# The Future Generation of Global Information and Communication Technology (ICT)
## *Can Africa Meet The Challenge?*

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In a world where information technology is the bedrock of global development, where nations in Asia who got independence from old colonial masters at the same time as Africans are decades ahead of most African nation-states, one must finally begin to extrapolate some assertions into some obvious truths:

- *That African Information and Communication Technologies (ICT) problems must be quantified, studied and put into a platform for accelerated attention and possible leapfrogging;*
- *That in consideration of the failure of outsiders to address the African problems, such answers to questions of our underdevelopment must begin to come from Africans themselves;*
- *That we have more human resources than most developed nations, but have not started to harness what we have; and,*
- *That since Africa has failed to define itself in the global community, others have stepped in to define us...And the picture they painted is not too pretty!!!*

To answer the question of whether

| Table 1 Quantified Estimates of African Digital Divide Parameter | | | |
|---|---|---|---|
| Information Technology Attributes | In N. America | In Africa | Years to Catch Up |
| 1. PC Count per 100 Households | 85 | 3 | 30 |
| 2. Computer Literacy per 100 Persons | 78 | 5 | 25 |
| 3. Internet Use Per 100 Persons | 87 | 4 | 20 |
| 4. Computer Impact to Life per Day | 98 | 7 | 25 |
| 5. Wired Schools per 100 Institutions | 100 | 2 | 15 |
| 6. Businesses with IT Application | 97 | 4 | 27 |
| 7. University Graduates with IT Skills | 85% | 5% | 45 |
| Contribution to Target Sectors: | | | |
| 8. Banking (Electronic) | 100 | 10 | 28 |
| 9. Civic Institutions | 100 | 2 | 35 |
| 10. Commerce | 100 | 8 | 20 |
| 11. Personal | 95 | 15 | 15 |
| 12. Social Services (govt) | 100 | 5 | 22 |
| 13. IT Developer Count per 100 Persons | 12 | (0.1) | 175 |
| 14. IT Knowledge Workers Per 100 Persons | 18 | (0.7) | 150 |
| 15. IT Contribution to Economy | 15% | (0.2) | 210 |
| 16. Overall Economic Development | 20% | 0.5% | 225 |
| Nigerian IT Professionals in the Americas (NITPA) Studies, 2002. | | | |

ICT status, with African data based on extrapolations and approximations from World Bank and UN studies (See Table 2). Our efforts here is to place this information along side each other, and using time-series analysis, project the number of years it will take African nations, on the average, to catch up with North America in ICT. The numbers speak for themselves, showing in summary, that if current rate of change continues without radical intervention, it will take Africa 30 years to catch up to North American household personal computer (PC) counts, 20 years to catch up with current North American Internet use, over 150 years to catch up with ICT literacy, and close to 225 years to catch up in overall ICT economy. The result therefore raises questions, along with some specific observations that must also be noted, as seen in Table 1.

The African ICT problems are multifaceted, with two, perhaps three possible intervention strategies, including leaving both policy development and implementation in the hands of international agencies such as the World Bank, crafting out a regional strategy such as (New Economic Partnership for African Development (NEPAD), or leaving it all to chance. Rejecting all other options, this article is meant to examine how Africa must build capacity through mobilization of her indigenous resources for development engagement through (1) Education (2) policy realignment (3) Business-to-Business engagement and (4) knowledge content creation.

Africa can meet the challenge, we must first ask whether Africa can ever catch up with the speed of changes and development in the global ICT theater, and what strategies much be adopted by Africans if we must have a chance.

This article is an effort to frame the collective African problems from and ICT perspective, based on a recent study by the Nigerian IT Professionals in the Americas (NITPA), a Diaspora based network group (www.nitpa.org) working to address the issues of Digital Divide in Nigeria and Africa. Beyond defining where the problems lie, we would set out to perform some assessment of the global conditions and the reality of the emerging ICT world. We will list the enormous challenges facing Africa along the way, and provide some specific recommen-

dations. An assessment of this nature should have taken place in Africa some 25 years ago; but more importantly, it is hoped that Africans everywhere will buckle up our belts and declare this "a time for action". The Computer, Telecommunications, and Office Equipment Leadership Forum (CTO2003), therefore, could not have come at a better time, as it provides us (Nigerians in the Diaspora) with the opportunity to share our views, strategies and activities towards addressing the Digital Divide.

## A look at where we are compared to the West

In Table 1, we report the status of the African ICT condition, compared to North America. The data was collected from several publications on global

## The African Challenge— Where the problems lie

Beyond study figures as presented in Table 1, the question of where the problems lie has been well documented in the literature. In our attempt to address the pertinent issues with recommendations, we must look at a summary of these problem sources as part of this work:

- **Infrastructure Inadequacies:** Telecommunications, Hardware, Energy, Roads
- **Human Capacity:** Inadequacy; 90% of expert skills "imported"; Indigenous experts abound in the Diaspora. The few resources in African nation-states wish to migrate to the West due to lack of enabling environment - (brain drain).
- **Government Policies:** Big problem - Some officials even ask for bribe in order for external agencies to assist their own nation. Examples abound in the global press.
- **Educational Handicap:** Very real; Poor classrooms; Untrained teachers; Inadequate curriculum, etc.
- **Global Image:** The press has not been kind to Africa as an equal partner in global competition.
- **Security Problems:** High crime in certain African countries; Poor legal assurances (the 419 menace in Nigeria, for example).
- **Institutional Inadequacies:** Research; Employment opportunities; Mentoring.

## The Global Practices

What external agencies are doing to address the Digital Divide problems world-wide:

We must recognize that the world does not fold its hands while African nation-states continue to slide in calculus of the Digital Divide as documented in Table 1. Much, in fact is being done (See Table 2); yet, the impact seems to be minimal at best because the programs put more emphasis on "what worked elsewhere" than customizing the intervention to each African nation-state environment. This practice is fully demonstrated by the fact that "missions" to the theater, as the international community calls it, are almost akin to performing surgery by remote control.

One must be there, experience the inadequacies, to be able to perform the right intervention, and that's where a trained indigenous resource pool comes in.

## Why Must We Act Now and Act Immediately

We have dwelled enough on the negative and need to direct our spotlight on the current global environment, drawing a justification for why Africa must respond to this call for action. For starters, the world is experiencing a major technological revolution, centered on information and communication technologies and genetic engineering. The Internet is at the same time the epitome and the most powerful medium of this revolution. Under

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### Table 2: Global response to the African Digital Divide

1. Digital Youth Consortium:
   http://www.gioventudigitale.net/en/index.asp – Youth Linkage (#3)

2. UNICT Task Force: http://www.unicttf.org/ – Global policy initiatives (#16)

3. Digital Partners: http://www.digitalpartners.org/ – business financing (#6)

4. Social Enterprise Laboratory: http://www.digitalpartners.org/sel.html – micro grant initiatives through competitive proposal process (By Digital Patners) (#6)

5. Drish Tee: http://www.drishtee.com/ – Indian initiatives connecting Village to village, a form of local Internet café (90 villages and growing)

6. SEWA – Self Empowered Women Association:
   http://www.sewa.org/ – Gender initiative targeting women needs in ICT development (#4)

7. Global Classmates: http://www.globalclassmates.org/ – educational initiatives linking primary/secondary schools around the globe. (#2)

8. Development Gateway: http://www.developmentgateway.org/ – A World Bank Digital Divide Portal (#1–15)

*(#) in parenthesis shows the intervention problems of ICT as shown in Table 1, being addressed by the initiatives.*

the impulse of new technologies and flexible forms of organization and management, we are witnessing the formation of a new economy, characterized by rising productivity in many developed nations, growth and global competition. During the late 1990s most of the world had experienced reasonable rates of economic growth, in spite of the Asian crisis of 1997-98.

## The Internet, New Economy, and Global Conditions

There is a new economy, expanding throughout the world, unleashing productivity, and creating prosperity, but in a very uneven pattern. This economy is characterized by 3 inter-related features.

**Informational:** Productivity and competitiveness are based on knowledge and information, powered by information technology. This translates, essentially in the need for a technological infrastructure, and the crucial role of highly educated human resources.

**Networking:** The new economy ensures productivity and flexibility on the basis of information-powered networks. Networks exist within firms and among firms; networks between regions, and decentralized networking around nodes. An important example of dynamic node in developing countries is Bangalore, India, a major software and electronics area, linked to the major technological centers of the world, particularly to Silicon Valley. The new global architecture is built around flows between dynamic nodes. The negative aspect of this dynamic is that the system allows for the switch-

ing on and off of regions and even countries according to their contribution to the value chain structured around these global networks. For Africa, the switch does not even exist, not to speak of whether it's on or off.

The new economy is a global economy. A global economy is a new kind of economy. It is the economy whose core activities have the capacity to work as a unit in real time on a planetary scale. This capacity is technological, based on telecommunications, databases, fast transportation, and information systems. It is institutional, based on deregulation, liberalization and privatization. And it is organizational, based on the networking of business firms, and on flexible forms of management and work. The key dimension of globalization is financial globalization -financial markets are now globally interdependent and electronically enacted in real time, bypassing government controls, and determining the fate of economies (for instance, in 2000, on average, currency markets exchanged about 2 trillion US dollars per day). But also, the core of production of goods and services is globalized, organized around multinational corporations and their ancillary networks, accounting for about 30% of global Gross Domestic Product (GDP). International trade is also an important dimension of globalization, but the expansion of trade is mainly a function of the internationalization of production, as multinational corporations and their networks account for about 2/3 of international trade, including about 40% of trade that

takes place within a given firm and its networks. Science, and technology, and highly skilled labor are also organized on a global scale.

The global economy is highly segmented: not everybody is included, but everybody is affected. For Africa, it has been more exclusion with heavy effect; and the time has come for us to understand how the intricate relationships function, allowing for our full participation in the global ICT economy.

Speaking of this new economic order, let us review the new rules of engagement that directly impact today's global reality.

The new economy is powered by the Internet - the equivalence of the electrical engine, of the Industrial Age, making possible the operation of the network enterprise, the historical equivalent of the industrial factory. Information technology - including information based transportation systems are the basis of connectivity and knowledge-based production.

New rules for labor: Highly skilled labor is critical. - flexible adaptable, self-programmable, able to innovate by working in flexible enterprises.

New rules for capital: Financial markets are the core of realization of value.

Growth of value of stocks substitutes for profits as the determinant of the new economy, since it is the main criterion to attract investment. Market valuation is led by information -of which profit is one of the elements, but not the only one. In the long term, yes, profits (expressing productivity) have to be there for growth to be eco-

nomically sustainable. But profits may come as result of investment in labor and production, and this investment is attracted by stock valuation mechanisms that are driven by information turbulences in financial markets.

The virtual global economy is today becoming the "real" economy. The performance of firms in this information-based, information-driven, and information-valued economy determines the fate of the people and country, such as Nigeria, Ghana or Senegal. It is in this reality that African ICT professionals must put their collective brains together to fashion the way forward - including solutions in telecommunication, infrastructure, human resources and funding capitalization.

Human resources are critical; in fact this is the essential infrastructure, without which technology means nothing. The new economy is a people-based economy. This means education. But education is not the same thing than the warehousing of children. The key issues are the training of teachers, and the reform of the school system into a new pedagogy adapted to the Information Age. The university system plays a pivotal role in the new development strategy, both in training and in research. Furthermore, beyond the school system, there is a growing need for a multifaceted process of social learning over the life time.

Productivity in the new economy requires a strong technological basis, of which the Internet is the most direct expression. So, developing

countries such as exist all over Africa do not need to reinvent the Internet. But, Africa must learn how to groom an Internet industry. For Nigeria, Ghana or Kenya to be productive and competitive, the country needs to produce, sell, and manage with the Internet. Nonetheless, the issue of how best to apply this tool in any African country, without abusing it, nor using it as a cheap tool for cyber-crime, has fast become very crucial. For, while other nations are racing to define their "information utility" based on educational and commercial content, Africa (and Nigeria in particular) has been labeled the global capital for chain letters, the originator for 419 scams, and the bedrock of the latest cyber-abuse. Our charge now is to turn this around, and find the necessary content base for our technology users.

## Africa's Place in the Global Economy

The Information Technology revolution is changing everything, and we must work fast to adapt or be swallowed up by the waves. Under the current parameters of international division of labor, developing nations, such as most African nations, are threatened with structural irrelevance associated with their technological obsolescence. On the other hand, if properly used, the Information Technology revolution could spur a model of informatics development that would allow Africa to leapfrog beyond the industrial stage in our process of development. This leapfrogging strategy is difficult, complex, and

still unclear in its actual context. But it offers the best prospect to overcome structural, global inequality. Indeed, there are already numerous projects and programs around the world implementing development along these lines, including some UN, World Bank and USAID initiatives. Each African nation must mobilize its ICT resources to meet this challenge, and for Nigeria, the process started in 2001 with the coming together of over 500 Nigerian ICT professionals in the America, leading to the emergence of NITPA. The Nigerian IT Professionals in the Americas (NITPA) believes that Nigeria must be plugged into the ongoing ICT development processes; for the paradigm remains true, that for development to be cumulative and synergistic we need to redefine development in a global perspective, and implement a coordinated, global strategy. And how does this professional cluster define the main elements of this new approach to nation-building? The bullets below are extracted from the organizational charter:

- **Image Building:** Promotion of Nigerian image at global levels (through direct contacts)
- **Organizational Alliances:** Development of high-level partnership of organizations (NITPA, ITAN, COAN, etc)
- **Institutional Alliances:** Development of high-level partnership with government entities (Govt agencies - NITDA, NCC, Professional Entities, Educational institutions)
- **Business Alliances:** Development

of micro-level Business-to-Business relationships (between entities of interest)

- **Training:** Education of Nigerian masses on ICT through conference pronouncements
- **Fund Sourcing:** Building of framework for effective funding of ICT projects through collaboration between "needs owners" (Nigerian institutions), and "opportunity enablers" (NITPA-and the global agencies).
- **Capacity Building:** Creation of an effective ICT Advisory Board (a framework, at least)

To achieve the above stated goals, any such cluster must devise a networking, project engagement, and policy initiative strategies sustainable enough to assure that the above stated goals are met. For NITPA (which can be adopted by any other African country) these include:

- **Direct and continuous engagement** of all stakeholders (government, business community, academia, professional organizations, funding agencies)
- **Bi-annual Conferences,** one in Nigeria and another in the Americas (US, Canada)
- **Creation of the Nigerian IT Portal** (www.nigerianworld.org) to bring our capacity out to the world, with a visibly effective skills bank (www.nigeriaskillsbank.org)
- **Development of effective tools** to aid in fighting the 419 menace
- **Professional Exchange program** (between companies and organizations)

- **Establishment of ongoing training programs,** allowing for IT specialists from the Americas to provide training to Nigerian Universities, High Schools, and businesses.
- **Passage and enforcement of the indigenization bill.**

NITPA assured that different task forces around these issues are set up with implementation methods in place.

## An African ICT Manifesto: Meeting the Challenge

What we described above, if implemented expeditiously across African countries, amounts to an Information Technology Manifesto. For instance, with one out of every five Africans being a Nigerian, a population of 125 million, and over 2 million Nigerians outside the country, most in developed nations, Nigeria and all of Africa has abundant human resources that if harnessed well, will provide more income for the country than oil and gas.

Case in point is the much debated Indian model. Today's reality is one of networks of high skilled workers and entrepreneurs, moving back and forth between different nodes of production and innovation. Many people who come to Silicon Valley from Bangalore go back to Bangalore and to India, set up companies, and live between California and India. The same process is happening between the United States and Taiwan, Singapore, Israel, Mexico, China, and lately, Russia. The key here is to adapt same model of "African-Diaspora Networks", bringing in African talents

from around the world into these networks, so that ultimately innovation works back and forth regardless of boundaries. At the end, all earned incomes are retained in Africa, and more particularly, all project experiences and expertise are recycled among our people. We have for so long allowed expertise skills acquired in the process of building our systems, installing our networks and maintaining our infrastructures taken out of the continent at the end of each project cycle, only for us to require the same skill set from yet another foreign company months down the line. Our technological survival, the future of our development is in our hands. Africa must rise and meet this challenge, and we believe that the NEPAD and other African initiatives constitute a good foundation for African emergence. All progress-loving Africans must look forward to future implementation of sustainable ICT strategies leading to a bright ICT future for the continent.

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