that the 4IR brings forth. Instructively, investing more on STEM education especially making it free for all secondary school level will at the long run improve overall quality of life. This paper therefore calls on the
parents, teachers and students as stakeholders to proactively transform education system by making education policies and curriculum more relevant and responsive. It recommends research collaboration across STEM fields for integrated curriculum which will enhance connectivity and information sharing among the stakeholders. Also, more investment in STEM education is needed for transformative shift in Nigeria for the purpose of achieving 4IR.

It is recommended that Chapter II of the 1999 Constitution should be reconsidered by integrating right to education as “Fundamental Human Rights” that can be ordinarily enforceable in the Nigerian courts. The paper advocates for free STEM education by designing another curriculum and amending the “Education (National Minimum Standards and Establishment Institutions) Act” to remove the barrier of classification of subjects in order to make STEM education free. Until this is done, advocating for legislation that will provide free STEM education for the purpose of aligning with 4IR will remain an illusion. This paper finally advocates for female participation in science subjects both in primary, post primary and tertiary institutions in order to eliminate gender disparity in STEM education in Nigeria.

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