

ENVIRONMENTAL BENEFITS AND CHALLENGES OF ICT: THE LAGOS EXPERIENCE

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Abstract

The growing influence of improved information and communication technology (ICT) on all strata of human living, including the environment, is acknowledged. This has been considered more vital to the challenging conditions of emerging mega cities like Lagos, Nigeria. A questionnaire survey of business office users across different occupations was carried out. The result as analysed on a 5- point Likert Scaling indicated that ICT-facilitated commuting and work habits could become a needed panacea to reducing peak-hour traffic congestions among other benefits. On the other hand, ICT usage, the paper observed, could also generate new activities and wastes with grave implications on efficient environmental resource management.

Key Words: ICT, 'Teleworking', Commuting, Benefits, Challenges and Environment

1.0 INTRODUCTION

One of the Millennium Development Goals is to foster international integration in development through information and communication technology (ICT). Incidentally, advancements in ICT in terms of mobile telephone and high speed computer with networking facilities (intranet and internet) have practically redefined many aspects of our living.

Modern business activities are being facilitated by information technology (Tapscott and Caston 1993, Mandel 1994 and Gill 1996). This is made possible with declining cost of computer technology, its increased power (Wofford 1987, Niles 1999) and the improved efficiency of telecommunication which cost is also reducing. Electronic commerce (EC) had been foreseen by Clinton and Gore (1997) to be a very significant global economic element in this twenty-first century. Actually, almost all firms, from agriculture through manufacturing to services are at least supporting their activities by various types of information technologies. Computers are now a common feature from the living room to the boardroom. The trend has been sustained by the realization of various capabilities of IT which according to a study by Wreden (1997), improves productivity by 51% in corporations, reduce cost by 39%, improves decision making (31%), enhances customer relationships (33%) and develops new strategic applications (33%).

Turban, Mclean and Welherbe (1999) also associated the drive towards IT to the following advantages, among others:

- i) performance of high speed, high volume numerical computations;
- ii) provision of fast, accurate and inexpensive communication within and between organizations;
- iii) increase in the effectiveness and efficiency of people working in groups in one place or in several locations; and
- iv) allowing quick and inexpensive access to vast amount of information, worldwide.

ICT facilitated flexible office working practice has been generically termed 'teleworking' (Bergum,2007). Consciously or otherwise, many urban dwellers have been practising different forms of teleworking, to varying degrees.

Without doubt, these developments must have their implications on the environment. The Organisation for Economic Cooperation and Development (OECD) Conference of May 27-28, 2009 at Denmark aptly recognized the key roles of ICT and the internet in tackling global warming through increased energy efficiency, reduction in energy use, urban systems and transport among others. In fact , the Conference believed ICT was vital to 'improving and overhauling infrastructures and systems that are major emitter of greenhouse gases, most notably urban infrastructures, buildings and construction, energy generation and distribution' (Vickery, 2009).

How about the negative effects, if any? Of course, ICT revolution is expectedly like a two-sided coin. Its dark side could perhaps, be more than contemplated. Some analysts would rather hold that on a net basis, the effect of ICT on business, the environment and in fact, all strata of endeavour is neutral as the ills associated tend to balance out its benefits (Mokhtarian, 1996 and Dixon and Martson, 2002). The environmental benefits and threats arising from ICT usage form the kernel of this paper with particular focus on Lagos Island in Nigeria.

2.0 CHALLENGES OF THE URBAN ENVIRONMENT: THE EXAMPLE OF LAGOS ISLAND, NIGERIA

That environmental problems are critical for growing cities is perhaps, incontrovertible. However, this issue becomes more pronounced for emerging mega cities within the developing nations of which Lagos is a typical example. Even within Lagos Metropolis as a whole, Lagos Island as the focal point deserves special attention. Here, over 6 million people congregate daily within a land area of 8.7Km² for various commercial activities (News, 2009).

The challenges of large urban centres are common place - heavy traffic, inadequate parking spaces, large waste generation, pollution and insecurity among others. This is often the experience with cities evolving through natural growth as against deliberately planned urban centres. That Lagos Island is sandwiched within the lagoon with a rather poor terrain further compounds the situation. So worrisome was the pressure on this area that the idea of relocating the Nigerian federal capital territory from it to Abuja came up in 1975-76 about the same time that the seat of Lagos State Government was also shifted to Ikeja in the northern part of Lagos Metropolis. Though Lagos Island has since been reduced to the status of the nation's center of commerce, the problems of overcrowding, lack of parking space and chaotic traffic situation (vehicular and pedestrian) identified way back in the mid-70s by Wilber Smith and Associates(1975) and which pushed off its public administrative functions never abated. Rather, many of its office users have infiltrated and practically dislodged the high-brow residences in the adjoining Victoria Island pushing them towards the Lekki-Ajah axis. While the aim was to escape the seemingly unmanageable Lagos Island environment, it is an irony that both Lagos and Victoria Islands are presently experiencing similar forms of traffic congestion and over-stretched facilities.

3.0 METHODOLOGY

The study set out to establish through a questionnaire survey of 216 daily commuters to Lagos Island (specifically, office users), the use of different ICT media and their propensity to 'telework' – opting for flexible office commuting culture by taking advantage of different ICT facilities. For the likelihood of opting for some form of teleworking practices, the respondents' disposition to the following were measured:

- i) partial home-working;
- ii) full home-working;
- iii) resort to secondary location or satellite office; and
- iv) use of business centre or 'cyber café'

Respondent office users were made to rank their disposition to each option on a 5-point Likert Scaling. The result was analysed using the relative importance index (RII) similar to that of Lim and Alum (1995).

4.0 FINDINGS AND DISCUSSION

Consciously or otherwise, ownership and use of relevant ICT media is indicative of the respondents' tendency to telework. As depicted in Table 1, all except one of the 216 respondents use mobile telephone with 209 (or almost 97%) employing at least one computer system for information processing. In terms of electronic messaging however, while 52% have e-mail addresses, only 81 (about 38%) and 60 (or 28%) respectively have facsimile equipment and full website facilities.

Table 2 indicates the extent to which the respondents from this study are disposed to various forms of ICT facilitated flexible work (teleworking) practices. In this survey results, the Likert Scaling scores were highest for partial home-working with RII of 3.12, followed closely by the use of 'cyber café' or business centre and satellite office location leaving full home-working the least likely option. However, that more people (28) are highly disposed towards full homeworking than partial homeworking or satellite office location is noteworthy. A survey by the Lagos State Ministry of Transport as reported by Afolabi (2008) estimated that about 800,000 vehicles ply the Lagos roads daily.

Let's assume, rather conservatively, that the reduction in daily traffic can be limited to the 28 of 216 (about 13% savings in commuting) respondents with 'high disposition' towards full home working on ICT criterion (though not all would eventually be full-time teleworkers, some of those 'disposed' to it or 'highly disposed' to other forms would however join). Average commuting time from the study in morning period (the to-work direction considered more critical) alone is about 1 1/2 hours whereas, the return journey in the evenings always take longer but for purpose of analysis, this would be taken to be the same to give total daily travel time of 3 hours. From experience, an average fuel efficient car would be expected to consume, at least, 20 litres for both of these intra-city daily trips. At the prevailing price of N65/ litre, the annual savings in fuel cost alone would be approximately N49.35Billion (almost \$336million) by these 'teleworkers' that would keep off the Lagos roads. The financial saving is just one of the several gains to the individual teleworker and ultimately, the national economy. There are equally, some environmental benefits to result from teleworking which include, among others;

- *Reduced carbon emission from traffic flow,
- *Less noise pollution, and
- *More spacious parking lot.

In general terms, the ICT revolution has proven to be further beneficial to the urban environment in the following ways:

i) Traffic monitoring- Many radio stations such as Eko FM and Wazobia FM within Lagos have found it expedient to use ICT media to monitor and disseminate traffic situation reports during critical commuting periods thereby assisting in preventing a worsening of the situation as in-coming commuters are advised to divert towards alternative routes

ii) Environmental Data Collection and Monitoring-This is made more effective by using information technology, especially the geographic information systems (GIS). It is expected that more detailed and accurate digital maps could now be obtainable with ease in respect of various physical, economic and environmental data requirements

iii) Security Controls and Crime tracking- The Lagos State Government has been displaying some GIS-based video coverage of sections of the Metropolis which, when fully developed, could prove efficient in tracking criminals and unearthing events the type that had hitherto been considered mysterious. The Kwara State Government had earlier reported a similar breakthrough in security oversight of Ilorin, the State Capital.

5.0 DANGERS OF ICT TO THE ENVIRONMENT

Much as ICT presents tremendous opportunities for improved and efficient methods and approaches to environmental resource utilization, we must still be honest to keep an eye on areas of potential danger associated with it. Some of these are highlighted below, even if somewhat controversial for now.

i) High volume of equipment with terminal lifespan flooding the nations under the guise of bringing in cheap, fairly used ICT equipment especially the disused, low grade processing units and monitors. Unfortunately, the disposal of these chemical-laden boxes could spell monumental damage to the soil, water bodies, and worse still to the air directly should they be discarded by burning

ii) Indiscriminate erection of communication masts across the landscape, often dangerously close to residents with radiation effect that may be potent sources of terminal diseases. Whether it can cause brain tumor is still being debated (Owomero, 2007). However, Otitiloju et. al (2010) did confirm from a Lagos-based study that 'the exposure of male mice to radiofrequency radiations from mobile phone (GSM) base stations at a workplace complex and residential quarters caused 39.78 and 46.03%, respectively, in sperm head abnormalities compared to 2.13% in control group'. The possible implication on human health could therefore be inferred. Nigerians nevertheless continue to have the allergy that mobile phone masts trigger many health symptoms including anxiety, nausea and tiredness, among other health hazards (Aginam, 2009)

iii) The hardly controllable habit of receiving and a times, making phone calls while driving, near a working petrol engine, especially power generating sets, more so that the prevailing power situation has turned these sets into 'necessities' and are sometimes in their multiples in each dwelling. These are fatal risks often assumed in ignorance.

The use of cell phone while driving has been equated to driving under the influence of alcohol (Ogg, 2006) and a study by Omolase (2008) established that 23.5% of respondents made calls while driving with about (50%) receiving calls. Also 23.5% were reported to often read text messages behind wheels and perhaps, more ridiculously, that some 3.9% of the respondents do send text messages while driving.

iv) Flexibility in travel while reducing peak hour traffic to and from work could also generate more of less significant vehicular trips during normal working periods. Also, teleworking may encourage increased urban sprawl by commuters who see less travel as trade off for longer trips from more spacious living environment. Again, for a teleworker, the gains to the office in terms of reduced space and furniture needs as well as less energy consumption might all have just been swapped to the home account.

6.0 CONCLUDING REMARKS

We are already on the fast lane in the technological freeway and the safety rule is 'caution and alertness' rather than 'stop or beat a retreat'. All stakeholders- the populace, the ICT facility providers and policy makers - have their different responsibilities to make sustainability of life and environment matters of concern along this way. For instance, there is increased need for Planning Authorities to be proactive in their appreciation of physical planning requirements in this ICT age. More residential apartments should be expected to be equipped with the attendant energy needs and safety measures while traffic flow may even out across working hours but with new challenges accompanying that. Taking such cue is a section of the Minnesota Statute 1994 making teleworking considerations a mandatory element of building plans especially, in respect of development proposals from State Agencies (Gainey, Kelley and Hill 1999). Also, proper legislative control of the siting of communication masts at safe distances from residences and other sensitive facilities has become imperative. Perhaps, this would be found more necessary in developing countries like Nigeria with epileptic power supply that must always be augmented with equally dangerous high voltage generating sets.

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Table 1: Use of ICT Media among Respondents

Media	Frequency	%
Mobile phone	215	99.5
Computer Processor	209	96.8
Fax Machine	81	37.5
E-Mail	113	52.3
Website	60	27.7

Source: Field Survey (2009)

Table 2: Respondents’ disposition to Teleworking practices

Telework option	Highly disposed (5)	Disposed (4)	Undecided (3)	Indisposed (2)	Highly indisposed (1)	RII
Partial home-working	26	52	82	34	22	3.12
Full home-working	28	18	36	46	88	2.31
Satellite office	26	51	40	33	66	2.71
Business Centre/ ‘Cyber Café’	46	43	57	21	49	3.07

Source: Field survey (2009)