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ICT Innovation Hub

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ABSTRACT

Information and Communication Technologies (ICT) becomes crucially important for sustainable development in developing countries. A developing country like Nigeria needs to prepare itself to make maximum use of the new opportunities created by ICT innovations which is highly supported by National Information Technology Development Agency (NITDA). Some of innovation hubs were designed as fixed office spaces with inflexible work arrangements and poor natural lighting. The main aim of this dissertation is to study these innovation spaces in order to establish the architectural principles behind the physical design of their workplaces. The scope for this study was limited to: flexible space, inspiring space, collaborative space and social space. Data collection methods such as observations and interviews were used to collect information. Findings from literature review are compared with data from the case studies so as to get best result of the study parameters. Inspiring space considerations were made to provide the use of natural lighting and views, careful use of colour and settings that are casual, informal and comfortable. Also, collaborative space considerations include, visual connections throughout the workspace, group areas for informal brainstorming such as lounges. And finally social space considerations require, convenient access to food and beverages, comfortable lounge seating. Based on the research findings, the author drew recommendations that can be adopted to improve the workplace environments that help to support innovation and act as guidelines for future designs which include flexible spaces in the which point towards workplaces with architectural elements such as semi-permanent walls, mobile furniture and clear circulation.

Keywords: Information and Communication Technologies, Telecommunication Technologies, Networking Technologies

INTRODUCTION

1.1 Background to the Study

Over the years, Nigeria has continued to witness a phenomenal increase and advancements in information and communication technologies. Computing and telecommunications is Nigeria's fastest growing sector with the advent of global system of mobile communication (GSM), the springing up of cybercafés and the increasing awareness of information and communications technologies (ICT) is on the rise in Nigeria (Jidaw.com, 2017).

Information and communication technologies (ICT) will become crucially important for sustainable development in developing countries. Around the globe, new information and communication technologies (ICTs) are making or supporting inventive frameworks and systems that are progressively influencing social orders and their administrations, enterprises, networks, and people, with the goal that everybody has equitable access to sustainable development and growth. (Howkins & Valatin, 1997).

Developing countries need to develop their own ICT strategies by drawing creatively on available experience to configure their technical and human resources. A developing country like Nigeria needs to prepare itself to make maximum use of the new opportunities created by ICT innovations.

Nigeria, considering the high population is indeed the giant of Africa, regarded as the most likely black power in the 21st century, but yet to be empowered technologically. The saddening fact remains that there is a big gap between the average Nigerians' computer skills and the skills of citizens in developed countries around the world. Computers are commonly recognized as facilitators of present day human advancement. Today, there is no field of movement that isn't being made simpler with the utilization of computers. From the most noteworthy modern and business exercises, to the home, the impact of the computers is, unavoidable. Computer, almost certainly, have become a key device to one and all. Little wonder it is being held that within the next few years, any person that is not computer literate will be caught off guard.

Information and communications are integral to human society. The information age has made technology, particularly information and communications technology, indispensable. In African societies that existed before colonial rule, people communicated using various instruments and codes such as talking drums, flutes, gongs, town crier and village square meetings. Many historical records are still recorded on the walls of caves, and especially through oral tradition. The use of writing and the invention of printing transformed the type and content of recorded history. Communications on a universal scale became possible through the use of books, newspapers, magazines and radio. "More recent technological innovations increased further the reach and speed of communications, culminating, for now, with digital technology". (Chris, 2003)

The advancements in technology have created so many ICT tools that are necessary and useful in the development process. These new technologies have become central to contemporary societies.

A basic classification of these modern technologies is as follows:

- Telecommunication Technologies includes telephones-mobile, fixed (with fax), and broadcasting of radio and television, often through satellites;
- Networking Technologies, of which the best known is the internet, but which has extended to mobile phone technology, Voice over IP telephony, satellite communications and other forms of communications that are still in their infancy. (Aswalap, 2007)

These all have come to dominate modern society and become the basis for the survival of the modern man, thus defining what is now called the information society. This is the information age! ICT applications provide new tools to improve access to information and for sharing
knowledge. The industrial sectors in developing countries depend on the quality of their science and technology research and their ability to transform the results of research into marketable products.

ICTs have been identified as major tools in achieving the Millennium Development Goals and other global development agenda. Nigeria can't afford the luxury of ignoring the multiplier effects of access to ICT. Nigeria has certainly done well so far in improving infrastructure capacity in "record time", now it's time to start focusing on quality.

The primary purpose of this project is to provide an enabling working environment that will encourage the development of information technology, communication technology and media technology expertise in Nigeria. There is a need to develop human capacity in areas such as: technical support, management, research and development. Human development in ICT can be encouraged through increased awareness of opportunities and capabilities in ICT. The environment will encourage ICT education, research, development, training, software/hardware and other creative efforts. The knowledge that will be acquired will bridge the digital divide and enhance the quality of infrastructure, the quality of access, the quality of usage, and the quality of growth.

1.2 Objectives

To accomplish the aim, the following have been set out as objectives;

i. Proper zoning of the spaces in the building to help create connectivity among the closely related ones.

ii. Provision of adequate circulation spaces which is one of the basic factors in creating communal relationship among the users as existing innovation hubs lack adequate circulation spaces.

iii. Provision of an environmentally friendly design which will improve flexibility by using adequate or proper building materials

iv. Blending of the natural environment into the design which will help to improve learning and conducive environment.

LITERATURE REVIEW

2.1 Identification and History of Building Type

2.1.1 Meaning/ definitions of ICT (information and communication technology)

The impact of ICT is enormous and global in its magnitude, pervasiveness and usefulness because of its most distinguishing features of a dramatic decrease in cost, size and tremendous increase in processing speed, storage and communication capabilities. ICT has a profound effect on the progress and development of human civilization. the apparatuses utilized in ICT incorporate computer programs, databases, communication systems, investigation and structure strategies programming languages, artificial intelligence, information bases, etc. Information implies knowledge and technology implies the utilization of computer and communication. ICT has influences majority of all areas of human works.

Information and Communication Technology' (ICT) first appeared in the mid-1980s and was defined as "All kinds of electronic systems used for broadcasting telecommunications and mediated communications", with examples including personal computers, video games, cell phones, internet, and electronic payment systems and computer software etc. The ICT is made of computer and communication technology. The computer technology is the tool for storing and processing information in digital form while communication technology helps us to transfer and disseminate digital information. Moreover, ICT implies an assortment of innovative applications all the process and communication of data. The term ICT can be characterized as "the combination of computing, as well as networking, and data processing technology and their applications" (Patel, 2018).

2.1.2 Meaning of innovation

This process of interpreting a thought or development into goods or service that creates value or for which clients will pay. Innovation includes conscious utilization of information, creative mind and activity in inferring more noteworthy or various qualities from assets, and incorporates all procedures by which new thoughts are produced and converted. In business, advancement regularly results when thoughts are applied by the organization so as to additionally fulfill the necessities and desires for the clients (Businessdictionary.com, 2019).

2.1.3 ICT Innovation Hub

As stated previously, the term ICT can be defined as "the integration of computing, networking, and information processing technologies and their applications", whereas, Innovation hubs are social communities or work space or research centres that provide subject-matter expertise on technology trends, knowledge and strategic innovation management, and industry-specific insights. These hubs empower dynamic information move researchers and business specialists, from one perspective, and industry, government and delegates of the scholarly community, then again. Here, leaders can meet and conceptualize with researchers and business specialists and talk about their unpredictable business challenges (www.quora.com, 2015).

Therefore, an ICT innovation hub is central place of activities where application of information that enables generation of new ideas and converted into useful products related to information and communication technology.

RESEARCH METHODOLOGY

3.1 Research Design

The research took a survey design format. Hence, the major data collection methods used during the course of this dissertation included in-depth interviews, focus group discussions, case studies and participant observation.

3.1.1 Data Needs

TYPE 1: The data needed for the justification and site location of the dissertation include:

1. Bio-social information of the inhabitant of the study area
2. Data on the existence of ICT innovation hub in the study area
3. Data on the existence of ICT innovation hub in the country
4. Data on the significance of the project in the study area

TYPE 2: The data needed for the facilitation of the project include:

1. Bio-social information of the users in the study area
2. Data on the facilities and spaces
3. Data on carrying capacity of the study area

3.2 Sources of Data

The sources of data used for this study were of two types namely:

1. Primary data
2. Secondary data

3.3 Case Study as a Data Collection Tool

In order to gain full insight as to what a project of this magnitude entails, case studies were carried out on a number of existing ICT innovation hubs. These were carried out with a view to understanding their workings, taking note of the merits and demerits of the architectural designs on their functional processes and subsequently utilizing the findings to aid the design of the ICT innovation hubs, local Nigerian examples were visited, while a study was carried out on a foreign example.

ANALYSIS, FINDINGS AND DISCUSSION

4.1 Site Selection Criteria:

4.1.1 Proximity to research and higher education centres

A large number of entrepreneurs in ICT innovation hubs come from the university world. Some of the most successful ICT centres in the area work together with university centres which, as a result of this collaboration, on the one hand, included the promotion of entrepreneurship in their education programme and continually provide the innovation hub with entrepreneurs with added value. (Pérez & Serrano, 2014). On talent, the state has easy access to most of the higher institutions in the region which include Nnamdi Azikiwe University, Awka, the dominant federal tertiary institution in the state, has a campus in the manufacturing town of Nnewi. Other institutions include Paul University Awka, Chukwuemeka Odumegwu Ojukwu University Igbariam and Uli campus, Federal Research and Development Institute, National Root Crop Research Institute, and the Medical Research Centre. Choosing a site will create a general linkage of the higher institutions in the state.

4.1.2 Proximity to business areas, office blocks and business centre

The site addresses this issue because business areas, office blocks and business centres are being located around the area. These areas include Eke- Awka market, Anambra state administrative buildings, etc.

4.1.3 Accessibility

Another factor that must be considered when choosing the location of the ICT innovation hub is the accessibility of the location, both with regard to public and private transport (motorised and not motorised). It being located along old Enugu – Onitsha road. It has link to Enugu- Onitsha express way.

4.1.4 Proximity to business associations, chambers of commerce

As in the case of town council economic development offices, these are public or private agents who support entrepreneurs, meaning that it is also recommended that there are organisations of this kind near

the ICT innovation (Pérez & Serrano, 2014). Awka being on the developed cities and the capital of Anambra State possesses the unique character.

4.1.5 Availability of land for expansion

If there is need to for expansion in future, the site will serve better because there is provision for such.

4.2 Site Analysis:

4.2.1 Location context and neighbourhood

The site is located along old Enugu road, Awka. This site is easily identifiable by the users though noise was considered too. It is surrounded by different zones/ character which include the following;

i. Institutional zones: Nnamdi Azikiwe University, Awka is the major institution located close to the site.

ii. Commercial zone The area has numerous commercial areas such as petrol stations, small shopping centres, hotels and various businesses which is one of the major criteria for siting innovation hub.

iii. Residential zone: There are residential buildings within the site. These include student hostels, estates etc.

iv. Recreational zone: Awka Wonderland was noted as a major recreation within the site, by that means creating social attraction within the area.

4.2.2 Natural site conditions:

i. Topography of the site

This shows the contour map of the site and the surrounding. The maximum height within the site is 48 metres and the minimum 46 metres. See figure 4.2 below for clearer illustration.

ii. Vegetation:

The vegetation on site consists of a continuous overgrown grass cover interspersed with a few mounds as well as small shrubs. There are many trees on site. The impact on design is that majority of the trees on site will be kept and only a few cut down. There will be need for some landscaping to take place.

iii. Soil

The sub-soil of the site is evenly compacted together which makes the bearing capacity to be high. The impact on design is that for the fact that the site has good load bearing capacity, the choice of the foundations should be strip and pad.

4.2.3 Climatic Analysis of the site

i. Climate:

The area which is Awka exists in the tropical wet climate zone with obvious wet and dry seasons. About eight out of the twelve months of the year appreciate the downpours while the four outstanding months fall inside the dry season. These two seasons are achieved by the two prevalent breezes that standard the territory: the south western monsoon winds from the Atlantic Ocean and the North eastern dry. The harmattan – an especially dry and dusty period happens for around about fourteen days inside dry season typically among November and February (UN-habitat, 2009).

Temperature:

Awka experiences high temperatures in the range of (27-28o C), which increase to a peak of about 35o C between February and April, the hottest period (Ofomata, 1975). The coolest periods occur from middle of July through December to early January, coinciding with middle of the rainy season and the harmattan respectively. Awka's high temperatures creating warm condition have great potentials for promoting outdoor recreational pursuits and tourism (Un-habitat, 2009). Changes in temperature as much as 6.60C have been recorded between the highest and lowest temperatures in a single day.

ii. Rainfall and Humidity

High humidity and rainfall characterize the Awka region. During the dry season relative humidity falls in the afternoon within 68%. This low relative humidity coupled with high afternoon temperatures account for the desiccating effects of the dry season. During the rainy season the relative humidity is much high and sometimes as high as 95%. The high humidity and rainfall in the area produce considerable discomfort. Between 1979 and

1989, the mean annual precipitation recorded was 1,485.2 mm with, mean month to month figure of 50mm. An outright day by day limit of over 200mm has been recorded among June and August in the region.(Un-habitat, 2009).

Solar path/sunlight

The sun rises from the east at about 6am every morning and sets in the west at about 6pm in the evening. In the afternoon the sun takes its position on the north, which is the hottest directions amongst its contemporaries (east, west, and south). There is a general decrease in the total hours of sunshine per year from north to south of Nigeria. The amount ranges from a minimum of 1300 hours in the Niger Delta to over 3200 hours in the extreme north-east. Awka community is exposed to about 2154 hours of sunshine yearly. The monthly variation increases to over 2770 hours in the dry months. Cloudiness increases as the rainy season approached and as it progresses and reaches its highest value in August, the number of sunshine hours' declines considerably.

iii. Wind speed and direction

There are two main wind present in the area. They are the north-east trade wind and the south-west trade wind. The north-east trade wind comes from the Sahara Desert. This wind is usually cold, dry and dust laden. While the south-west trade wind is from the Atlantic Ocean. This type of wind is cool and moist laden. The two wind flow from there point of origin and meet at a central point called the inter-convergent zone.

Architectural Implications Wind

i. Use of landscape elements like plant materials extensively to serve as wind breaks or buffer sound from sounding activities.

Sunlight

i. A good Landscape would help soften the environment through the reduction of glare and direct sunlight intensity.

ii. The extensive use of shading devices will help reduce the intensity of solar absorption into the building.

iii. Proper orientation of activities within the building will help to apportion the ingress of solar radiation were it is required.

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

From the case studies and examples cited in the previous chapter, it can be concluded that most ICT Innovation Hubs lack adequate spaces to carry out their functions. A developing country like Nigeria needs to prepare itself to make maximum use of the new opportunities created by ICT innovations. Therefore, the design would properly implement and execute all the relevant findings of the research in order to achieve an architecturally sound structure which exhibits a thorough and careful interplay of the basic design principles of, unity, balance and harmony in the application of design elements, while respecting the natural conditions of the site.

5.2 Recommendation

The research was an investigation into the design of physical workplace environments that support ICT innovation and enterprise in Nigeria to find out how to design such workplace environments for majorly today's youth. Four main elements of the physical workplace are recommended in order to create a work environment that supports ICT innovation.

These are:

i. Flexibility of space:

Through the provision of a variety of spaces in terms of size and function and the provision of a work setup that can easily be reconfigured.

ii. Inspiring space:

Through the use of natural light, views, careful use of colour and casual work settings.

iii. Collaborative space

Through the creation of group spaces both casual and formal as well as good visual connections and flexibility in its arrangement.

iv. Social space

Through the design of spaces that encourage interaction such as comfortable lounge seating that encourages mingling, access to food and beverages in the form of cafeterias or kitchenettes and a well-defined reception and welcoming areas for visitors that enable views into the workspace.

These recommendations are to be applied in the project to further prove the efficiency of their operative role.

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