Computer Science
Community Telecentres in Mali: The Beginning of the Internet in Africa

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Community Telecentres in Mali: The Beginning of the Internet in Africa (2014) is the work of Cheick Oumar Traore. He was born in San in the old Bambara Kingdom of Segou located to the south of Bamako, the capital of Mali. He was passionate about electronics since his childhood. He received a certificate of superior technician in Industrial Electronics from Ecole Nationale d'Ingénieurs de Bamako. Thereafter, he continued his studies in Engineering, majoring in Computer Science Networks, and received a Master of Electrical Engineering degree from Université de Montréal Ecole Polytechnique de Montréal in Canada (Traore, 2014, p. back cover).

Traore is currently Project Manager at Conseillers en Gestion et Informatique (CGI) in Canada. There, he executes information technology (IT) infrastructure, builds projects for high visible clients, and plans and directs the building, deployments and cutover facets with a project team of more than 30 people. The scope of his work includes, but not limited to, client office moves/setups, security audit, physical/virtual servers builds/migrations, network builds, storage, active directory, backup, monitoring, symmetrix remote data facility—SRDF links setup, host intrusion prevention/detection systems, ESX, HP UX, Windows, Unix/Linux, AIX, Symantec Veritas Cluster system, SAN replication, etc. (LinkedIn Traore, 2021).

Each day, Traore leads his team to deliver IT projects for clients with high expectations. As the project manager at CGI, with a focus on customer satisfaction, his daily task is to plan and direct all IT infrastructure facets. He and his teammates ensure that all projects are delivered according to the CGI's highest standards in order to meet their clients' needs (LinkedIn Traore, 2021).

Before that, Traore served as a program manager at Harris Stratex Network in Nairobi, Kenya from May of 2006 to November of 2007. There, he executed large and complex microwave radio systems projects for the East African region. He also managed all project facets, including path surveys, engineering, manufacturing, quality assurance, shipping, billing, delivery to sites, installation, test and commissioning, acceptance, and training (LinkedIn Traore, 2021).

Also, from January of 2005 to May of 2006, Traore was a proposal specialist for Public Safety Systems in Montreal, Canada. He was responsible for preparing all elements of the request for proposals, which included functional compliance tables with written descriptions of the unique advantages of the solutions, the establishment of Stoner-Rice tables for products and services, and the compliance of legal and financial requirements (LinkedIn Traore, 2021).

In addition, from May of 1994 to December of 2004, Traore was the program manager at Harris Microwave Communications Division also in Montreal, Canada. His duties included (a)

managing microwave radio systems projects for the Middle East and Africa; (b) managing all project facets, including path surveys, engineering, manufacturing, quality assurance, shipping, billing, delivery to sites, installation, test and commissioning, acceptance, and training; (c) preparing budgets, estimates, schedules, subcontracts and scope of work; (d) reviewing and validating costs margin analysis (CMA) and budgets by product groups, performing analysis and forecasting estimates for the cost to complete projects; and preparing revenues forecasts and invoicing milestones; (e) managing and executing customer contracts issues—project penalties, amendment /revisions, scope of work changes, etc.; (f) negotiating and managing subcontractors/vendors' subcontract agreements, purchase orders and statement of work, field installation, etc.; and (f) managing commercial issues—e.g., letter of credit, pre-shipment inspections, etc. (LinkedIn Traore, 2021).

Furthermore, Traore says that he is determined to continue to write new books and articles on the appearance of new communication technologies and to share with others his know-how in this field. He believes that such work is imperative because "the field never ceases to reveal its secrets" (Traore, 2014, p. back cover).

Book Review

Appraised in the book, an outgrowth of Traore's doctoral dissertation written at the University of Montreal in Canada and defended in June of 2013, is the emergency of new users of Internet access centers in Mali. The book shows how the development of information communication technology has spurred real excitement within the local population. It also reveals that despite the weakness of the technology in Mali, significant appropriation of social networks and the development of platforms have made it possible for people to use the medium and express their views (Traore, 2014). In order to buttress these claims, Traore arranges his examination into nine relatively short chapters.

First, Chapter 1 surveys the development of Trusted Internet Connections (TIC). Discussed here are perforated cards invented by Joseph-Marie Jacquard around 1800, the first computer invented in the United States in 1945, the first transistors invented in 1948, and micro-computing started in 1964. The thesis here is that these developments were possible because of the desire and necessity of humans to automate some long-time tasks performed by hand, especially calculation. It is this need that propelled mathematician and philosopher Blaise Pascal to build the first machine (Pascaline, also called Pascal wheel) to calculate additions and subtractions faster (Traore, 2014).

Second, Chapter 2 looks into the development of the microprocessor and its peripherals. The focus in this chapter is on the history of the making of the microprocessor in 1969, the era of multimedia and digital technology, the birth of the Internet and how it has metamorphosed, what the World Wide Web (WWW) means, and how messages can be submitted on the Internet. Here, we learn about the different electronic components that form a processor that could not fit into an integrated circuit, which is necessitated by the interconnections of many components that include several integrated circuits. We are also apprised about how United States intelligence agencies made it possible to succeed for the first time the placing of all the components that constitute a processor on a single integrated circuit, thereby leading to the development of the microprocessor in the 1970s. This miniaturization of the microprocessor facilitated (a) increased speeds of the operations of the processor, (b) reduced distances between the components, (c) reduced costs by replacing multiple circuits with only one, (d) reduced energy consumption due

to the construction of smaller computers or microcomputers, and (e) increased reliability by removing many connections among the components of the processor and deleting one of the vectors (Traore, 2014).

Third, Chapter 3 is about how to connect to the Internet. Surveyed here are how to transport coded information in the form of electric power, the transition from the electric doorbell to the telegram, the inventors of the telephone, and the principle that underlies and components of the telephone. The procedure for connecting to the Internet commences with having a modem (the device that allows the user to send and receive data through a landline telephone or cable/satellite) and subscribing to an access or Internet service provider (ISP). Next, the provider puts the user's computer in contact with other computers connected to the Internet. Also, all of the data are transmitted by radio wave from one computer to another without a modem or phone line (Traore, 2014).

Fourth, Chapter 4 sifts ensuring the thread when wireless technology was born in the 1950s and using different points of the network via the wave path. The scrutiny in this chapter is on the purpose of this new contribution, its theoretical framework, and its introduction in Africa. The major lesson to be gleaned from this chapter is that the miniaturization of electromagnetic wave transceivers and telecommunications satellites led to the invention of mobile/cellular telephones which allow people to call one another across the globe and, therefore, Africa. Nonetheless, a mobile phone with only one transmitter is relatively weak, as it is the case in most parts of Africa. Thus, for the phone to work very well, it needs to be close to a relay. To cover a given territory, it is therefore necessary to install a large number of relays (Traore, 2014).

Fifth, Chapter 5 entails an exploration of the notion of "information communication technology (ICT) for socioeconomic development purposes." The review here includes a theoretical approach to the problem of ICT development, the tenacious obstacles that oppose the admission of ICT as factors against development in Africa, the argument of unproductive luxury that constitutes ICT in relation to numerous priorities for development in Africa, and the real difficulty to measure the economic and social weight of ICT in development as a real obstacle. The major thesis here is that from a developmental perspective, the use of ICTs is to encourage the integration of tools in different human activities, whether it is the introduction of information into business enterprises or education and health care or in major innovative developments such as E-government, digital development of a territory, etc. Concomitantly, the growing importance of information in all types of activities allows ICTs to be used as tools to help formalize development strategies locally and nationally in both developed and developing countries, In essence, information, of which ICT is the vector, has emerged as a strategic resource in the development context (Traore, 2014).

Sixth, Chapter 6 weighs up how the change of paradigm on the technology and its use imposes a positive vision of the role of ICT in development. Thus, the investigation in this chapter centers on how ICT is actually an instrument at the service of development in Africa, limitations of the accounting approach regarding the informal economy of the mobile phone sector, the structuring or indirect factor as a more operative indicator for assessing the role of ICT in development, and recommendations for a successful implementation of a project. We glean from this chapter the following two factors that underlie the informal economy of the telephony sector pertaining to mobile telephones in Africa: (1) the use of networks to try to properly appreciate the weight of ICTs in development and (2) the share of the sector's activities related to the handling or processing of information. For example, in the constitution of the gross national product (GNP) and the establishment of jobs, the preceding two activities are referred to

as “diffusing factors” or “direct factors” because they have directly appreciable effects on an economy. The direct effect of ICTs here is therefore the direct establishment of progress in terms of employment and economic opportunities through the activities of equipment, service, and manufacture when it exists (Traore, 2014).

Seventh, Chapter 7 is composed of case studies apropos the efforts to empower the poor through inexpensive and cost-effective ICTs. The appraisal here is on the choice of innovative technologies, mobile telephone and applications, wireless technologies, business models and possibilities of community ICT projects, and community prosperity models and direct models established by communities. Evident in the chapter is how in recent years there has been an increase in the interest of empowering the poor through cost-effective and inexpensive ICTs. To achieve this, it is suggested that pro-poor policies and regulatory frameworks be established in order to precipitate an enabling environment for the development of affordable infrastructures in underserved areas, large-scale initiatives that provide easily accessible and affordable services for the poor, sufficiently-funded sustainable projects, commitment and project ownership, human resource allocation that is sufficiently endowed to sustain it, and giving the poor the necessary tools to improve their conditions and quality of life (Traore, 2014).

Eighth, Chapter 8 interrogates cooperatives as having been around for a long time to respond to the cultural, economic and social needs of communities. In this probe, the following aspects are surveyed: (a) pro-poor models directed by governments, (b) municipal broadband networks, (c) provision of services to communities, and (d) private sector models and establishment of community ventures. Principally broached in the chapter is how cooperatives have, for instance, been utilized as vehicles for the construction of infrastructure such as electric supply and irrigation, purchase of equipment and grain that benefits farmers, or political achievements as in the case of the defeat of apartheid in South Africa. As it pertains to telecommunication cooperatives, it is in rural and remote communities that cooperatives are formed in order to attract service. While only a small number of African countries have enjoyed the contributions of ICTs in poor rural areas, they are, nonetheless, quite popular. In fact, the African rural communities’ model has been adopted in Argentina, Bolivia, and the United States (Traore, 2014).

Ninth, and finally, Chapter 9 provides recommendations for implementing a successful ICT project. Three project case studies—(1) Network Information on the Health of Mozambique; (2) System Information Agrarian valley of Huaral, Peru; and (3) Nepal Wireless Network Project—are discussed vis-à-vis providing complementary resources for success. At the end, the conclusion is drawn that despite the many problems that hinder Africa’s development, ICT tools regularly shape the way of life of Africans, change the way they work, and structure their human activities. What is emphasized in this chapter is that communities and their leaders need to be mobilized to advocate for pro-poor policies and a regulatory environment where they do not exist in Africa. This is because in recent years, regulatory environments and policies have changed dramatically whereby there is now a separation between the delivery of network services and their infrastructure. This development has modified the role of operators’ traditional methods and paved the way for the provision of a wider choice of ICT services, which requires new policies and different regulations. Consequently, the proprietary models are changing, and the actors involved are moving away from the traditional model with a limited number of major telecommunication operators to an open model that makes it possible for communities to play a role in the provision of ICT services. Nonetheless, in many developing countries, pressure groups are needed to act on policies and regulations in order for many communities to benefit

from the new convergence of ICTs (Traore, 2014).

This book's strength lies in its practicality that is well informed by ICT history, concepts and theories, augmented with case studies. Its weakness, like most self-published books, is that it suffers from many typographical, grammatical, syntactic and mechanical errors.

Book's Greatness

At least three aspects make this book great. The first aspect is the unique way Traore intuitively uses logic to explicate the emergence of ICTs and their impact on Africa, as news is teeming with these notions and projects that occupy frontstage, thereby furling debate before disappearing without warning only top pop up a few months or years later without the situation having changed. The ingenuity of the author hinges upon how he demonstrates that ICTs feed their own "snakes of sea," leading experts and managers to establish far-reaching plans to computerize all urban and rural communities. Accordingly, the best-informed people regularly predict the next emergence of television centers. Yet, each time, these predictions do not come to fruition, thereby leaving users to solely deal with the challenges of these ICT tools. At the same time, however, progress allows the most courageous users to dispense with the support via paper, E-mail, teleconference, archiving, and fax from the personal computer. These occurrences indicate that anything is technically possible. But, since not many people are inclined to set up tools, materials and software to develop a "virtual office," Troare therefore decided to offer a practical work that is dedicated to the establishment of television centers in Mali.

The second aspect that makes the book great has to do with Traore's skillful examination of the processes of selecting, training, and mentoring managers (also referred to as "pilots") who are considered as change agents in the development of community telecommunication centers in Mali. He dissects these processes according to their positive and negative results regarding the establishment and development of telecommunication centers. The ICTs project was launched in order to respond to the needs of Malian authorities in their efforts to connect the country's 703 communes. At the conclusion of the World Summit on the Information Society (WSIS) convened in Geneva, Switzerland in December of 2003, the United Nations Education, Scientific, and Cultural Organization (UNESCO) and the Swiss Agency for Development and Cooperation (SADC) decided to establish multimedia community telecommunication centers in three African countries: (1) Mali, (2) Mozambique, and (3) Senegal. The establishment of these centers was modeled after a similar project launched earlier in Asia without, however, taking into account neither the basic needs of the beneficiaries nor their specific conditions—cultural, economic, and political. Traore reveals that in spite of the challenges that often characterize the African context, Africans express a genuine interest for ICTs. The sector has therefore witnessed significant and widespread growth throughout many African countries, albeit with various degrees of success.

Given all this, however, Traore shows that a majority of the African population has still not been connected, since an estimated 70% of the population resides in more economically marginalized rural areas. Once the telecentres were established in various locations, most of them were confronted with the difficult challenge of selecting "pilots" to serve as change agents. Those in charge of selecting the "pilots" favored people located within their own family networks. Accordingly, Traore emphasizes the "pilot's" decisive role in the telecommunication centers and the support they are able to generate within the beneficiary population. He therefore postulates a model starting from the actions of the change agents, hoping to stimulate awareness

among local deciders. He conducted case studies in four different sites in order to better comprehend the processes of selecting, training, and mentoring "pilots," with an emphasis on the major factors influencing, for each of those processes, the level of success in all the centers.

The third aspect that makes the book great concerns the fact that it has been given notable recognition in scholarly works. It is shown on Google Scholar where on July 12, 2022 the French edition had 13 citations. Also, a concentrated search on the Google search engine with quotation marks on the title of the book in order to isolate only those places where it is mentioned on the same day yielded 261 results in 0.51 seconds for the French edition and 621 results in 0.55 seconds for the English edition.

Conclusions and Recommendations

It is abundantly evident from the findings in the preceding sections that this great book on Computer Science written by Traore epitomizes the notion that the knowledge of the principles and use of computers allows one to offer solutions to real-world problems. It is therefore an essential skill for life. The findings also reveal that the design, development and analysis of software and hardware used to solve problems in a variety of business, scientific and social contexts in Africa require both theoretical and practical thinking.

Therefore, future researchers must explore ways of developing computer software and hardware that are African-centered in order to address the continent's own peculiarities. That means they must include the end-users in the process so that they can suggest real solutions.

Also, due to the high cost of making the continent technologically less dependent on foreign entities and, thus, not to succumb to their dictates, African leaders must pool and invest the necessary resources to enable their scientists to work on developing their own computer technologies. This will make it possible for them to be free of foreign prescriptions that sap their innovation and priorities for using the technologies.

References

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