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E-Readiness Assessment of Enugu State, Nigeria

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ABSTRACT

This study looks at the e-readiness of Enugu State (ES), Nigeria as the government is making efforts to digitalize government administration processes to provide the citizens access to governance information through the establishment of portal which test run was just completed. The study provides assessment guide; a mirror which governments, should use to determine the direction and milestones. It provides the e-readiness measuring instruments and showcases the outcome of application of the assessment methodology through a study carried out in the State. The main objective was to raise the awareness of stakeholders on the key issues in e-governance implementation to ensure rich content, sustainable service management and efficient use of ICT in support of current efforts in institutional, economic and administrative reform programmes.

Key words: E-readiness, e-governance, Enugu State, implementation, assessment, ICT

INTRODUCTION

With ICTs increasingly becoming a key factor in driving production and development, a knowledge-based driven economy is not negotiable and is one in which the generation, adoption and exploitation of ICT knowledge play a key role in the creation of wealth especially in underdeveloped economies. This is because ICT is a viable platform for generating wealth and an enabler of change; it releases people's creative potential and knowledge. Economist Intelligence Unit (2005) stated the greatest economic benefit of ICT is its ability to help individuals and enterprises conduct processes more efficiently anywhere in the world. SADC/WEF (2002), say that Information and Communications Technology (ICT) is a key weapon in the war against world poverty. When properly used, it offers huge potential to empower people in developing countries to overcome development obstacles and achieve economic viability and dependence.

Williamson (2005) stated that the economics of governance should be an effort to implement the study of good order and workable arrangements. Workable arrangements imply feasible modes of organization, all of which are flawed in comparison with a hypothetical ideal. The object is to work out the efficiency logic for managing transactions by alternative modes of governance and hierarchies. World leaders in government, business and civil society are considering how best to harness the power of ICT for development and empowerment through the conduct of e-readiness assessments.

Current thinking often frames the discussion in terms of e-readiness, or how ready a country is to reap the benefits offered by ICT generally in terms of policy, infrastructure and ground-level initiatives. In line with this the Information Technology Association of Nigeria (ITAN) and World Information Technology and Services Alliance (WITSA) organised a conference which the objective

amongst others was to examine, assess, evaluate and determine the e-readiness Status of Nigeria and provide a global ICT update for the benefit of Stakeholders. The conference evaluated and recognized with great concern that the current e-readiness framework in Nigeria is inadequate. It stated that Nigeria has a fundamental role to play in advancing the dynamics of information and communications technologies to deliver quality and effective e-government, e-transaction, e-education and other essential services to the citizenry (ITAN, 2009).

Too often developing country governments tackle e-readiness by focusing on either the need to improve the e-commerce capacity of the business sector or the need to improve access to ICT in disadvantaged communities. But one must understand that economic and social goals are interdependent and the relationship between them is complex. However, it is measured or approached, the broad range of factors that influence e-readiness are interconnected and the relationships between policy, infrastructure and ground-level initiatives are inextricable.

Unarguably, ICT can be an engine for growth and is ready to drive the necessary changes to make that happen. But translating a grand vision into practical steps that fit their local context is not a simple matter. Since, there is no uniform level of e-readiness or economic and social development within Nigeria, there is the need to have a realistic and sincere appreciation of what ICT can and cannot do for each segment of the society. Governments must lead by ensuring effective coordination of its disparate ICT initiatives across states ministries and agencies of government and also should be proactive in focusing ICT initiatives towards a common national goal. It is increasingly clear that for a country to put ICT to effective use; it must be e-ready in terms of infrastructure and the accessibility of ICT to the population at large. Effort therefore must be made to seek ways to improve the countries and communities e-readiness.

A country's e-readiness is essentially a measure of its e-business environment, a collection of factors that indicate how amenable a market is to Internet-based opportunities. In Nigeria, banks and educational institutions have started to bring their transactions online but the growth and proliferation of such initiatives remains hindered by very low Internet penetration about 0.1% at year end 2004.

In discussing e-readiness it may be necessary to recognise its 2 parts: the IT capabilities and the attitude towards digitalisation. When exploring the IT capabilities of the respondents, we acknowledge that the IT infrastructure consists of many sub-elements, however, the most fundamental element is the Enterprise Resource Planning (ERP) system. Therefore, it is interesting to analyse if an ERP system is used and to what degree it is used among the respondents (Danfoss and Aalborg, 2005).

For a broader framework, one may look at e-readiness according to Nath (2000) where stated that it is the ability for a region to benefit from information and communications technology and depends on an enabling environment that includes following:

- Matured technical infrastructure in various government departments
- Civil service willing to reengineer, share information and treat citizen as customers
- Internet penetration or presence of many public access points
- Legal framework that fosters public confidence and supports a government mandate to conduct transaction online
- Political commitment from departmental champions and managers
- Awareness citizen that understands its rights and is willing to express them and fight for them in cases of laxity and inefficiency

Although, few countries are completely ready on all the above dimensions, this should not discourage them from starting small through pilot projects used to bring about changes in public sector performance.

A number of e-readiness assessment tools have been developed over the years. Each tool measures how ready a society or economy is to benefit from information technology Bridges (2001). The range of tools has varying definitions for e-readiness and different methods for measurement. For instance, the Computer Systems Policy Project (1998) defined an e-ready community as one that has high-speed internet access in a competitive market; with constant access and application of ICTs in schools, government offices, businesses, healthcare facilities and homes; user privacy and online security and government policies which are favorable to promoting connectedness and use of the Netrk. It divided measurements criteria into five categories: infrastructure, access, applications and services, economy and enablers (policy, privacy, security and ubiquity). While, the Centre for International Development (2000) define an e-ready society as one that has the necessary physical infrastructure, integrated ICTs throughout businesses, communities (local content, many organizations online, ICTs used in everyday life, ICTs taught in schools) and the government (e-government); strong telecommunications competition; independent regulation with a commitment to universal access.

These e-readiness tools and models can be divided into 2 main categories: those that focus on basic infrastructure or a nation's readiness for business or economic growth and those that focus on the ability of the overall society to benefit from ICT. These 2 categories described as e-economy assessment tools and e-society assessment tools are not mutually exclusive. This study is focused on e-society readiness and is based on 2 surveys conducted in 2007 in Enugu state Nigeria. The pilot study was to assess government e-readiness to produce the necessary content that can empower the citizen and the second was to assess the e-readiness of citizens to benefit from access to governance wide information service.

MATERIALS AND METHODS

A pilot study was conducted in the early stages of this study between November 2006 and March 2007. The study consisted of interviews and questionnaire to senior staff members in 11 establishments in the ES. Seventeen government establishments were selected from Ministries Department Agencies (MDA) of government, 2 Non-Government Organisations, 2 Tertiary institutions, 2 (NGO) and 2 private companies. The respondents for the interview were senior officers; above the rank of the principal grade in the various establishments to ensure that those interviewed possess the knowledge, are conversant with the policy issues and possess the authority to represent the establishment effectively. The objective was to determine the e-Readiness, State commitment and support for IT development and application in governmental processes and to determine the level of user (i.e., staff) awareness regarding their requirements for IT in their workplaces.

The second (citizen) questionnaire was administered to 200 respondents selected from 30 communities in 10 out of the 17 Local Government Areas (LGA) in ES. Average of six respondents was interviewed from each community. The objective of study was to ascertain the e-readiness of the communities and the citizens, in terms of infrastructures, awareness, contents, accessibility, utilization of ICTs, etc. The LGAs within the capital territory were intentionally excluded from the selection process because of their obvious e-readiness status.

A total of 136 correctly completed questionnaires were used, giving an acceptable response rate of 68%. Part of the reasons for non-response from 32% of the questionnaires was attributed to lack of interest, the novelty of the research as respondents were not accustomed to this kind of research and partly the length and detailed nature of the questionnaire. The respondents were persons who possess at least secondary education.

RESULTS

Results (Outcome) of pilot survey

- The main channel for advertising government services is the organisation's internal notice boards, while radio/Television is occasionally used
- There is no policy on utilization of IT facilities for performance of functions
- Cash payment is the accepted mode for payment of services, only about 40% (especially schools) have banking/cheque options
- In 80% of the cases the customers travel to the office to procure a service, complete form (s) for services and return same after completion
- In 70% of the cases data generated in these offices are stored in physical file, only the NGOs and the privately own companies store most of theirs electronically
- Data processing is mostly done using type-writers, only a few 36% use computer, mainly; 70% for word processing
- The average number of functional computer for most of the government establishments is less than 4
- Less than 10% of the staffs are trained to use computer, while less than 6% actually use it for their daily functions
- 80% of the establishments have no maintenance arrangement for their IT tools, maintenance is ad hoc
- Most of the activities in the various ministries are duplicated in one or more other ministries/agencies in the state
- 90% of the computers are not connected to share resources; mostly the NGO and private organisations among the surveyed establishments have their services on the internet

Result of the main study questionnaire

Test statistics: The following statistical tests were applied to validate the e-readiness status of ES. Based on the results from the Table 1 and 2, the researcher chooses to say that ES is not e-ready and went further to test this stand against the alternative that the State is e-ready. Two hypotheses; null and alternative were formulated as follows:

- H_0 : ES is not e-ready
- H_1 : ES is e-ready

The test statistics carried out are Z-test for proportion in Table 1 and Chi-square test (Table 4). The Z-tests and χ^2 tests for proportions were used to test various e-readiness parameters, while the χ^2 test was used to test for homogeneity of e-readiness parameters for LGAs in the study.

Table 1: Social Infrastructures in surveyed towns

| Attributes | Options | No. of respondents | |
|--------------------|-------------------------|--------------------|------------|
| Schools | Primary | 2 | |
| | Primary and sec. | 105 | |
| | Prim, sec and tert. | 17 | |
| Telephone services | All Mobile | 14 | |
| | MTN and GLO | 57 | |
| | MTN, GLO and CELTE | 11 | |
| | MTN, GLO and rainbownet | 16 | |
| | None | 3 | |
| Attributes | Yes | No | Percentage |
| Electricity | 110 | 25 | 80 |
| Banks | 54 | 81 | 40 |
| Coop. societies | 100 | 26 | 74 |
| Agric officer | 65 | 61 | 48 |
| Health institution | 117 | 18 | 86 |
| NGOs | 47 | 79 | 35 |

M: MTN, G: Glo, C: Celtel, R: Rainbonet, MG: MTN/GLO, MGR: MTN/GLO/Rainbownet

Table 2: Communication, training and use of computer and internet

| Attributes | Options | No. | Percentage |
|--------------------------------|------------------------|-----|------------|
| Fastest means of communication | Telephone | 94 | 69.12 |
| | Radio | 30 | 22.06 |
| | Television | 1 | 0.74 |
| | Do not know | 9 | 6.62 |
| Use of computer | Yes | 130 | 95.59 |
| | No | 6 | |
| Application of computer | Process Document (PD) | 69 | 50.74 |
| | Send/Receive Mail (SR) | 19 | 13.97 |
| | PD and SR | 10 | 7.35 |
| | Do not know | 26 | 19.12 |
| Computer training centre | Yes | 82 | 60.29 |
| | No | 49 | |
| | Do not know | 4 | |
| Internet services | Yes | 46 | 33.82 |
| | No | 75 | |
| | Do not know | 34 | |
| School, teaching computer | Yes | 83 | 61.03 |
| | No | 48 | |
| | Do not know | 3 | |
| Trained in use of computer | Yes | 79 | 58.09 |
| | No | 53 | |
| | Do not know | 3 | |

Z-test for proportion is calculated as follows derived from Spiegel (2004) when sigma is omitted:

$$z = \frac{\bar{p} - p}{\sqrt{p(1-p)/n}}$$

where, \bar{p} is the sample proportion AVERAGE (array); p is the hypothesized population and n is the number of observations in the sample Count(array).

Table 3: Test of proportions for social infrastructure in 6 LGA's

| Attributes | | | | | | | Average | SD | Zcal |
|---------------------|------|------|------|------|------|------|------------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | proportion | | |
| Electricity | 0.29 | 0.90 | 0.96 | 0.74 | 1.00 | 1.00 | 0.81 | 0.277 | 6.79 |
| Tele. service | 0.95 | 0.90 | 1.00 | 0.95 | 1.00 | 1.00 | 0.97 | 0.041 | 10.09 |
| Banks | 0.24 | 0.65 | 0.60 | 0.21 | 0.80 | 0.18 | 0.45 | 0.268 | -1.15 |
| Cooperative society | 0.62 | 0.25 | 0.84 | 0.89 | 1.00 | 0.55 | 0.69 | 0.276 | 4.14 |
| Agric officers | 0.43 | 0.55 | 0.52 | 0.79 | 0.40 | 0.36 | 0.51 | 0.155 | 0.19 |
| Health institutions | 0.81 | 0.90 | 0.88 | 1.00 | 0.90 | 0.82 | 0.88 | 0.069 | 8.32 |
| NGOs | 0.29 | 0.25 | 0.68 | 0.16 | 0.40 | 0.27 | 0.34 | 0.183 | -3.44 |
| Use of computer | 0.95 | 0.95 | 1.00 | 0.95 | 1.00 | 0.95 | 0.97 | 0.025 | 10.11 |
| Comp biz centre | 0.33 | 0.55 | 0.88 | 0.63 | 0.90 | 0.41 | 0.62 | 0.236 | 2.54 |
| Internet centre | 0.10 | 0.40 | 0.56 | 0.37 | 0.50 | 0.23 | 0.36 | 0.173 | -3.06 |
| IT train. centre | 0.29 | 0.70 | 0.72 | 0.74 | 1.00 | 0.50 | 0.66 | 0.242 | 3.40 |
| Computer trained | 0.29 | 0.50 | 0.72 | 0.32 | 0.90 | 0.82 | 0.59 | 0.261 | 1.95 |

Table 4: Tests for homogeneity of the e-readiness indicators

| Indicators | 1 | 2 | 3 | 4 | 5 | 6 | Tot. Yes | χ^2_{cal} |
|------------------------------------|----|----|----|----|----|----|----------|----------------|
| Electricity | | | | | | | | |
| Yes | | | | | | | | |
| Observed | 6 | 18 | 24 | 14 | 10 | 22 | 94 | |
| Expected | 5 | 14 | 19 | 11 | 8 | 18 | | -2.59 |
| Tel. services | | | | | | | | |
| Yes | | | | | | | | |
| Observed | 20 | 18 | 25 | 18 | 10 | 22 | 113 | |
| Expected | 19 | 17 | 24 | 17 | 9 | 21 | | -4.05 |
| No. that use computer | | | | | | | | |
| Yes | | | | | | | | |
| Observed | 20 | 19 | 25 | 18 | 10 | 21 | 113 | |
| Expected | 19 | 18 | 24 | 17 | 9 | 20 | | -3.71 |
| No. trained to use computer | | | | | | | | |
| Yes | | | | | | | | |
| Observed | 6 | 10 | 18 | 6 | 9 | 18 | 67 | |
| Expected | 3 | 6 | 10 | 3 | 5 | 10 | | 1.84 |
| Internet centres | | | | | | | | |
| Yes | | | | | | | | |
| Observed | 2 | 8 | 14 | 7 | 5 | 5 | 41 | |
| Expected | 1 | 3 | 5 | 2 | 2 | 2 | | 9.51 |

The hypothesis is restated as follows:

- H_0 : $p < 0.5$
- H_1 : $p > 0.5$

The confidence level chosen for all test is 95%, therefore, the $\alpha = 0.05$. $Z_{\alpha/2} = 1.96$. H_0 is reject if $Z_{cal} < -1.96$. The highlighted Zcal values were rejected which implies that H_0 is true on those issues.

Table 3 shows result of the tests for the positive responses from 6 local government areas on social infrastructure.

Codes for LGAs: 1 = Awgu, 2 = IgboEtiti, 3 = Nsukka, 4 = Oji-River, 5 = Udenu, 6 = Udi

Chi (χ^2) test: The χ^2 test was used to test for homogeneity of e-Readiness parameters in the six LGAs. The hypotheses tested are:

- **H₀:** There is difference in e-readiness parameters across the LGAs
- **H₁:** There is no difference in e-readiness parameters across the LGAs

The following test criteria were used, $\alpha = 0.05$ and degrees of freedom = 5, the χ^2 value is 11.07. The H₀ is rejected for any parameter where the calculated $\chi^2_{cal} > 11.070$. The results are shown in contingency table in Table 4. Where,

$$\chi^2_{cal} = \sum o^2_j / e_j - N$$

DISCUSSION

Generally, e-readiness assessments help leaders measure and plan for ICT integration, focus their efforts and identify areas where further attention is required. The assessment does not stand as a goal in itself: it has to lead to the development of a strategy and the preparation of an action plan that will address the opportunities and constraints identified in the readiness assessment to further the objectives of the country in the area ICTs (INA Academy, 2005).

According to Bridges (2005), in compiling data on e-readiness assessments, the goal is not to judge one assessment over another, or to diminish the value of work that has already been done. Rather, it is to provide a resource to policy-makers and others who want to use e-readiness assessment results to plan for the integration of ICT in society and to organizations that are considering new assessments.

Our work unlike some e-readiness projects such as the case studies compiled within the framework of the training and professional development of teachers and other facilitators for effective use of ICT in improving teaching and learning, which was implemented between 2003 and 2007 by the UNESCO Asia-Pacific Programme of Educational Innovation for Development, with the support of Japanese Funds-in-Trust (UNESCO, 2007) is not addressing one specific area of readiness, but like the project of Bridges (2002) in partnership with Cape Town IT company DGE, which was commissioned by the City of Cape Town to conduct an assessment of the City's digital divide, our project examines traditional measures to gauge e-readiness such as access to technology, affordability and skill levels, as well as often overlooked issues of relevant content and services and socio-cultural factors that impact effective, sustainable access.

In ES, government establishments including MDAs and privately own institutions are beginning to develop electronic information systems, to cater for varied information needs of different categories of users. There is, however, no exchange of information among these government organs and between the information providers and the potential consumers. Consequently, the awareness and utilization of the existing electronic information is very limited. There are no cross-linkages between the information systems since most of their data are not available in electronic form. The Internet penetration is still very low but there is noticeable improvement about 33% which is better than 0.1% in the Pyramid Research of 2004 for Nigeria, in the Economic Intelligence Unit (2005).

The lack of access and co-ordination of the information is presenting bottleneck to good governance in terms of an effective and transparent policy formulation and implementation. Furthermore, it hampers access to government wide information required by the government, private business, NGOs and the general public. Therefore, the need exists to co-ordinate, integrate and improve access to these valuable sources of information. This if done, it will contribute to national development in a number of ways:

- It will provide better co-ordination of the information facilities developed in government and private institutions
- Improve and increase the exchange of information between the institutions
- Provide better means of access to the information
- Sensitised institutions on need to collate and continually update information on their activities
- Development in information generation, sharing and communication skill of workers and users

Interviews conducted as part of the research also indicated that most officials of the State were not only aware of the key role IT could play in the State but the lack of infrastructures hinders its widespread use. This position was reflected in the Table 3 of results above with respect to available IT equipments and applications and the number of staff trained in utilizing IT resources. There were no the strategies nor plans on ground for IT development and utilization in the State, which include expansion of facilities; training of all staff in computer literacy and improving the terms of services to attract and retain the scarce IT qualified personnel. The responses indicated clearly that the problem of computer literacy at the time of the interview was significant.

The follow up interview also indicated that of those few who have some computer skills, 4% of them acquired their skill from self-study, the rest of the respondents attended some formal training from one of the several private training centres that have sprung up in major urban areas and 94% were computer illiterate. The average length of training in computer literacy was 6 weeks and most of these trainings about 58% were at elementary level. An overwhelming number; 99% agreed that PC's would greatly improve their day to day activities.

In the citizen survey Table 3, 81% of the communities have electricity even though unreliable, 72% have one form of telephone service (with MTN dominating in coverage), 60% have schools where computer trainings are conducted even though 93% of those school are owned by business people with less than 30% of this own by NGOs. 58% of the respondents are trained in the use of computer for various purposes and 54% of those posses' one form of certificate with majority at elementary and intermediate level.

On factors hindering the respondents from utilizing ICTs using a 5-point Likert scale Howard and Sharp (1987), 76% strongly agree that high cost of training, 75% said high cost of hardware/software and 66% lack/unsteady electricity, were the three major factors.

On factors hindering Investments in IT: 78% choose Lack/no steady electricity supply while 65% said poor IT infrastructure were the major hindrances.

The survey also used the Likert scale to find out the user awareness/benefits of using ICTs under the following factors: acceptance, utilization, maintenance and exploitation. The major factors encouraging the acceptance of ICTs are opportunity for easy access to the PC and related equipments, job satisfaction/demand and control of individual work.

- On maintenance (i.e., continuous use); training opportunity, reliability and durability, were the major encouraging factors
- On strategies for implementing a virile and sustainable e-governance system, 85% of the respondents agreed strongly to all the factors which include comprehensive Information Policy and Planning (IPP), significant investment on ICTs and Staff/Student training and reorientation of staff to the use of ICTs
- On handling of personal/private information, 78% said integrity of personal records, 77% use of personal data for specific purpose and 75% access right to personal data were the major concerns of the respondents
- On information content preference, 70% choose government budgets/expenditure, 68% corrupt practices/actions taken and 77% choose education as the most preferred amongst the 14 listed options

Regarding the information systems that end-users were using and the ones that they required, respondents indicated the following major concerns: privacy of personal data, integrity of personal records, the right of access to their personal data, restriction of access to personal data to only authorized persons, confidentiality of personal data and protection of identities of individuals. Clearly, this is indicative of the fact that the respondents are aware of the sensitivity of personal records on information super-highway.

CONCLUSIONS

The study was conducted with the objective of deriving from it pertinent research issues about the use of the emerging tools of Information and Technology (IT) in the design and administration of the 21st century governance. The studies show that the introduction of information technology will provide varied opportunities and create awareness among the end users. The top officials interviewed were in support of the development and widespread utilization of IT in the State. Since, the IT situation was shown to be generally poor in government sector readiness; with regard to the current user requirements for government e-readiness, the study indicated the need for the following further research into e-readiness of e-governance issues:

- Real issues in IT; user requirements, preconditions, situational/contingency factors
- Information system characteristics and complexity factors such as IT locations
- Management of information systems, relationships between various entities, i.e., (government/real processes), IT and management of information systems
- Influence the need to improve management processes and other IT related issues

The research findings can be summarized as follows:

- There is a clear causality relationship between situational factors and risks that need to be considered when implementing IT systems in organizations
- Knowledge of the pertinent prevailing situational/contingency factors, which constitute the environment in which the State exists, is vital to successful development, implementation and utilization of IT systems
- The situational factors can be classified into specific and generic factors, with the former class of factors being more pertinent to the State while the latter refer to more general factors that affect other parts of the country and beyond

- The study identified IT research issues, which include user requirements for IT, preconditions associated with IT, hardware, software, states of IT, complexity factors, management of information systems, relationships between entities and external influences

The main conclusion of this study was that there is the need for e-readiness model to guide IT related problems and implementation in Enugu State, which can be applied in other States in Nigeria. This conclusion is based on the observation that majority of the other Nigerian States are faced with similar problems and depend on the same sources, federal government and external donors, for financial and other forms of support. The model solution must, therefore, take into account the requirements that have been identified to realize efficient and sustainable e-governance.

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