Information Technology as a vehicle to Millennium Development Goals

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Abstract- **Eradicating extreme poverty continues to be one of the major challenges of developing countries like Nigeria, and is a major concern of the international community.**
Ending this menace will require the combined efforts of everybody. This is why information technology will remain a vehicle to Millennium Development Goals in this dispensation. This paper sets out as an evaluation of existing developments, and researches done comparing it to the expected goals set by European Union. To achieve this, the writers discourse the different roles information communication technology (ICTs) can play in reducing poverty, providing education and quality healthcare services for all, promoting gender equality and coping with environmental change and extreme climate events. The writers proffer solutions to all area of weaknesses which would help to facilitate the achievement of the stated goals come 2015.

KEYWORDS: Millennium Development Goals (MDGs), Information Communication Technology (ICT)

I.   INTRODUCTION

If the world is serious about achieving the Millennium Development Goal of having the number of people living in extreme poverty by the year 2015 which is a mile away, ICT must figure prominently in the effort. Everyone, governments, civil society, and private sectors have a vital stake in fostering digital opportunity and putting ICT at the service of development.

Essentially, ICTs are enabling technologies both hardware and software necessary for the delivery of voice/audio, data in both high-speed/low-speed, video, fax and Internet services from point to point using wired and wireless media and associated equipments that are connected via Internet Protocol (IP) and non-IP networks, where the option exists that any or all of the communicating points may be fixed or mobile during the communication process [1].

Sustainable development as defined by [20] is a global crusade movement. While the research made by [6] said

similar, that sustainable development is a process rather than an end goal. He further noted that this process requires constant evaluation and analysis of the emerging trends in the discussion so as to take the issue of sustainable development to the next level. Sustainable development simply put is developing for the present and future, that is, the process of ensuring that the present development is sustained and maintained for the future. It focuses on the need to improve the lives of citizens for the future, building the nation for the future. To achieve and sustain such sustainable development, revolutionary efficient, reliable and potential tools must be employed. These tools are the Information and Communication Technologies (ICTs) such as the Internet, mobile phones, Close Circuit Television (CCTV), e-mail, microcomputers among others.

ICTs are new technologies that cannot be ignored in Africa especially for development. This is because ICTs are one of the main driving forces stimulating development and changes in the digital age. It was in the light of this that [12] noted that "great transformations in the lives of the people are in part a function of advances in Information and Communication Technologies (ICTs)." [28] added that "the magical changes are quite glaring in every facet of our lives and touches simplest of domestic services to corporate and limitless industrial applications". ICTs like the Internet according to [19] creates and meet demands which satisfies human and corporate needs. In fact, ICTs are what Africans need to climb to the heights developed continent has reached.

A research according to [23] reports that MDG was formulated at the beginning of the century in September, 2000 when a total of 192 members of the United Nations signed the Millennium Declaration at the Millennium summit. The MDGs is to be achieved between 2000 and 2015. It identifies eight (8) developmental goals as follows:

1. Eradicate extreme poverty & hunger (50% of 1995 by 2015)
2. Achieve universal primary education (all complete Primary Education.)
3. Promote gender equality & empower women (up to secondary education Level by 2005 and all levels by 2015)
4. Reduce child mortality (by 2/3rd among children up to 5 years age)
5. Improve maternal health (reduce by 3/4th the mortality rate)
6. Combat HIV/AIDS, malaria & other diseases (Halt and reverse)
7. Ensure environmental sustainability (integrate in policy)
8. Develop a global partnership for development in cooperation with private sector, make available the benefits of new technologies, particularly ICTs Role of New Technologies.
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II.   LITERATURE REVIEW

There are existing writings on MDGs but none specifically on the said topic. Therefore, here are few writers that made positive impact in the past [2] opined that ICT had changed the world in its entire activities. The problem discovered in this paper is simply not being specific on the challenges facing ICT to attaining MDG. Research according to [4] outlined the problems faced in India and preferred a working solution to alleviating the pains and suffering of the masses even after its 60 years of independence. The paper outlined means and measurers to increase income.

Meanwhile, [7] acknowledged that ICT can reduce poverty by improving poor people's access to education, health, government and financial services. Also, it can help farmers and artisans by connecting them to markets. It also outlined a simple model to explain why a digital divide may exist between the rich and poor. They therefore concludes that low-cost access to information infrastructure is a necessary prerequisite for the successful use of ICT by the poor, but not sufficient.

In the same manner, [8] reports that ICT has a positive net effort on reducing poverty and hunger, enhancing education and gender equality, and improving health and environmental sustainability which are the actions and targets identified as developmental challenges in MDGs.
The papers show a distinctive difference between understanding of ICT amongst the rich and the poor in Nigeria and suggest possible solutions and recommendations.

A.   Objectives of the study

This study aims at achieving the following objectives:

(1) to illustrate that Information Technology is a vehicle to MDG's in Africa with emphasis on Nigeria
(2) to ascertain the level of Nigerians awareness to Information Communication Technology
(3) to establish the various factors militating against the effective utilization of ICTs for sustainable development in Nigeria
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B.   Materials

Since the central aim of this study is to prove from past achievements though, with available technologies that ICT is a vehicle to MDGs. The researcher used the secondary data collected in tables 1 and 2 to validate these views. The first data on table 1 is showing the level of Nigerian awareness compared to other 9 sub-saharan Africa countries.

The second table is a survey design to collect data from 300 respondents; the sample consisted of 200 academic staff and 100 postgraduate students purposively selected from Delta State University and University of Lagos all in Nigeria. The respondents were selected on the basis of their expertise and position in society and their presumed knowledge and usage of ICT in Nigeria. The research questions are listed below. Source: 10].

C.   Research Questions

1. Internet penetration in Nigeria among sub-saharan African countries
2. What are the various factors militating against the effective utilization of ICTs in Nigeria?

Table 1: Internet Penetration: Top 10 in Sahara Africa (2009)
Source: [10]

Country	Number of Users	Internet Penetration
Mauritius	340 000	26.7%
Nigeria	23.9 Million	16.1%
Zimbabwe	1.5 Million	13 %
Zambia	1.3 Million	11.9%
South Africa	5.3 Million	10.8%
Botswana	100 000	5.1%
Namibia	101 000	4.8%
Angola	498 000	4.0%
Swaziland	42 000	3.7%
Lesotho	70 000	3.3%

Table 2. **F**actors militating against the effective utilization of ICTs in
Nigeria
Source: [10]

Category of response	Total no of respondents	No of response	Percentage of response
Poor network	298	5	1.67
Poverty	298	10	3.35
illiteracy	298	9	3.00
High cost	298	2	0.60
Lack of technical know-how	298	2	0.60
poor power supply	298	32	10.70
All of the above	298	273	91.60
None of the above	298	-	-

D.   Results

Computer was first used in Nigeria in 1963 for analysis of the 1962/63 national census data [10]. Forty seven years later, penetration still remains relatively low at about 10 million nodes or 7 per 100 inhabitants. While Internet use has risen from 200,000 in 2000 to about 24 million users in 2010, the growth of 16.1% despite the geometric increase in population. Table 1 shows that Nigeria came second in the top 10 countries in Sub-Saharan Africa on Internet penetration; beaten by Mauritius with 1.3 million people, and not far ahead of Zimbabwe with 11.5 million people; this is still extremely poor considering the population of Nigeria compared to other African Countries.

Also, in table 2 it was proven that all respondents believed that there exist some problems militating against the effective utilization of ICTs in Nigeria. Out of the 298 respondents, 273 respondents (91.6%) chose "all of the above" as their option, which implies that the problems militating against the effective use of ICTs are poor network, poverty, illiteracy, poor power supply among others. From the remaining respondents, 32 of them (10.7%) chose poor power supply, 10 respondents (3.35%) saw poverty as factor, 9 of them (3.00%) gave illiteracy as a problem, 5 respondents (1.67%) saw poverty as a challenge while 2 respondents (0.6%) each chose high cost and lack of technical knowhow as the factors militating against the effective utilization of ICTs for sustainable development in Nigeria.

Other problems given by the respondents are corruption, bureaucracy, nepotism, settlement factor, politics, lack of access to rural people, ownership factors, commercialization policies, over centralization amongst others.

E.   Discussions

From the above results, it is believed that ICT is not new to the Nigerian citizens and full implementation of ICT will eradicate the above challenges posed by respondents on table 2.

The eight listed MDGs are to ensure that all the United Nation (UN) member states are able to attain sustainable development to the point that they will be referred to as being developed in all ramifications. It is against this notion that most government, especially in developing countries like Nigeria has come out with different development agenda to enhance the quality of life for her citizens.

To achieving this, [5] reports that every leader comes up with goals that go in line with the MDGs goals though on most cases they don't have the methodology of achieving these goals a typical example is the case of Late President Musa Yar'Adua, as part of his development agenda for Nigeria, declared a 7-points agenda for Nigeria upon assumption of office on May 29, 2007. Late Yar'Adua's 7- points development agenda for Nigeria as follows:

1) Critical Infrastructure
2) The Niger Delta
3) Food Security
4) Human Capital Development
5) Land Tenure Changes and Home Ownership
6) National Security and Intelligence
7) Wealth Creation

It is worthy to note that most of late Yar'Adua's predecessors like Gowon (1970-76), Obasajo (1978-1979), Shagari (1979-1983), Buhari (1983-1985), Babagida (1985-1993), Abacha (1993-1998), Obasanjo again (1999-2007) also had their own development agenda. Research according to [5] recalled their development agenda as follows; Gowon was Accelerated and Rural Development (ARD), Obasanjo as a military head of state sought for feeding the nation through production of sufficient food called Operation feed the Nation (OFN); Shagari fought for revolution of the rural communities, Buhari was War Against Indiscipline (WAI), Babangida formulated a Directorate for Food Road and Rural Infrastructure (DFRRI), Abacha dreamt of family support programme (FSP) and Obasanjo in his first and second term as a civilian president focused on National Economic Empowerment and Development Strategies (NEEDS) [5].

Most of these developmental agendas of past Nigerian leaders may not have achieved the desired result in Nigeria not because they were not well planned and

implemented but could be because they did not take into considerations the general world view of development agenda which is the bedrock of the MDGs. This is why the MDGs should be incorporated into the current development agenda of Nigeria by President Goodluck Jonathan. This is very necessary if Nigeria ever wants to achieve sustainable development. Take a look at the health report stated by [7] and [15] but reported by [29].

The report stated that the prevalent HIV/AIDS rate in Nigeria among those between the ages of 15-49 has been rising steadily from 3-4% in 1993 to 4-5% in 1995, to 5.4% in 1999 source: reports of the National HIV/AIDS and Reproductive Health Survey [1]. Furthermore, it has also shown that the adult prevalence rate has increased from 1.8 % in 1999 to 4.5 % in 1996 to 5.8 % in 2001. It shows that with technological advancement, health is also improving.

According to a report by [30], the Nigeria MDGs 2005 is the second series of annual reports on the MDGs in Nigeria. The report which addressed the eight MDGs highlights the current status and trends of each of the MDGs, the challenges and opportunities in attaining the goals, the promising initiatives that are creating a supportive environment and priorities for development assistance.

The report concludes that there is high potential to attain some of the Millennium Development Targets namely,

- Achieving universal primary education
- Ensuring environmental stability
- Developing a global partnership for development [30]

Given the current policy environment and strong political will, there is also the likelihood of eradicating extreme poverty and hunger. However, based on available information, there is the need for sustained efforts to ensure that the country meets the following goals by year 2015:

- Achieving gender equality and women empowerment
- Reducing child mortality
- Improving maternal health; and
- Combating HIV/AIDs, malaria and other diseases

The conclusion of the MDG 2005 as provided by [30] is very remarkable and gives hope that there is possibility for achieving all the MDGs in Nigeria with sustained effort. This conclusion is quite different from the conclusion reached by the first report in 2004. It is

intriguing that without providing the basis and reason for the dramatic change, the 2005 states that there is high potential to achieve 3 of the goals (Goals 2,7 and 8) likelihood to achieve one with strong political will (Goal 1) and the need for sustained efforts to ensure that the country meets the remaining four goals (Goals 3,4,5, and 6).

III. INFORMATION COMMUNICATION TECHNOLOGY AND MDGS

According to [18], the Millennium Village concept was berthed in Nigeria in 2006. Two clusters have been established so far, one in the southern and northern parts of the country. These are the Ibaram/Ikaram Millennium Village Cluster in Ondo State and the Pampaida Millennium Village Cluster in Kaduna State. Both clusters were officially launched in mid 2006 and have recorded some progress.

These villages have introduced a broad range of interventions that simultaneously addresses the specific needs of each cluster. The interventions are designed to transform the communities by enhancing their productivity, health, education and access to markets. The objectives are listed below:

A.   Goal 1: Eradicate Extreme Poverty and Hunger
2015 target halve proportion of the people living on less than N150 a day, and those suffering from hunger

Opportunity:

i.   Expanding economic opportunity for poor people by stimulating overall growth and by building   up their assets e.g., land and education
ii.   Increasing the returns on these assets through a combination of market and non-market actions

Targeted Action:

i.   Encourage effective private and public investment. (Investment and technological innovation are the main drivers of growth in jobs and labor incomes)
ii.   Reducing risk for private investors (through stable fiscal and monetary policy, stable investment regimes, sound financial systems, and clear and transparent business environment)
iii. Also ensuring the rule of law and taking measures to fight corruption (Tackling business environments based on kickbacks, subsidies for large investors, special deals, and favored monopolies) [30]

iv.   Expanding infrastructure and communications
v.   Upgrading the skills of the labour force
vi.   Building the assets of poor people and creating human, physical, natural, and financial assets that poor people own or can use
vii. Increase the focus of public spending on the poor people this expands the supply of basic social economic services and relaxes constraints on the demand side for example, scholarship for poor children. [30]

B.   Goal 2: Achieve Universal Primary Education

Target 3: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling [30]

ICT may also be applied towards building an equitable knowledge based society by facilitating better access to education for people in remote locations or from underprivileged sections of the society in an economical manner for example, to allow a country to take advantage of new technology, it must have an educated workforce who are ready to use the computers within classrooms which can help children learn more and even start local and global jobs of their own.

ICTs increase supply of trained teachers through ICT-enhanced distance training as has been experienced in many countries and also under the ITU/UNESCO In-service Teachers' Training projects based on ICT application (fiber-optic/VSAT and TV/PC). Distance learning helps in conducting educational and literacy programmes in rural and remote areas, particularly as good teachers are scarce in such areas.

Figure 1, which is a research by [31] illustrates the optimal levels of education under two different scenarios; traditional 'brick-and-mortar' education versus online education or e-learning. In the case of traditional education, the social cost curve (SC) shows a slow rate of growth for early years of schooling (basic education) and then a much more rapid growth for higher levels of education (indicating higher marginal social costs for post-primary education). This is because of the expensive capital and recurrent costs of higher education and the fact that much post-secondary education in developing countries is heavily subsidized which Nigerians need to learn from.

The social cost curve (SC') for e-learning, on the other hand, is much flatter on the assumption that the marginal cost of education using the various ICTs will fall rapidly. An online course may be quite expensive to develop initially, but, as it is potentially deliverable to millions of students at very little extra cost, unit cost has the potential to fall over a large output range (the quantity of hours spent in education).

The assumption of a higher initial cost for IT infrastructure for e-learning (compared to that for traditional education) is illustrated by the SC' curve starting higher up the vertical axis as showed in figure 1.

The social return curve (SR) for the traditional educational model rises sharply at first, reflecting the improved levels of productivity that result from basic education, and then begins to fall off with additional years of schooling. By contrast, the social return curve for e-learning (SR') shows an upward trend, illustrating the benefits associated with this paradigm shift in education. With continuous lifelong learning, it is theoretically possible for this curve to maintain a positive slope. The SR' curve also starts at a higher initial level on the vertical axis and remains always above the SR curve, reflecting the assumption that the employment of ICTs is likely to produce higher rates of productivity.
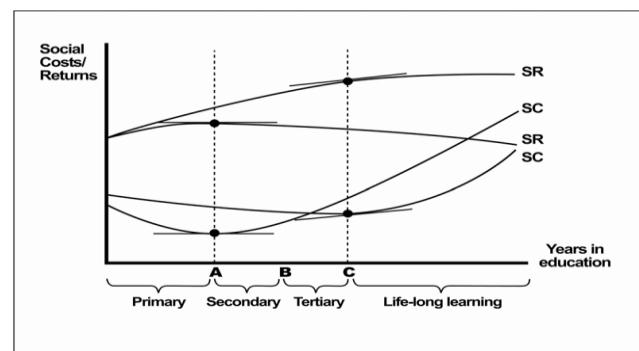

Figure. 1. Showing the SR and SC level of e-learning versus traditional learning Source:[31]

C.   Goal 3: Promote Gender Equality and Empower Women.

2005/2015 target Eliminate gender disparities in primary and secondary education by 2005, and achieve equity at all levels by 2015 [31]

Gender Equity is the process of being fair to men and women. [15] To ensure fairness, measures must often be put in place to compensate for the historical and social disadvantages that prevent women and men from operating on a level playing field. Equity is a means. Equality and equitable outcomes are the results.[28]

Women play a vital role in our society. There is a relationship between the empowerment of women and reduction of poverty and until there is a creation of wealth, reduction of poverty cannot take place [12]. IT can help women in creating wealth through the use of

some social network sites like Facebook, Myspace, Blogs [18]. These sites allow each user to own a page which gives detailed information about the person. This also serves as a means of knowledge sharing, advertising/marketing and social networking, i.e. bringing together one or more persons or organizations. Women should also create blogs, websites for academic and social services such as marketing of catering services, fashion and designs among others.

ICT can play a role in bridging gender disparities by directly benefiting the women who use technology as well as by improving the delivery of services to women [19].

This is also reflected in the relatively higher proportion of women employees in the Indian IT- sector - as compared to other sectors of the economy. The influence on gender equality is not restricted to the urban cities alone. There are also examples where ICTs are being used to strengthen earning opportunities for women and to build productive skills among disadvantaged women as well as offer knowledge-based services that help improve the productivity of women's enterprises in smaller towns and cities.

ICTs deliver educational and literacy programmes specifically targeted to poor girls and women. Studies show that females outnumber males in E-learning programmes [26]. ICTs empower women by facilitating them to tele-work. In Call Centres, the agents and supervisory staff are predominantly feminine. ICTs have opened up new area for employment of women thus empowering them economically [26].

Further Recommendations
i. Getting more girls into school, for example, by offering cash or food for schooling, as in Northern Nigeria
ii. Hiring more female teachers, as in Pakistan.
iii. Support for micro credit schemes for poor women
iv. Asset inequalities across gender, ethnic, racial, and social divide (Removing social barriers that result from distinctions of gender, ethnicity, race, religion and social status)
v. Strengthening the participation of women in political processes and local decision making
D.   Goal 4: Reduce Child Mortality
TARGETS BY 2015:
To reduce child mortality by 2/3 from 93 children of every 1,000 dying before age 5 in 1990 to 31 of every 1,000 in 2015 [31].
Child survival lies at the heart of everything unicef does. About 29,000 children under the age of 5– 21 each minute die every day, mainly from preventable causes. [29]

More than 70% of almost 11 million child death every year are attributable to six causes: diarrhoea, malaria, neonatal infection, pneumonia, preterm delivery, or lack of oxygen at birth [29].
A mother's health is also critical to newborns, particularly in light of new research that suggests a sound neonatal environment is an important predictor of future health.
Improving Family Care Practices.
About 80% of health care in developing countries occurs in the home and the majority of children who die do so at home, without being seen by a health worker [29]. Meanwhile, proper infant feeding and breast feeding are still not practiced by many families. As many as 40 % of child deaths could be prevented with improved family and community care not high tech health equipment, but access to solid knowledge, support and basic supplies. The above could be controlled by having mobile phone numbers of Doctors and Nurses who will be glad to be of assistance in case of emergencies.

Basic treatments expected for mothers should also be taught during antenatal care such treatments includes; treatment for diarrhoea, including the use of oral re-hydration salts, and for acute respiratory infections such as pneumonia [26].

F.   GOAL 5: IMPROVE MATERNAL HEALTH

2015 target Reduce by three quarters the proportion of women dying during childbirth
Major causes include;
- Lack of antenatal care
- Low proportion of women attended to by skilled birth attendants
- Delays in the treatment of complications of pregnancy
- Poverty
- Harmful traditional practices
- Low status of women [15]

Recommendations
1. Use of telemedicine for making available medical expertise in remote locations.
2. Helping doctors to upgrade their knowledge and skills through better availability of medical research and information.
3. Maintenance of health records and patient histories in order to avoid repetitive tests and expensive visits by patients.
4. E-procurement of drugs and medicines to cut down on waste and unnecessary expense to patients.
5. Improvement of antenatal and delivery services in hospitals, especially emergency obstetrics care
6. **Government should address the problem of women dying from poorly performed abortions**

National Institute of Maternal and Child Health
 i. Will provide an avenue through which government will providing funding for MCH
 ii. Will reduce donor dependency on MCH programming
 iii. Will provide an avenue for research and data collation on matters related to MCH
 iv. Will develop guidelines, policies and strategies for reducing maternal and child mortality in Nigeria
 v. Will provide a forum for capacity building and resource mobilisation for MCH [29]

G. GOAL 6: COMBAT HIV/AIDS, MALARIA AND OTHER DISEASES

Targets By 2015:
Halt and begin to reverse the spread of HIV/AIDS.
Halt and begin to reverse the incidence of malaria and other major diseases [8]. Millions of children are dying needlessly. Malaria kills a child somewhere in the world every 30 seconds [8]. Disease is a cruelly potent child killer, especially when combined with the poverty in which much of the developing world lives. In the absence of good nutrition, sanitation and health care, HIV/AIDS, malaria, measles, polio and tuberculosis mean certain end to millions of children who would survive and flourish elsewhere [8].

Focusing on HIV/AIDS and Children:
UNICEF directs its efforts in several key areas to combat this pandemic, the first being prevention. More than 2 million children under 15 are infected with HIV, and 15 to 24-year-olds accounted for half of all new HIV infections in 2003 [8]. For example, UNICEF helps organize information campaigns on HIV/AIDS prevention and treatment, and helps increase young people's access to youth-friendly, gender-sensitive health services that provide voluntary testing and counselling, especially in countries affected by emergencies.

Working with partners to roll back malaria:
Malaria afflicts primarily the poor, who tend to live in malaria prone areas in dwellings that offer few, if any, barriers against mosquitoes [6]. Household use of insecticide treated nets (ITN) is currently low, averaging only 1 per cent, as the nets are still too expensive or unavailable in some areas [13].

UNICEF, along with the United Nations Development Programme and the World Bank, joined with the WHO in 1998 to found the global partnership Roll Back Malaria, with the goal of halving the burden of malaria by 2010. Foremost among these is mass-purchasing ITNs, the most effective prevention against malaria, and developing local distribution systems for them. If every African child under five years slept under an ITN, costing only $4, nearly 500,000 child deaths could be prevented every year [8].

H. MDG 7: ENSURE ENVIRONMENTAL STABILITY

Remote sensing technologies and communication networks permit more effective monitoring, resource management, and mitigation of environmental risks. Telework reduces the need to travel, saves energy and reduces pollution. E-Waste is becoming a measure issue. There is a school of thought according to which the manufacturers of electronic equipment should be held responsible for recycling and waste disposal in eco-friendly manner [21].

I. GOAL 8: DEVELOP A GLOBAL PARTNERSHIP FOR DEVELOPMENT

The Targets are to develop further an open, rule-based, predictable, non-discriminatory trading and financial system that includes a commitment to good governance, development and poverty reduction both nationally and internationally.

IV. CONCLUSIONS

Recognizing the dominant role played by ICTs in globalization and in attaining the MDGs as discussed above, the governments of Nigeria countries may seriously consider, among other actions, to create an enabling environment by putting in place suitable policy, regulatory and legal framework and fiscal incentives to encourage investment in ICT industry, network infrastructure keeping in mind the emerging new generation network and services, improve access to network for broadband services in rural areas by establishing Tele-centres and Community Service centres.

Nigeria as a countries may recognize the contribution of ICTs for sustainable socio-economic development and in achieving MDGs and accelerate the sector reform process for attaining rapid growth through private sector participation with regulator providing a level playing field, creating an investor friendly climate, safeguarding consumer interest, to usher in open market competition leading to better quality of service to end-users at lower cost.

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