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The role of governments in planning and developing digital libraries in developing countries

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Abstract

ICT revolution has not only presented us with a powerful technological instrument to boost up creativity, innovation, economic prosperity, social mobility, solidarity and welfare; but also paved the road for mankind to live in harmony in their societies. The World Summit on Information Sciences has time and again emphasized the dynamic role of ICT. as enabler of development, by improving positioning in the global economy, and directly targeting the full range of development objectives. This is anew vision for developing countries, LDCS, and countries with economy in transition to make a tiger leap to catch up with the rest of the world. The challenge now is double folded: to balance a sustainable economic growth with social empowerment.

In order to leverage the cross-sector benefits of I CT. government involvement is crucial to create and reinforce strategies via coordinated deployment of resources, Strong, active sponsorship and wider involvement of stakeholders to make developing countries ICT-centric economy, banking on development of adequate networking mechanism, capacity framing, and re-enforcement of co-operation and collaborative work. The transformative power of ICT.is best manifested when applied in traditional communities where comparison between indigenous actual modes of life and the proposed potential of ICT reveals a lot of disparities

The paper concentrates on ICT training in quest of behavioral changes at different levels governmental ‘strategies, initiatives, investment in ICT. etc.” and societal “human resources development, alleviation of Poverty, eradication of illiteracy”; taking the Sudan as an example.

The issue of DL using Greenstone open source soft ware is introduced. In both the agrarian and the industrial societies ICT. has encouraged and led to great hopes and dreams to establish the Information Society where all individuals have the right of access to Information without barriers social, political, or technological, this issue is addressed.

Paper ends by taking a concrete example (Ahfad Women University/ Sudan) where GSOS is practically used for building, organizing and preserving national heritage and making collections digitally maintained. Data, Metadata is now completely searchable on the Web. Problems and limitations encountered are indicated.

The Role of Governments in Planning and Developing Digital Libraries in Developing Countries

Paper presented by
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Introduction:

The second half of the 20th century witnessed real, drastic, organic changes in the global society that affected many scholarly dynamic fields such as administration, management, economics etc. Such fundamental changes could not be compared to any thing, but to those changes caused by the Industrial Revolution took place at the 18th and the 19th, and considered by all scholars and scientists the most imperative up lift in Man history, the impetus behind these changes was the Information Revolution manifested in Computers and Computers applications which, in a nut shell a resultant of the Industrial Revolution itself. A new age came into being. Information Revolution towards the mid fifties of the previous century was coupled by another Revolution, not by any means less than it in both effect and significance i.e. the Electronic Revolution manifested in Tele communication devices, together, the two revolutions made what we refer to as command of Information Revolution "ICT" which precisely describes the coming together of computer and data transmission technology, to revolutionize Information Systems:

Computers are able to talk to each other, over Tele communication links, or can transmit data to and from remote terminals. Remote terminals can send data to computers and receive output messages.... Information Technology also involves other equipment and Information transmission systems, not just computers; for example, there is electronic mail, facsimile, cable television, Tele text, Electronic Telephone Exchanges, Satellite Communications and Data Transmission using laser Technology. In developing countries the shift from oral tradition communication to electronic communication has always been described as the paradigm shift.

Recent years have significantly raised the speed of retrieval, storage capacity and the accessibility of much more complex, accurate and diverse Information sources. This has given a global dimension to local Information... Remote villages, international towns, can communicate via Instant Direct Dialing (IDD) with any place in the globe, and also through the Internet. Information can be retrieved and displayed world wide at much lesser costs than through conventional modes like postal services, TV or news channel. These developments created many business opportunities for either those, who produce and market ICT itself, or those who realized the commercial value of speedy, cost-saving communication and data transfer.

Information Technology:

The Industrial Age imperatively has given way quickly to the Information Age; arguably the technological advancements have paved the road for many electronic challenges and opportunities to present themselves in favour of human kind, making life easier than before. The convergence of applications, and the content Delivery of

computing, Tele communication, Electronic publishing, the revolution in Multimedia, the driving force behind innovation and manufacture of hard ware as well as soft ware, globalization and its implications; all these factors collaborated in shaping the map of the new world, notably the effect of these concrete factors is reflected in the following areas:

- Investment in education "capacity building"
- development in ICT infrastructure "modern technology"
- growth of investment in R&D
- growth in ICT development (question under review).

To start with, one indicates the very fact that we have been in the Information Age for a considerable period of time that we came to understand quite clearly what is meant by the phrase "Information is Power". The thrust and the significance of Information is well illustrated by the fact that now a days we are all with out any discrimination very much fascinated and fond of associating our selves with the glamour of Information culture, and the magic of electronic environment even if it is just for intellectual pretension. Presumably it is the fashion today to add the term Information or knowledge to any idea, old or new, so as to highlight it and give it new connotation, take for example and for more insight the following (newly coined) phrases; Information Society, Information Age, Knowledge Management, Knowledge- based Economy as it is the case in the issue under review. If we are brave enough to bring about in our phraseology and new vocabulary building, the very hot, on- going phrases digital and electronic, then emphasis will be focused directly on Computing and Telecommunication epitomized in the Internet; and eventually indicating the use of Networking Technologies. As a matter of fact, ICT significance is increasingly promoted by the proliferation of microelectronics, and the down escalation in the cost of both, computing and data transmission. Progress in this respect is revealed in many aspects, such as E- Commerce, Internet Hosts, etc

Why Know About It:

An individual must know and understand about IT in order to use it effectively and productively. In a report produced by Committee on Technology Literacy, entitled, "Being fluent with IT", four broad categories of rationale motivating quantitatively and qualitatively the understanding of IT, are indicated

- Personal rationale
- Workforce rationale
- Educational rationale
- Societal rationale

Because of these rationales, every now and then a new technology is introduced in our midst, intending to make our live easier, some of these technologies die quickly leaving no trace behind them, other take hold, and acquire a momentum and become revolutionary in magnitude; this very type of technology changes and colours our live, some times results in very sharp upheavals affecting our way of thinking, that is to say "scholarly change", and the way of getting things done meaning "managerial changes". Computer & Communication technologies are two good examples to illustrate our point; their remarkable impact is more or less like that of the steam engine, electricity and solar energy the time they were invented.

Now it is an established fact among planners, executives and successful managers

that managing a modern organization depends increasingly on managing Information & Knowledge of and about that organization. The Information Revolution has vastly increased the capabilities that are available for analyzing and transmitting Information on the one hand; on the other hand, Communication Revolution in particular, has enhanced, and notably revolutionized Information handling and transmission. We are presented at the moment with an avalanche of modern technologies working collectively to make life easier; digital manipulations, high connectivity, reliable interactivity, new horizons in terms of manufacturing and producing new multimedia accessories, new business opportunities, new applications and new interfacing of different traditional apparatuses, giving them new qualities of novelties and functionality etc, etc; all are fueling great Communication explosion analogous only to that of Information. The nearest and the best example to demonstrate the hegemony of ICT is the Internet, particularly the Web. Headline news pushed to the desktop, web browsing from a palmtop, cyber book stores, auction houses; all these and many others are typical examples of how the web has fundamentally changed where, how, and when we do business. Kofi Annan, the Secretary General of the UN, intelligently recognized the significance of endorsing ICT in his future world development plans. Annan says: If the world is serious about achieving the millennium development goals of halving the number of people living in extreme poverty by the year 2015, ICT must figure prominently in the effort.

The use of ICT and services, group-decision, super systems, electronic mail, electronic data interchange (EDI) and electronic Information services such as videotext, audiotex CD ROM, and of course all the on-line services, has received a considerable attention in recent research, and practical daily life, currently all these issues are integrated in intelligent Networks. .

Now it is banal and entirely self evident that ICT capabilities can add to an organization's growth and effectiveness by topping and improving the abilities to gain and use Knowledge adequately, and to communicate it to the end users.

It is plausible, banking on what has been said so far, to remember the salient fact that ICT despite its glamour and prestige is just a tool for appropriate manipulation of Information and acceleration of its impact in development. In the words of McGee & Peusak, advocating the significant role of Information 'IT investments create no more value, by themselves than do investment in a new machine tool...The value of IT depends on Information, and the role of Information in organizations'

Never the less despite, once again, all the glories attributed to ICT, it is very difficult with the sudden leaps which are the features and the main characteristic of technological development, to foresee those convergence which markedly influence the Information landscape, prediction is not possible, in itself is a major drawback. The only truth we are certain about at the risk of repetition, is that ICT is changing our live, our disciplines, our way of thinking and perception and our modes and modalities of getting things done, what else is left untouched? High potentials in microcomputers and multimedia are very much telling, capturing, and compelling. But, alas with the swift changing variables, and with the swift rhythm of technological progress and advancement, we can no longer talk about traditional disciplines in the same way and manner of Aristotle in his ten predicables based on ancient Greek logic, or Francis Bacon and his fascinating efforts in organization of knowledge, or Ranganathan in his famous epistemology, or even Jesse Shera in his

fabulous very recent hits in knowledge classifications. Nothing is absolute, all disciplines are open for change, modification, or entire deletion and we are presented with a new notorious literary and scholarly map still open for more changes and alterations. Control is a missing term in this respect.

The challenge today does not rest with the mobility of disciplines- which is more or less analogous to social mobility in a sense that both are chaotic-, but the real challenge is manifested in the repercussions of having them mobilized in a completely new and extremely turbulent-we do not want to say alien – environment ie the digital environment. Three features of turbulent environment are identified by Rosen (1995)'

as follows:

- Predictability: this is dependent on the adequacy and timeliness of data, obtained perhaps by constructing alternative scenarios or by futurology
- Complexity: inter-relationship and local variations in a fast changing world; multiplicity makes strategic control of a large Organization very difficult if not impossible

Novelty: (Expect) the unexpected; new market; new electronic capabilities; there is a need for flexibility

Here the pace of technology is threatening to bewilder, hence a host of many problems is the resultant. As a matter of fact, we can not dream at any given time or point of understanding or containing sudden, abrupt and uncontrollable changes as has been indicated before, but we are "supposedly" ought to do our best to appreciate changes at least in the most important touching issues affecting directly our norms and values and our basic needs, such as agriculture, education, industry, medicine etc, the latter notably is one of the fields that benefited tremendously from the high technological revolution, consider e g medical images, it is debatably one of the most powerful diagnostic tools available, with out hesitation one says, apart from X-Rays radiographs which are essentially radiological images acquired using films in analog format; all other medical imaging are conducted in digital format. At the top of all these fields of knowledge affected by digitization is of course the field of economics comprising all issues pertaining to the term "development". This is the area that gained very sound reputation working in a digital environment, and where we are going to concentrate our debate. "Economy" in this context is going to be one of three major topics to deal with, inseparably, through out the paper namely:

1. Information Technology
2. Digitization
3. Knowledge (or Information)-based Economy, some times known as the Internet Economy, in many cases known as the digital Economy, and more often than not, the issue is referred to as the Economics of Information, terms are often used interchangeably. Our aim is to demonstrate role of ICT usage in development, with specific reference to developing countries, LDCs, and countries with economy in transition.

In the above mentioned new pattern, the expectation is, either that new approach consolidates and intensifies the economic and social cleavages between, as well as within nations; or it provides a good base for equitable participation in a new economy, where knowledge, adequate, readily accessible are provided .To recapitulate one says, a network in this respect is of a paramount significance, for accessibility and interoperability.

Without hesitation the top of the tops here is the Internet.

Internet, telecommunication reduce economic transaction cost, minimize risks and uncertainty pertaining to distribution of goods services in high mass consuming societies compared to prior tracks of telecommunication. It is more extensive, revolutionary and glamorous; there is some sort of correlation between telecommunication and economic growth manifested in business transactions, new economy based more or less on faster means of communication, the engagement of traditional enterprises in newer, functional modalities in business management such as e commerce, e banking, e government etc. is an other significant example, the direct effect of ICT on the daily routine of life reflected in quick household services, very fast adequate connectivity, data transmission, instantaneous access to remote areas, distance education, capacity building etc. Traditional societies are under the threat of being left behind in the rapidly hanging cyber communities. Introduction of ICT in communities striving food, medicine, and clean water is a very sensitive issue that should be tackled carefully, and should go hand in hand with the improvement of social conditions and social environment, take for instance the Sudanese community, socially there are two very distinct categories of people; the upper stratum i.e. the elite, well of, highly educated with good offices in the central and local governments, live in urban vicinities, they send their children to private schools. The second stratum is the lower class embracing the overwhelming majority of the population sparsely distributed in the vast rural areas, poor, illiterate, inhabit the remote deplorable rural areas with limited or no schools, hospitals or other human services, suffice here is to mention that life expectancy is extremely short. The critical point is the fact that no middle class exists. This is the class where ICT could do miracles and change the shape of life drastically This is not a far fetched dream; with the remarkable leap of Sudatel 'the National company for telecommunication'; the possibility of connecting rural areas is gaining momentum. The Internet up to this moment is an urban phenomenon being dependent on fixed telephones; connectivity in such situation is fraught with difficulties, this suggests that wireless technology is a possible solution. People in the Sudan are very familiar and deeply acquainted with wireless technology, mobile telephone is widely recognized, in rural vicinities apparently it is the technology they unanimously opt for without inhibition, hence chances of creating a mobile society are taking the lion share among ordinary simple citizens compared to that of Information society where the Internet is the dominant feature for obvious reasons, to use the mobile one doesn't need to go to school; with the Internet the case is different, one doesn't only need to be literate in his/ her mother tongue but also needs to master an other language namely English to navigate and search the net adequately. This is an other indicator that the pre-requisites of ICT is not equally distributed among all nations, Sudan is no exception in this respect; all developing countries experience the same serious problems Yet we have to remember globalization is a sweeping merciless phenomenon that couldn't care less for equality and equity when the question of transfer of modern technology is under focus. DCS. and LDCS are treated on equal footing regard less of their socio-economic structure, effect is almost crosscutting. Logic of things emphasizes that diffusion of ICT which, is more or less an industrial revolution 'creature' into pre-industrial societies never undergone the practical sophistication's of western societies, still suffering from all symptoms of backwardness and mal-management, calls for a serious exercise to be carried out before any jump-start is contemplated, exercise

comprises the following yardsticks:

- Favourable social conditions conducive to diffusion
- Affordability to set the right infrastructure
- Knowledge and expertise for adequate utility
- Right contact with the source and origin of technology to maximize benefits and minimize inhibition and alienation. E.Rogers suggests that diffusion occurs rapidly between homophiles

Digital Transmission up date

ICT is a technology that does not take a rest, always ever- changing ever- growing and clinging tenaciously to our mentalities and actions, to the extent that it became parts and parcel of our daily routine. Let us take and examine the prompt evolution of a limited number of the existing services to demonstrate our argument, and see how pivotal and central they are. May be we should start with the Direct Broadcasting Service (DBS in developing countries), being the nearest to our conception, so it needs no more qualification. In short, it is a new invasion which is extremely emotionally loaded, most uncontrollable, most irresistible that it became an integral part of our live, the question we ought to ask here is not “how” because it is obvious but the question is “ why” , the answer is simple, because socio economic and cultural messages normally enjoy a high degree of receptivity among viewers. Then take along the same line the multicast services manifested in many TV- based activities; we will mention quickly and selectively the interactive TV which constitutes the ultimate goal of matching video-based entertainment and Information with viewers activity engaging, or even creating video content, thus out dating the analog- based telecasting which is as we all know, a one way communication , degree of receptivity and participation is extremely high ; take also in the same context, Wireless, Digital Radio Services, Video Delivery Services, Telephony Services, Data Services, and a whole sale of cable services , with cable TV services featuring prominently. At a very high top comes of course the Internet- on TV services, which is virtually a hi tech., that provides windows or browser-type interactivity in the form of graphical or text enhancements over a broadcast video background;

. A variety of companies are involved in this technology such as: Microsoft being in the lead, followed by World Gate and More Company etc. because the technology gained momentum

Needless to comment. The story obviously is endless, and the pace of technology is frightening.

Digitization

Digitization is one of the hot if not the hottest issue catching the attention of many radical librarians, to build a digital library, requires- naturally - that the content of a collection be available electronically, in the words of D Baker, digitization is the process of converting any thing physical or analogue item into electronic representation or facsimile

The rhetoric of the Information High way has provided the impetus to convert many existing paper-based (or sound collection) in to, or translating a piece of Information, such as a book, sound recording, picture or video, into bits. Bits are the fundamental units of Information computer system. Needless to mention here that digitization is achieved by different types of technology.

The amazing fact is, with digitized services there are many good qualities ought to be appreciated:

- Availability of Information is secured, bear in mind people used to talk previously about the scarcity of Information
- Quick, reliable accessibility, the technology to day enabled multiple users to access Information at the same time
- Digitization makes stand alone databases scalable and interoperable. Information scientists are now able to build effective, scalable Web Sites to serve digital demands of patrons.
- Digitization enables both, the user and the indexer to identify and acquire Information regardless its physical location

The concept of resource sharing is practiced to the benefit of the end user. To be precise one indicates that there are still many good qualities to be added infavour of digital application:

- Build up virtual communication
- Immediacy of accession
- An economic value manifested in reduction of cost and maximization of gaining as a result of efficient connectivity, and inter-workability of numerous data bases. D. Baker gives a good account of what we could gain from going digital:
 1. Quick multiple access points to materials.
 2. Provision of alternative access to originals.
 3. Preservation of physical originals
 4. Enhancement of the content
 5. Integration of Information to other type of provision
 6. Integration of many different media/ collections through one access.

As a result of business becoming information-oriented, as competition between companies is increasingly being based on information, as services, promotion and marketing and eventually every single step in business is more or less information loaded; without organization and knowledge management, chaos is no doubt is the total product .The global exchange of Information and Knowledge that is driving the Information revolution is rapidly becoming the foundation of business and society, revolution that is challenging the traditional methods of work, trade, education and family life. The ability to transfer and process Information quickly, conveniently and inexpensively has become a prerequisite for economic growth (Naidoo, 1998)

The Digital Library:

With out adding marble edifice, this virtual library is by all measures transforming the image of Information provision. Technology, its 'imperialistic thrust', to borrow Neil Postman phrase, is forcing librarians and technologists to struggle together in the evolution of a new profession. For an authentic interpretation of this new offshoot let us consider Matson, L definition: a digital library is a library that maintains all or a substantial part of its collection in computer- processible form as an alternative, supplement, or complement to the conventional printed and micro film materials that currently dominate library collections.

The real challenge in my opinion is; neither to be taken by enthusiasm and to follow the technological current blindly nor to resist it ignorantly, is 'the challenge how to correlate

traditional methodologies with new technologies, so that we ensure an adequate system for access to Information and knowledge'

ICT industry in itself is a great contribution, as it will be proved during the course of discussion, a solid contribution to the GDP. It is a business investment. In advanced countries such as USA economic growth is highly dependent on ICT, hard ware and software. This is an exciting area for economists to investigate. Obviously we can not investigate the role of Information at large in this short paper, so our emphasis in this account will be placed on use and application that foster economy, through the use of digitized Information, which creates a market place through the Internet. Peter Lymann stated that as IT has transformed the practices of Knowledge discovery, the results, cultural, scientific, the new social environments and institutions that we have begun to call the Information society and the Knowledge Economy.

Since the whole issue of the global economy is now knowledge oriented a very quick resume' on the essence of keeping knowledge within control is needed, reference here goes to:

Knowledge Management (K M)

Before we are drifted astray by the strong, sweeping current of ICT –we have already dwelt on, and definitely we will deal with elaborately later on-, I think it is high time to stop and contemplate the crucial issue of Knowledge Management (K M) which actively dominates the Information floor these days, as it is pivotal and directly relevant to our theme of discussion. New to equation is the novelty of managing Knowledge itself, the concept entails monitoring Information and Knowledge by measuring and modifying Knowledge modes of processing and their environment, obviously a very long and complicated steps and ideologies are involved, we are not intending to discuss at the moment, but we thought it may be important to draw attention to their presence. KM provides a managerial perspective on the effective use of ICT for strategic advantage and operational performance in global organizations. IT is a newly emerging, interdisciplinary business model dealing with promoting interests and productivity of an organization through integrating internal data and activities with relevant external resources. Rudy Ruggles , a leading thinker and practitioner identifies eight-8-salient points in favour of application of KM in development and in E Business in particular

- Generating new knowledge
- Accessing valuable knowledge from out side sources
- Using accessible knowledge in decision-making
- Embedding knowledge in processes, products, and/ or services
- Representing knowledge in documents, data bases and soft ware
- Facilitating knowledge growth through culture and incentives
- Transferring existing knowledge into other parts of the organization
- Measuring the value of knowledge assets and/or impact of knowledge management

Abundant knowledge is both a challenge and opportunity; opportunity in a sense of good utility, yet it is a great challenge because of the over whelming amount and diversity of Information available. Rebecca O Barclay in one issue of Knowledge Praxis points: we

define: KM as a business activity with two primary aspects :

1. Treating the knowledge component of business activities as an explicit concern of the business reflected in strategy, policy, and practices at all levels of the organization
2. Making a direct connection between an organization's intellectual assets-both explicit (recorded) and tacit (personal know-how), and positive business results. By this definition, Barclay presents the two parameters that differentiate between Knowledge being (explicit & tacit) and Information, which is always explicit the moment it is subjected to documentation,

Therefore, the essence of KM in a nutshell is:

- Asset utilization
- Knowledge evaluation
- Knowledge improvement
- Knowledge accumulation
- Knowledge generation
- Knowledge sharing
- Knowledge production

Policy for ICT Acquisition for Developing Countries

For sustainable development in developing countries and LDCS priority should be given to ICT. There is a pressing need for government proactive policies across a broad range of fronts with out emphasizing or over looking any to secure endorsement, and utilization of ICT. Focusing on bridging the gap in opportunities for those with limited access to technology; bearing in mind that disparities in ICT access and usage between countries continues to exist even in developed countries, while disparities in Internet and mobile usage is reducing rapidly, suggesting the possibility of more even and wide spread access to ICT. In our context prioritizing resources, increasing connectivity, expanding access, and retaining skilled labour are the main four challenges facing our governments. There should be a strong commitment to be "wire places" to be followed by sound initiatives and programmes storming and overwhelming the entire community preparing it to react positively towards the paradigm shift expected which is envisaged in the establishment of Digital Libraries

Uneven distribution of technology, and inequality in access to technology, are apparent in variety of ways obstructing social, political, and economic development, resultant of this attitude and situation is what we refer to as the digital exclusion; leading at the end of the day to marginalization, absence and lack of representation in the global collective participation. Inequality can be seen:

- In terms of level of technology "infrastructure"
- In terms of level of connectivity "Internet hosts, PCS, Internet users, etc,"
- Level of access
- Level of income, which is a true measure of the digital divide.

Digital libraries which are seen as the heavenly answers in developing countries have no or a meager chance to exist in poor societies let alone to make an impact. This is juncture where the government intervention is most desired in collaboration with all interested

parties, namely the partnership between the public sector, and the private sector, the stakeholders, civil society organizations and possibly the NGOS. There are seven (7) distinct areas specified by the UNCTAD in its report entitled "ICT Development Indices 2004", need to be addressed for utmost commitment officially to guarantee success:

- General policy Vision, policies on ICT environment
- Net work infrastructure
- Technology development
- Technology diffusion
- Diffusion in business
- IT skills, education and training and initiatives
- Global and International Co-operation

The practical interpretation of the above mentioned sign posts are seen in the following platforms:

1. Adequate Connectivity; measured by Internet hosts per capita, no. of PCS, per capita, no. of telephone main lines per capita, no. of mobiles subscribers per capita, the aggregate of all these measures gives true indicator of infrastructure development
2. Access, covers no. of estimated Internet users, adult literacy rate, cost of a local call and GDP per capita (Sudan GDP per capita is less than \$100, cost of a local call is &\$2, this means that opportunity for high level of access is almost nil)
3. Policy; manifested in , Internet exchanges, competition versus monopoly

The role of government in developing Strategies & Initiatives for DL In developing Countries

There is drastic shift world-wide from papers to the screen and from the screen to the net work. Documents in this respect acquired a new definition. D, Baker in a 1998 article wrote

"What is an electronic document?. It is here defined as information presented electronically with the same objectives as a paper equivalent and additionally, information is stored electronically in multimedia from which may or may not include graphics (static), video (moving images), sound, text as hypertext (e.g. SGML, or even ASCII), software, data set etc.

Governments in the third world should prepare themselves for such drastic change. The change from traditional libraries with all its implications and repercussions to a new form of libraries i.e. the digital libraries. Change does not occur with enthusiasm and lip service, as it was the case when professionals in emerging countries were defeated when they were crusading for the establishment of traditional libraries two or three decades ago. A national strategy should be the guide this time. Certain elements ought to be spelt out as directives for commitment:

1. Visions:

New concepts are highly encouraged to endorse ICT, as enabler of sustainable development and a catalyst for social change , here is the platform where DLs programme helps bringing innovation through endorsement of Research and Development R&D, bringing valuable information for the community introducing it to the information society. Ignoring ICT in such fast moving ubiquitous world means

alienation, digital exclusion and social banishment.

The significance of clear-cut visions is implicitly and explicitly reflected in planning at various levels; retrospective, current, and futuristic. It helps planners and executors in scientific thinking, prediction and evaluation, mainly to devise the right programmes for adequate implementation. More over, visions play an important role in convincing decision-makers, government officials, donors and other interested parties to get committed

Visions constitute the backbone for building the general strategy for ICT. In development through:

1. Endorsement of ICT in development, and establishment of DLs. To supply information and reading materials for literate at various levels
2. To educate the 90% of the population who are non-literate by supplementing and joining forces with schools, literacy classes by providing follow up materials and practical extension work
3. To make information available through academic, scientific, and technical libraries a national resource to accompany development

In a society almost oblivious of the significant role of library provision, two pivotal processes, which are not mutually exclusive; are to take place (Social obligation kit):

- Creating the general awareness;
- Educating users.
- Citizens should have a feel and appreciation of gains and benefits of DLs especially the disadvantaged in remote villages far away from centres of civilization and excellence. This the environment where the impact of ICT can not be mistaken for several reasons, the most significant reason is, the relevant technology could be very useful for the local people, using local materials, local labour;
 - to provide essential machines for small-scale development and to identify techniques which are relevant to human needs in particular places;
 - To train school leavers in simple techniques;
 - To stimulate production in the towns and villages as distinct from mass production in factories'
 - To use locally available materials;
 - To rehabilitated the disabled;
 - To provide opportunities for the employment of women in places where they live.

Unless the ICT project affects the people's daily lives and it is part of the structure of the community problem- solving technique, all efforts will be wasted, Wide publicity is the only answer

The right choice in this respect is the integrative approach. Strategy in our context could combine two folds not mutually exclusive; first on the part of the government what preparation pre-requisite and logistics should be catered for to create the adequate environment for DL, the second concentrate on the technicalities of building the DL, In this paper I will deal with the first fold i.e. the role of governments in the development process. We start with:

2. Legislation

This is self-evident, it starts with the political support i.e. government to declare its blessing and material and moral support. In our context, the Head of the State issues a

presidential decree to be announced ceremonially via the media; next step is to pass the necessary legislation, ministries and related government departments such as ministries of Information, Science and Technology, Education, Central and Local governments etc. Academic and Research institutions, possibly NGOS and civil society organizations are involved. Precisely this is the area where the required laws and by-laws are formulated in favour of the big project

The most important component here is the creation of a national body, to fight, to lead and to co-ordinate with other agencies committed or exhibiting signs of willingness to co-operate

3. National policy

In a nutshell, it evolves round classification and prioritization of developmental schemes and how ICT namely DLs figures in. Each country has its own visions, aspirations and expectations but professional unanimously agree that a National Body should be appointed to be in charge.

4. Infrastructure

We do not need to emphasize this point because it is the only pre-requisite fully understood by decision-makers in third world communities, there is a great tendency to overlook other logistics in favour of hard and soft ware in the wrong assumption that integrating ICT in development means precisely installation of computers and networks full stop. End product. Computers remain silent over desks of high officials for intellectual pretension. This picture of investing heavily on infrastructure keeps repeating itself in all developing countries Sudan is not an exception. The right approach now is to invest in connectivity with out losing sight of other salient factors supportive to transfer of technology.

5. Capacity Building

In developing countries, this issue is imperatively top priority. It takes many, different shapes and different levels so as to cover a wide spectrum of users. The main objective is to familiarize people with computer usage and to overcome machine inhibition. ITS and IMS are – naturally- the key persons to lead the campaign and the outreach programmes. The role of the campaign in this context is sweeping in nature; it covers:

- Training of trainers
- Decision-makers
- University staff and students
- Pupils and school leavers
- The public

Training programme is open making use of all available means to communicate the message. These are some of possible avenues:

- Establish training institutes
- Take advantage (hire) of the existing numerous ICT institutes working commercially and diffuse and disseminate knowledge and information
- Use universities and government IT labs. AS evening in the manner university lecture rooms are used as evening classes
- Libraries premises and schools buildings should be tapped for the same purpose
- Librarians and school teachers are expected to play a significant role in boosting the campaign at least within their domains and in villages where they live

- Cultural Centres and Cultural and foot ball clubs all over the country are the best options if well equipped with the required tools , because attendance is almost 100% especially in rural areas where these clubs are the only out let for villagers , it is a good opportunity to meet friends, play cards, listen to radio and watch TV. Learning computer skills would be I guess an exciting game to try.

- Literacy classes should not be over looked in the midst of computers fever

- The media (Radio, TV, and the Press) ought to be mobilized to play their informative and educative roles in the information society. DLs are the back bone of media performance

One of the very encouraging factors to be mentioned here is the fact that computer s kills became compulsory courses in the schools curricula on equal grounds with languages and religion and other compulsory subjects

Educational opportunities are available in the Sudan coupled by the desire and enthusiasm of the public to be computer-literate. University students generally speaking and postgraduate students in particular always report experience of attending formal training in computers, and computer applications. Most of them are familiar with on-line and computer-based programs. In order to further their education, to improve their careers and work performance, they take the initiative to attend computer- based classes to acquire knowledge and skills to achieve professional excellence. This accounts for the wide spread of computer training centers working commercially targeting researchers and students. If the abovementioned factors are taken in conjunction with the fact that the no. of universities in the Sudan has almost (previously 7 univ.) tripled, one can say confidently – again at the risk of repetition – chances for growth of DL libraries are great. Ministry of Higher Education banking on this encouraging atmosphere embarked on a leading project entitled Sudanese libraries Virtual Library; project is supervised by University of Khartoum. First stage concentrates on university libraries, within university libraries great attention is given to the big issue of digitizing the Sudanese national heritage. Starting with The Electronic Theses and Dissertations Program ‘ETD’ using open source soft ware (php My library) accommodating all previous WIN/ ISIS records, to followed by special collections in various university libraries.

6. Current Awareness

The issue is closely associated with capacity building in a sense that information should be disseminated for enlightenment the only difference is, the former is informal while the latter is more or less formal, both are badly needed in the platform. People are usually enemies to what they do not know .It is most effective when it takes the institutional form, it could be devised to cover lectures, seminars, practical demonstrations, chatting sessions etc.

Current awareness should start and concentrate on the decision- makers before any other stratum – of course without loosing sight of others- for several reasons, the most important ones are:

- They are the public purse controllers

- They need DL Libraries for organizational management, policy –making, and decision-making.

Current awareness by definition ought to promote and focus on the endorsement of establishing DL, using free open source soft ware to bring together local and international wealth of knowledge before decision-makers, community leaders, and the public for

management, to improve capacity building, to mobilize the whole community economically, politically, and socially

Sudan Attributes for Digital Libraries

Basic Information

Sudan extends over two million square kilometers, bordering nine countries; total population is 30,000,000. Telecommunication history dates back to the mid nineteenth century. The present infrastructure is a modern digital network

Status of ICT/ICM

In the Sudan

Sudan in brief is more or less government centered in all matters pertaining to policy making. And providing services, people themselves defer many developmental issues as being government concern; they have nothing to do with them

Government decided to privatize the state –owned Telecommunication Corporation, 1992 government passed regulations defining basic and value added services. Responsibilities including universal access obligations were stipulated in regulations for providers. Sudan National Telecommunication Corporation (Sudatel) came into being with concrete objective i.e. to encourage investors; company was given five (5) years monopoly extendable for three terms depending on good performance of the company which is still taking the lead. Telecom. Act 2002 designated Sudatel as the sector regulator shouldering all regulatory functions such as licensing, tariffs approval, spectrum management, interconnection approval. The Sudan Telecom. A digital network now replaces Public Corporation (STPC). Available information- relatively old data, needs to be up dated- indicates the following facts about it:

Wire line Telephone Network

Installed lines	1,500,000
Subscribers	990,000
Switches	238
International Gate ways	2
Fiber routes (KM)	6600

Gezira Telephone Network:

With a Japanese grant , the Gezira Scheme established its own private net work since 1988. It is not longer functioning properly as it failed to cope with the current of automation and digitization of the scheme administrative functions and shortages in spare parts

National back bone:

Combines fiber routes with satellite and microwaves links. Fiber links exceed 6,600km covering the northern part of the Sudan

VSAT Stations are to link remote small localities to the main network

Internet Connectivity

Sudatel monopoly on International traffic includes data and voice traffic.

Khartoum enjoys good connectivity, few big cities have local connection to the Internet , while other locations use national long distance calls to get connected a very expensive option. Dial up users are exempted from subscription to services, Sudatel levies charges with telephone monthly bills. Broad band Internet connection is rapidly gaining momentum

Internet usage at its early beginnings was confined to selected few such as government departments, organizations, academic institutions, cost of calls was inhibitive expensive , ordinary citizens can not afford it; providing services for a considerable period of time were restricted to Sudatel . Very recently new provider came into being – Zena net- but still dominated by the government official net. At the risk of repetition, telephone services up to a recent time remained government monopoly in both shapes fixed mainlines and mobile telephones. Few month ago two companies fixed mainline Kanar) and mobile (Areeba) were allowed to compete. The role of non-government agencies is minimal; public sector and private sector have hardly come into partnership to promote or execute developmental enterprises.

Government started its support and promotion to usage of ICT by putting the eggs in one basket I.e. investing heavily in infrastructure enabling certain government agencies to take the lead, resultant of this procedure emphasis were placed on connectivity as such at the expense of other significant drivers; overlooking all basics of strategic planning reflected clearly in relegating or overlooking some fundamental issues:

- Affordability
- Readily access to the Internet
- Relating ICT to development is incidental rather than being consciously worked for
- Training, capacity building are not well catered for

ICT in such situation is definitely the prerogative of the elite inhabiting urban cities, deepening the cleavage between urban and rural societies which was previously an information gap often referred to as (the unbridgeable gap), now the gap is even more acute and serious described as a digital divide. For people lacking basic needs; food. Medicine and education, gains and benefits of ICT are not likely to materialize.

Evaluation of the present situation

Mobile Network

Mobile Telephones in the Sudan proved to be the best penetrating, the fastest and cheapest technology to make a real uptake, demolishing all features of inequality in terms of connectivity and access. The technology invaded the rural areas equally good as it invaded urban societies sweeping all signs of technological and social barriers.

Internet Hosts, apparently despite of the fact that Internet now is evolving independently with out any obstruction of physical location, still hosts remain influential when issues such as the content and language used in communication are dealt with. We have to note that mobiles in DCs are still used in a very limited narrow sense particularly in remote deplorable rural areas (mainly to say hello to a friend), unlike usage of mobiles in developed countries taking advantage of mobile handsets now developed into fully

integrated multimedia device including among many other facilities Internet connectivity. Technology more often than not is adapted and related in terms of usage to certain unique actual or potential norms and values that shape utility of technology

PCs

The uneven distribution of PCs world wide is clearly indicated by ICT Development Indices Report 2004 by stating that 20% of the world population had access to 80% of PCs 2002. This piece of information is annoying. PCs are strongly needed for boosting ICT usage in development and promoting skills and introducing the (E) culture into traditional societies, the e- business, e-commerce, e- banking e-government etc. The wide spread of Internet users in developed countries raises hopes that developed countries will expand their access to the Internet

The aggregate of the above-mentioned information suggests that the general circumstances favour the establishment of digital libraries for open flow of information for development to revolutionize the prevailing reality in developing countries to cope and position themselves in the information society.

Digital Libraries in the Sudan:

Endorsement of ICT in development is an issue with out opponents, yet practical steps are very slow and fragmented. Piece mail provision doesn't give clear picture for purposes of evaluation. Starting point came as initiatives from some professionals and academics to keep abreast with their ,they came to appreciate ICT because of their association and contact with developed countries as post graduates over seas students in Europe and North America .Gradually the motion speeded up and accommodated by government and some commercial companies Sudatel (see p.14) came into being with the political and official support to lead the telecommunication revolution in the Sudan and dominated over other institutions interested in the field . It was not a surprise for **Sudatel** to be the first company to establish a national digital library in the country. Sudan National Electronic Library "SNEL"

Some Basic Information:

- SNEL uses open source soft ware (N-Tier)
- System endorses Mark format to meet libraries requirements for organization of knowledge according to Anglo American Cataloguing Rules
- For transmission of Information, system met all universal standards and protocols such as Z39.50 and OAI for hunting remote information
- Storage and Retrieval use both languages, English and Arabic covering all sorts of information including Audio visuals e.g.
- System is browsable, downloadable, and fully searchable with various
 - Key words
 - Full text
 - Indexes
 - possibility of building links between related data
 - Manipulation of search strategy
 - OAI, Z39.50

Data bases

- Academic thesis

- Electronic publishing
- Learned journal
- Services.

Conclusions

Several government departments, academic institutions, private as well as government companies started now to digitize their special collections and establishing digital libraries , to mention only few , almost all State well established universities are now some how involved, in addition to Ahfad Women university , and the Sudanese library Association "SALI" both are using Greenstone open source soft ware . Despite the fact that it is premature now to evaluate these collections, the start is commendable opening great chances for others to follow. This is the best time to unify the dispersed efforts.

The general atmospheres and appreciation of ICT, the enthusiasm exhibited by decision-makers, the levels of connectivity and infrastructure available, the estimates of Internet users, give some indicators that DL stands a good chance if appropriately approached.

The best opportunity for GSTOA to make a real impact in the Sudan is to be endorsed by academic and professional training institutes and be part of the curriculum taught to library and information science trainees same as CDS/ISIS which is widely used in libraries despite its disadvantages. In this case graduates go back to information centres with full appreciation of the GSOA and willingly they endorse the program.

The crucial point here in my opinion is:

- To find the right institute to adopt the software
- To launch a programme for training Trainers. Trainers are the teal crusaders for the software .