

# **The Role of Nigerian Universities in Bridging the Digital Divide in the Design of Sustainable Buildings**



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by

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**“WE live in a period of very rapid change. That also means that the opportunities for improving, for getting results, are changing very fast. Things that were not possible or were not needed yesterday suddenly become possible, and things that made a great deal of sense yesterday do not make sense.” Peter Drucker**

## **1.0 Introduction**

Information and communication technology has increasingly become a foundation of modern societies and economies. Simply put, the "digital divide" is the division between those who have access to information and communication technology (ICT) and are using it effectively, and those who do not (Cyber Outreach, 2002). There is therefore the tendency that people without access to ICT are denied the option to participate in new ICT-based jobs, e-government, ICT-improved healthcare, and ICT-enhanced education, and other activities that are connected with the technology. The digital divide is consequently a lost opportunity to improve the lives of those people that fail, for one reason or another, to have access to ICT.

According to Kofi Annan, the former United Nations Secretary-General, “The Internet holds the greatest promise humanity has known for long-distance learning and universal access to quality education. It offers the best chance yet for developing countries to take their rightful place in the global economy. And so our mission must be to ensure access as widely as possible, if we do not, the gulf between the haves and the have-nots will be the gulf between the technology-rich and the technology-poor” (Science, 19 February, 1999, page 1079). This statement underscores the importance of ICT, and the need to bridge the digital divide.

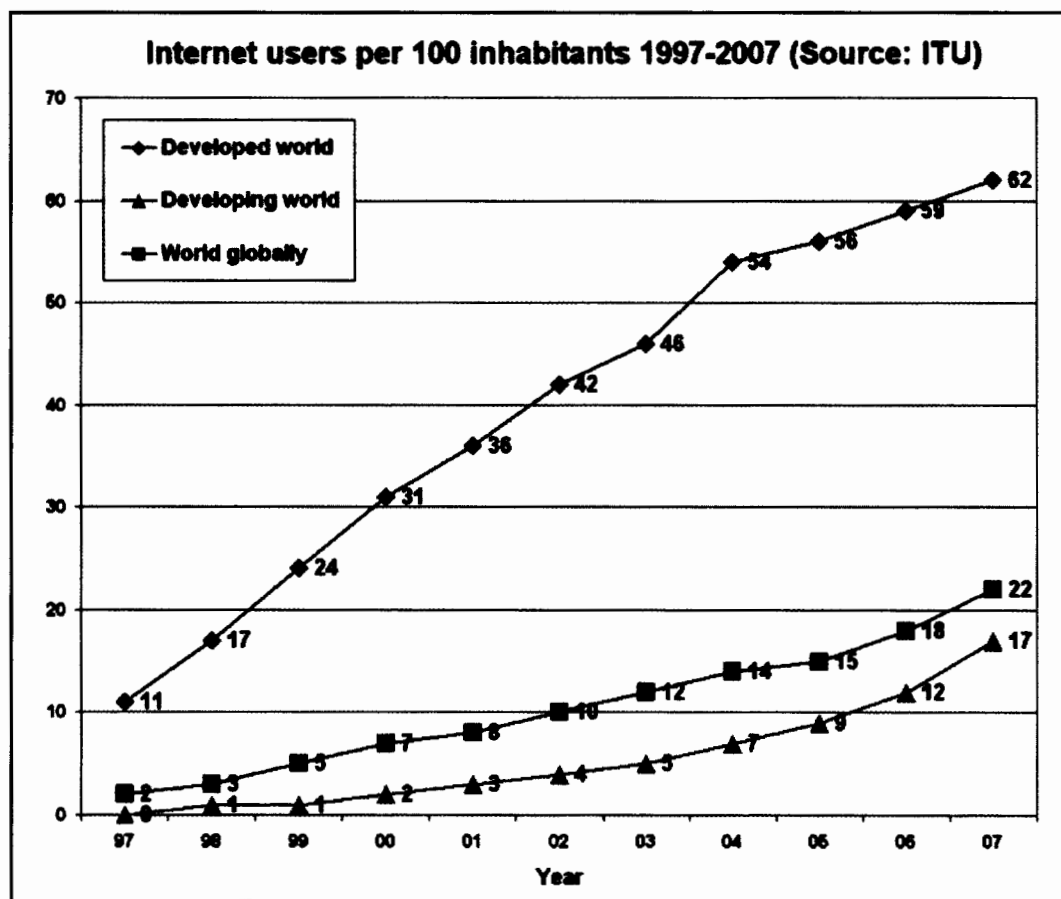
There is no gainsaying that ICT is a natural tool for collaboration and aggregation, which can be effectively leveraged if the collaborators speak the same language or at least understand each other. (Peiser, 2000); and Singh (2004), emphasized that the information revolution is a double-edged sword: as great opportunities to developing countries that have access to it; and those without access to it falling behind and becoming marginalized to the point of being left out.

A number of factors contribute to the digital divide, these are: imbalance of diffusion of ICTs infrastructure, high online charges, insufficiently trained staff, imperfect network legation,

and information resource shortage in the local languages. Others are: insufficient infrastructure which is a huge problem for achieving connectivity in rural areas; lack of incentive for telecommunication providers to invest in broadening their networks mainly due to lack of purchasing power and low population densities in the rural area; while internet service providers shy away from investing in locations that show little promise of profits (Karsten, 2003).

The term "Bridging the Digital Divide" has therefore become a common modern-day terminology. It sets the tune for asking how people of different cultures, languages, educational background collaborate using the medium provided by the ICT to solve common problems. It has many different definitions and at conferences, seminars and workshops, different bodies meet to discuss ways of partnering to resolve the challenges posed by digital divide.

Within the global setting, there is great disparity in digital divides between developed and developing countries. Fig. 1 succinctly depicts the situation.



Source: ITU (<http://www.itu.int/ITU-D/ict/statistics/ict/graphs/internet.jpg>)

From the foregoing, digital divide is a global challenge which has become more pronounced across racial, ethnic, economic, and geographic lines over the past decade as technology continues to advance.

However, it is equally necessary to examine the challenges of digital divide in terms of education support for the design of sustainable buildings in Nigeria. In this regard, there is a need to ascertain the present situation in Nigeria and determine the role that the Nigerian Universities can play in bridging the digital divide for the design of sustainable buildings. In doing so, it is important to understand the relationship between sustainability and sustainable designs and their clear connections with information and communication technology.

## **2.0 Information and Communication Technology in Nigeria**

Nigeria, with a population of 140 million people, 36 States and 774 Local Government Council Areas, has internet provision that is limited to major cities at rates that are exorbitant thereby making many of the rural and suburban areas unable to fully participate in the emerging information economy. There is wide gap between Nigeria and developed countries and several initiatives have been conceived by the government of Nigeria and other agencies to develop the ICT infrastructure with the aim of bridging the digital divide. These initiatives include the licensing of the Global System for Mobile Communication (GSM) operators and Second National Operator (SNO), Public Service Network (PSNet), Nigerian Universities Network (NUNet), in addition to massive investments in ICT infrastructure by investors across the country.

Despite these efforts, there is a great digital divide across the various sectors of the country. There is lack of critical drive and strategies to harness the full potential of ICT for the socio-economic development of the country; high subscription and infrastructure costs in addition to poor quality of service and epileptic network connections by service providers. All these have become major hindrances to the use of ICT in education, research and development in Nigeria.

## **3.0 Sustainability and Sustainable Design**

Sustainable development has been variously conceived in terms of value change (Clark, 1989), social reorganization (Gore, 1992), vision expression (Lee, 1993), moral development (Rolston, 1994), or transformational process (Viederman, 1994) toward a desired future or better world. The core idea of sustainability was defined by The World Commission on Environment and Development (i.e., The Brundtland Commission of 1987) as "development which meets the needs of the present without compromising the ability of future generations to meet their own needs".

Definitions of sustainable development have become more detailed conceptions of different content catalogued in Gladwin (1992); Pearce, Markandya, and Barbier (1989); Pezzey, 1992). The construct is fundamentally infused with multiple objectives and ingredients, complex interdependencies, and considerable "moral thickness" (Williams, 1985). However, sustainability is a relationship between dynamic human economic systems and larger dynamic, but normally slower-changing ecological systems, in which (a) human life can continue indefinitely, (b)

human individuals can flourish, and (c) human cultures can develop; but in which effects of human activities remain within bounds, so as not to destroy the diversity, complexity, and function of the ecological life support system (Costanza, Daly, and Bartholomew, 1991).

Sustainability connotes that both environmental and human systems, in the present and the future must encompass the "driving forces" of population change, economic growth, technological change, political and economic institutions, attitudes and beliefs. It goes beyond ecological efficiency to also include social sufficiency.

The built environment is recognized as a large environmental impact and has been identified by numerous authors (Mitchell, 2004; Watson, 2004; Watson, Mitchell, and Jones, 2004; Watson, 2003; Jones, Reid, and Gilbert, 2003; and Sarja, 2002) as requiring sound ecological management that can support holistic life cycle structures as the basis for sustainable decision-making for the built environment. The authors consider this as fundamental starting point for discussion and development of Built Environment Analysis tools. The holistic life cycle considerations include: social aspects of welfare, health, safety and comfort; functional and economic aspects of use incorporating flexibility; technical aspects of serviceability, durability, reliability and ecological aspects of biodiversity and resource depletion plus air, water and soil pollution.

In a building, the services and systems infrastructure have major effects across the physical, economic, functional and operational lives of the building. There is need for the use of the latest design technology to accurately plan every detail of even the most complex installations. This is attainable by computer modeling in advance of construction to ensure huge efficiency and productivity gains on any project. Employing building physics also enables the energy and environmental impact of a design to be robustly tested before it is built.

#### **4.0 Digital Divides to Digital Dividend in Sustainable Building Design: The Role of the Nigerian Universities**

The role of universities in bridging the digital divides in Nigeria can be examined from several perspectives, including capacity building, community development, and research. The university has great role to play in bridging the digital divides through the creation of an enabling environment for the use of ICT, foster information exchange among local scientists, and facilitate the interactions and collaborations between researchers in Nigerian institutions and their counterparts across the globe, and reaching out to immediate communities and towns. At Covenant University we are committed to driving the bridging of the digital divide especially in its application to the sustainable building

##### **4.1 Bridging the Divide through becoming an oasis of IT.**

In a nation where Broadband penetration is very low and infrastructure, hardware and software availability is poor the University can become an Oasis of capability which can help to drive the bridging of the digital divide. By ensuring the development of IT capability the University with

its higher than average awareness levels is therefore able to provide an enabling environment. This implies consistent an proper commitment to investment in the development of the required facilities so that they are available to Staff, students, interested persons and the entire community

#### **4.2 Information Sharing**

One of the key roles played by the emerging digital age is the ease with which information is both generated and shared. In countries with low level of penetration the result is an apparent disconnect from existing information and as Nenjamin Disraeli said “He who has the greatest information has the greatest success”.

The University is able to connect with international intellectual resources. For example at Covenant University’s Centre for Learning resources is committed to providing framework for linkages into the global information network and the university is a part of many international networks thus giving staff and students access to emerging information. In addition with the University’s ICT facility, staff are able to provide information access to a wider audience while accessing emerging information

#### **4.3 Bridging the Divide through Capacity Building**

The University is fundamenatally a Capacity building Institution and Education is at the heart of what the university does. It is therefore essential for the University to provide programmes to build persons capability in the application of ICT in designing sustainable buildings.. Students in the related built environment areas are exposed at Covenant University to Software applications and ICT based platforms for design and project management. In addition to managing a placement programme for students at university there should be commitment to supporting the professional development of the university faculty and staff in offering a range of internally and externally accredited courses, that can contribute to the successful construction of many educational building projects.

#### **4.4 Enhanced Collaboration**

One way of bridging the divide is by creating an atmosphere for collaboration between academics and practitioners in the fireld from the different parts of the current divide. The proper utilization facilitated and simplified by the enhanced Use of IT becomes a very useful tool. I addition this is further enhanced by the prvision of opportunities for face to face interactions. This is an area of commitment of Covenant University with the University using a variety of ways to facilitate this collaboration. At Covenant University we continue to work to strengthen collaboration with several memorandums of Understanding with International Universities to enhance collaboration. In addition the University has hosted several international conferences including a major International conference on the Built environment.In addition the University

has provided a secure and comfortable environment for visits from international academics both for short and long stays which would also encourage such collaboration.

#### **4.5 Bridging the Divide through Community Development**

The university should not be an academic environment that has boxed itself away from the immediate surrounding communities. It must have a link with and ensure that its impacts felt by such communities. For instance, in 2009, Covenant University decided to bridge the digital divide in surrounding communities of Ota and Iju-Ebiye village. Students from Covenant University volunteered to train students of Secondary Schools in the communities in computer skill acquisition and development. In addition, a number of computer sets were donated to schools in the communities.

As part of the Nigerian universities' corporate social responsibility, there should be commitment to a range of educational projects to benefit the local community. This will involve development of a range of vocational courses in ICT to engage learners from the communities in designing buildings to ensure healthy living conditions devoid of environmental factors that may be injurious to well-being of the inhabitants. These activities will in addition inspire and motivate young people to pursue careers in science, engineering and technology.

#### **4.8 Research on Sustainable building solutions**

One of the key areas of opportunity for information and knowledge is that of research on factors affecting sustainability in building project which are local and need to be understood both for local issues and also possible transfer of ideas which result from these ideas. At CU we have evolved the term GLOCAL which means thinking Global acting Local. And applying this to our research on sustainable building we expect to become major contributors to the discussion hence by the offer of content we will bridge the digital divide. There is need to understand the differences between the temporal and physical aspects of the building life cycle as an essential ingredient in the development of tools for assessing the environmental attributes of the buildings. Such tools will include computer-aided design and design softwares that can assist in aligning the needs of the occupiers of a building with the decision-making process. In designing for sustainability, Architects, Engineers and other designers in Nigeria should have sophisticated array of tools at their disposal to help them design new buildings more efficiently. The tools can be deployed to support more sustainable planning, design and construction from the very earliest consultation stages where stakeholders might discuss the suitability of early design concepts to their immediate and future local needs.

#### **4.9 Bridging the Divide through Research on ICT Utilisations**

The university is expected to carry out research for societal development such that the gap between the university's ability to deploy ICT and the inability of the external communities to do so can be greatly reduced. The university is in the best position to explore related integration of

software development applications on such ICT platforms. There is the need for the provision of key framework modules to assist in defining the investment and service goals at project initiation; integration of designs to avoid overlaps and confusion over a project life cycle; detailing the supply chain, considering building life cycle impacts; and delivering quality metrics for occupancy post-construction/handover.

The university is in the best position to provide versatile and flexible range of services including the design, integration and management and analysis of ICT solutions to challenges in ensuring sustainability in building design. In this regard, there should be extensive practical capabilities covering communication servers, network cabling infrastructures, applications, mobility, networking and security for buildings and their occupants. This will bring tangible commercial and environmental benefits and save costs, increase efficiency, and simplify sophisticated technology - adding value to building assets throughout their existence.

## **5.0 What then must we do?**

There are several key things that the Universities must do to fulfill their roles

1. They must be conscious of their roles and the opportunities presented by the emerging global world for bridging the digital divide. As the Chancellor of Covenant University Dr David Oyedepo puts it “If you don’t know where you are going anywhere looks like it”
2. There is a mentality that is necessary to lend itself to growth in these areas. Some key ones include
  - a. A global mentality that is conscious of the need to foster the bridging of the digital divide and create a culture of interaction using the digital revolution as the instrument and tool
  - b. A commitment to putting in place the required structures and facilities for achieving the same. At Covenant University we have been blessed to have a Chancellor and Board of regents willing to put in the right investment and Staff and faculty with a willingness to explore these things
3. We must foster continuous collaboration and interaction with relevant bodies local and international. These Partnerships are a key element to bridging the divide and at Covenant University this is something we are continuing to work on but it requires consistent work and a commitment to riving this and providing the enabling environment

## **6.0 Conclusion**

From the foregoing it is obvious that the Nigerian University can be a critical player in Bridging the Digital Divide. The Challenge is that by and large we are just at the beginning of the process and the ideas must be encouraged to generate momentum



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