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Muhammadou Kah  
*Rutgers University*

Raymond Papp  
*University of Tampa*

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THE EVOLUTION OF AN INFORMATION ECONOMY IN WEST AFRICA: A FRAMEWORK FOR DEVELOPING AN INFORMATION INFRASTRUCTURE IN THE GAMBIA

Muhammadou M. O. Kah  
Rutgers University  
School of Business-Camden  
mkah@crab.Rutgers.edu

Raymond Papp  
Sykes College of Business  
University of Tampa  
RPapp@UTampa.edu

Abstract

This paper develops a framework for developing and implementing an information infrastructure in a developing country with limited resources. It is based on an assessment of the evolution of an information economy in The Gambia. It is formulated in terms of the linkages between telecommunications and information technology infrastructure and economic development. The paper proposes a conceptual model of an Information Based Economy (IBE) for developing countries such as the Gambia. The framework, and the propositions that are developed from it, should be useful both for researchers, who can use it for developing testable research hypothesis, and for policy makers in developing economies, who may use it as a basis for developing a comprehensive set of sustainable information technology strategies that they can appropriately implement.

Introduction

This paper discusses the current information technology and telecommunications capacity in The Gambia, and highlights the problems that the country needs to overcome, particularly as regards its increasing disparity with the developed countries, the difficulty of achieving value from the utilization of information technology, and the exacerbation of social problems caused by under-development. This paper argues that these problems are unlikely to be resolved by the globalization process alone, and discuss further policy actions that The Gambia needs to undertake. Since the relationship between telecommunications and economic development is not uni-dimensional, it is useful to examine how the various dimensions of information technology affect the dimensions of telecommunication, and how various dimensions of economic development impact information technology. To do this requires an appropriate framework, both conceptual and practical, for understanding linkages between telecommunications, information technology, and economic development. Conceptual notions facilitate discussion and the development of theoretical models; whereas practical concerns are geared towards somewhat more “realistic” options that can be implemented by policy makers. This paper uses a conceptual and practical framework to look at linkages between telecommunications, information technology, and economic development.

This paper introduces a conceptual model of an Information Based Economy (IBE). The illustration in Figure 1 shows how telecommunications fits into a general economic development model. Essentially, it is hypothesized that some specific features of telecommunications can impact information technology and economic growth; also other features of information technology can also impact economic growth. These, in turn, both directly and transitively, impact several other economic variables such as decision-making, economic and organizational performance, national information infrastructures, and the information-based economy (IBE). The dotted lines in the model presented in figure 1 illustrate the point of interest, that is, this paper is concerned with the relationship between telecommunications, information technology, and economic development features. Though we recognized the importance of the rest of the model, further research is left to other efforts. In essence, figure 1, which follows on the next page, is a recommended IT strategy for The Gambia.

The Gambia offers a case of a rapid series of policy transitions in a small, well-controlled environment. The young nation’s infrastructure policy after attaining independence in 1965 focused on building basic facilities for economic development, and not on what would attract needed capital, technology, and jobs. The PTT, along with schools, roads, and air and seaports, were not major policy issues. This neglect in the economic development agenda proved disastrous. By mid-1970s, services were inadequate to support a transition to a strategy of economic growth. However, by 1984, the PTT had developed its network and could offer modern telecommunications services, well above most African countries. This remarkable transition from laggard to leader required not only heavy investment, but also a series of rapid transitions in the policy approach. The economic role played by telecommunications shifted following the takeover from Cable & Wireless in 1984, which resulted in a complete upgrading of the telecommunications infrastructure in The Gambia. While computer use in The Gambia is continuing to expand, few are interconnected. The Government is beginning to establish a formal information technology policy since the current economic strategies, goals, and plans did not explicitly link the two elements – telecommunications and economic development.

Currently, a visible link is emerging. This paper strongly suggests the development of a national information technology strategy in which information infrastructure is a key area of investment. Contrary to most studies of economic development in Africa, it is the position of this study that there is a need for advanced information technology services to provide access and sharing of data and information. The Gambia Telecommunication Company (GAMTEL) should continue to provide basic infrastructure and manage service delivery, but the provision of telecom and data communication services should be privatized. There is also a need
for improved connectivity in the national telecommunications network infrastructure. This will shift the future role of information technology from a productivity tool to a competitive weapon and an economic growth and development stimulant. This might well require further investment so as to upgrade the current network and accelerate development of strategic value-added applications and network public (government), private and educational institutions and also provide access capability to the entire user community in the country. In addition, implementing effective and appropriate IT training and strategies in all of these entities will be vital for economic transformation.

The necessity of a strategic alignment between the information technology strategies and the government’s national telecommunications strategies cannot be overstated. The need for The Gambia to compete both locally and globally is paramount. Only through careful formulation of its strategies can competitive advantage be obtained and maintained (Papp, 1995). Some areas that must be addresses include the development of an information technology infrastructure and a corresponding strategy to manage it. This infrastructure will require new processes, skills, and alliances. The implementation of a telecommunications system will allow The Gambia to compete on a global level and enjoy economic prosperity.

**Information Technologies and Telecommunications Capacity of The Gambia**

A number of developing economies, such as India, South Korea, and Singapore are successfully exploiting the opportunities offered by information technology to overcome economic under-development and to achieve significant competitive advantages in key sectors of their economies. Singapore is similar to The Gambia as regards its limited natural resources and strategic geographic location. In the early 1980s, its government implemented a policy for the development of a highly advanced telecommunications and information technology infrastructure to improve its position in transport services, and to attract foreign investment. Case studies of the implementation and impact of information technology development programs are rare, in contrast to the large number of publications reporting ambitious initiatives and innovative applications of computers and networks. The Gambia’s information technology infrastructure serves the broad public interest and commercial and industrial interests. The basic national infrastructure system includes roads, ports and airports, water, sewer, electric power, and telecommunications utilities, plus activities for designing, constructing, and regulating the use of such facilities. Advanced infrastructure systems include those that add value to the basic infrastructure: research and development, the establishment and monitoring of industrial standards, and information-based support activities such as trade facilitation. Because the economic behavior underlying investment in and operation of infrastructure allows non-users to enjoy many of the benefits without participating in the costs, markets providing capital for infrastructure investments tend to be inefficient. Thus, The Gambia’s government must initiate, fund, and operate nearly all basic infrastructure through subsidies, market protection, strategic partnership or other interventions. This, in addition to a national information technology vision, a sustainable national strategic plan for information technology development and implementation is needed. This pattern is dynamic - as an economy develops, demands upon its infrastructure tend to become more differentiated and capital-intensive, trends which motivate many governments to intervene; e.g., by deregulating or privatizing certain activities.

**Rethinking Vision 2020: The Need to Integrate Information Technology into The Gambia’s Economic Strategy**

The Gambia’s Vision 2020, which is an economic strategy predicated on liberal, neoclassical assumptions, seeks to improve primary production, especially smallholder agriculture. Vision 2020 has begun a national debate on The Gambia’s development strategy in the next millennium. As discussed by Saine (1997) in “Vision 2020: The Gambia’s neo-liberal strategy for social and economic development: A critique”, opening up the Gambian economy for investment in primary production, especially smallholder agriculture, will most likely not have the economic impact envisioned. According to Todaro (1997), economies such as The Gambia will have to function and compete in an imperfect and highly unequal real world of commerce. Saine (1997) insinuates that demand patterns for primary products have been relatively unstable, leading to unfavorable terms of trade and export earnings instability. Vision 2020 fails to pay attention to historical trade experience and the growing dependency theory or neo-Marxist arguments regarding the often unequal and sometimes exploitative terms of trade between the more and less industrialized countries. Conditions for export-led growth are less promising in the 1990s given that industrial economies have been mired in slow growth and commodity prices have been low for several years. Trade blocs will restrict access to European and North American markets for Gambian exports and, in addition, investors are more attracted to other regions, like Asia and

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Eastern Europe, than they are to Africa. The poorest economies, such as The Gambia’s, are not likely to benefit despite arrangements for preferential treatment. Instead, she will continue to strive to service her external debt, valued at $423 M in 1994, or 112 percent of GNP, and meet the basic needs of her people. Only developing countries such as South Africa, which are somewhat important in supplying required raw materials, are likely to benefit from trade and attract foreign investments.

The Vision 2020 relegated a minimal role to information technology as a vehicle for economic growth. Only one-half of one page of the report was spent discussing IT. Information technology as a vehicle for economic growth is not mired with historical failures like the agriculture sector. Since independence, over thirty years ago, the agriculture sector has been the focus of economic strategies. Given the track record of information technology and the arguments made in this dissertation of it being a catalyst for economic growth, the Gambian government should rethink the 2020 vision with greater emphasis on IT.

Furthermore, Vision 2020 also advocates a marginal role for government consistent with its neoclassical underpinnings. However, the Gambian government needs to be involved in developing domestic capital accumulation. The Gambian government cannot abandon its role as an agent of social development – an efficient, effective, and selectively interventionist state. If an IT–led economic development strategy finally gets adopted in The Gambia, the government would still need to selectively intervene to put the information technology infrastructure in place and create a stable political and legal environment with which to attract foreign investments. In the same vein, the government will have to wean itself from being a monopolist operator and regulator, allowing the private sector to grow and, ultimately, become somewhat more involved in IT investment and service provision.

Information Based Economic Development Model for

The starting point of the information-based economic development strategy for the Gambian government involves taking the decision to use information technology to harness economic growth. This should be done by moving beyond rhetoric to strategizing and implementing key policy changes in the telecommunications regulatory framework, nurturing a stable political environment (which impacts greatly on attracting foreign investment), and creating solid fiscal and monetary policies. Privatization of the public sector has already been started in the agricultural and tourism sectors. Through a national information and technology policy, privatization should be initiated and implemented in the telecommunications sector. The national information infrastructure is instrumental in determining viable policies, as discussed in this model (figure 1). Investment in information technology includes not only telecommunications infrastructure, but also electric utilities/energy upgrades to meet the demand. Adequate and reliable energy is very essential to the development, delivery and use of information technology services. Appropriate technology diffusion will emanate from appropriate government policy, implementation of a national information technology strategy and adequate sustainable information technology investments. Investments in information technology cannot be considered in a vacuum without assessing the national wealth of the country and how to create or have access to investment dollars. National wealth is largely impacted by governmental policies, which create the environment with which to accumulate investment dollars at home, and attract foreign investment and joint ventures. Once the above-mentioned information technology investments and concerted policy changes are in place, wage levels and employment growth rates will rise. The government’s investment in human capital, by creating more opportunities for people to train in information technology, will help to boost the country’s information technology capability. This will require a commitment by government to put in place and implement a sustainable information technology strategy to build an IT infrastructure for the entire educational sector, a plan for IT training, management and use. This will require strategic partnership with the private sector and relevant government and parastatals.

This enhanced information capability will impact upon cultural and social structures, changing people’s expectations and demands of their government. This, in turn, will impact upon government policies. Productivity and economic growth should be achieved once all the different components depicted in figure 1 start working synergistically. This will feed back in human capital and information technology investments, thereby bringing about improved quality of life and economic development in The Gambia. Figure 1, below, schematically shows an information-based economic development model for developing countries. The government’s role is central to the development of information technology in developing countries by providing political stability and the regulatory and legal framework to allow IT to flourish. The government’s role in ensuring that education policy takes into account the human capital needs of an information economy is also highlighted in this diagram. Governments in developing countries can develop and implement Information technology policies through a National Information Infrastructure (NII) board.

3See Lindauer and Roemer (1994) and Saine (1997).
The diagram shows how appropriate information technology policies are linked to wealth creation, which can translate into economic growth.

**Integrating The Gambia into the Global Economy: Information Technology as an Enabler**

Hall (1992) defines globalization in its most general meaning as a process that cuts across national boundaries, integrating and connecting communities in new space-time combinations. The term takes a variety of more specific meanings according to the different discipline studying it. One widely accepted perspective on globalization highlights the trend towards freer trade, and the flow of finance, labor, and commodities among countries. It also refers to the flow of data, which are critical for the operations of organizations today, allowing the connection of activities taking place in distant localities. According to Castells (1989), and Lash and Ury (1994), flowing capital, technologies, people, ideas, and images constitute the restructuring process of the contemporary economy. Another meaning of globalization refers to the increasingly significant role attributed to multinational corporations in the current economic regime. Numerous studies consider the activities of multinationals, analyze their performances, and speculate on their impact on the socio-economic systems of individual countries and regions. Many authors in various disciplines have studied different types of corporations, and although no consistent terminology is established, Bartlett and Ghoshal’s (1989) analysis is frequently cited. Bartlett and Ghoshal distinguish among three types of firms operating across national borders: multinational firms, operating their foreign subsidiaries as loose federations or nearly autonomously in order to be able to respond to local needs and national opportunities; global firms, applying strict control in order to co-ordinate worldwide activities and gain from standardized products, manufacturing processes, and operations; and international firms, pursuing rapid diffusion of innovations from parent company to subsidiaries world-wide while allowing for local adaptation. A fourth type, transnational firms, is identified as those organized as integrated networks and seeking to retain local flexibility as well as global integration and diffusion of innovations.

A third meaning of globalization refers to increasing partnerships, among companies around the world, irrespective of distance. The most frequently cited example is the subcontracting or outsourcing of software production by American and European companies to Indian software companies in Bangalore. Furthermore, in the domains of communication, politics, and culture, globalization refers to trends manifested in mass media and institutional patterns of behavior. Often, this notion of globalization has negative connotations, implying the spreading of a mass culture dominated by American influences, and a disintegrating effect on personal identity. It is usually considered a manifestation of the homogenization brought about by the modernization process. Most studies, though, present a complex process of tension between the particular and the communal, on the one hand, and the universal and the impersonal, on the other. According to Hall (1991), universalizing tendencies lead ethnic groups to reaffirm their differences and become attached to their locality, rather than resolving national or other local or regional identities.

All these forms of globalization, heavily relying on information technology, have direct impacts on The Gambia. Increasing flows of trade and capital, new and more sophisticated strategies of multinational corporations for the expansion of their business, often seeking to subcontract parts of the production process to partners in distant locations, and increasing exposure among diverse cultures create a new economic and social structure in the world. But what opportunities for economic growth do these trends provide to The Gambia, and how can The Gambia be helped to achieve socio-economic development within the new and dynamic world regime? The literature does not provide a clear answer to this question. Geographical circumstances, such as the local availability of material resources of special quality or at lower costs, appear to matter a great deal. Also, differences in entrepreneurial ability, scientific and technical know-how, and social attitudes appear to play an increasingly significant role as factors determining the structures of production. However, there is still uncertainty about how globalization favors certain places over others, and only limited policy guidance can be derived from the analytical studies of the current globalization phenomenon.

A number of cases of local policy for the development of technical infrastructure and institutional forms are discussed in the literature, such as the cases of the newly industrialized countries of the Far East. Such studies indicate the significance of social and institutional factors in addition to economic and technological measures, without, however, leading to a uniform theory of effective institutional intervention, organizational forms, and business management practices. A different combination of socio-economic and cultural factors seems to be responsible for each of the successful cases. For example, some cases indicate the significance of small and medium enterprises as possessing the necessary flexibility to provide the variety and quality of products and services demanded in today’s market. Others suggest the supremacy of large corporations, which can utilize new technology to achieve the required flexibility in production, as well as exploiting the power of their human and financial resources to determine favorable relations with suppliers, clients, and regulatory institutions. Indeed, it has proved almost impossible to imitate

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*See Robertson, 1992; Larrain, 1994; Friedman 1994; Appadurai, 1990.*
the successful cases. Rather, a contingency approach seems to be required, to assess the options available under the specific circumstances of a country or region, and to work out an appropriate program of measures.

Perhaps the only aspect for which there is certainty in all studies of the globalization trends is that an information technology infrastructure is necessary for participating in the global economy. Nevertheless, as noted earlier, The Gambia lacks adequate information technology resources as well as information resources. It can acquire such resources only gradually and at a substantial cost. Even then, the results are uncertain. Investing in information technology does not guarantee either economic growth or social improvement, and the experiences of the developed economies suggest that governments need to make sustained efforts for socio-economic restructuring (see OECD, 1988), and companies need to have competent management, in order to work out the sorts of organizational changes needed to exploit the technological potential. 5

Moreover, there is an inadequate understanding of what governments should do to promote information technology innovation and derive benefits from it. Thus, it is not enough for The Gambia to acquire information technology resources. It is necessary also to address the question of how such technical resources can be effectively utilized within their socio-economic context, and vis a vis the global socio-economic trends. Required institutional interventions and appropriate organizational changes are aspects of the ‘technology transfer’ process that have been largely neglected in the information systems literature regarding African economies. It is these issues that the remaining paper will consider. The paper will then examine the current ability of The Gambia to link the acquisition of technical capacity with appropriate institutional and organizational measures for its effective exploitation.

**The Dynamics of a National Information Technology Policy**

An information technology plan for The Gambia must extend its role beyond the borders of The Gambia, initiating an era of convergence in telecommunications, broadcast, and computer policies. A Gambian information technology policy vision should be built on a national information infrastructure (NII) that links the public (government) and private sector, users, computing resources, and content. The implementation of such an infrastructure will lay the foundation for the development of an e-government and facilitate the appropriate use of ‘e-learning’ technologies to help transform and enhance the educational sector.

Thus, this paper portrays three shifts in the focus of information technology policies: from an initial concentration on basic telecommunication services to stand-alone computing, followed by efforts to create convergence between these two, and then recognition of the interdependence and interaction between computing, carriage, and content. This paper also portrays shifts in the approaches used to form and deploy the financial, technological, and organizational assets necessary to build a national information infrastructure. Each policy regime is distinguished by its institutional approach to defining the roles played in capital formation by equity, earned revenue, borrowing, capital markets; by the public and private sector; and by foreign versus local enterprises. Each regime develops new institutions to regulate or influence the supply of, and demand for, information technology resources.

The Gambia’s national information infrastructure (NII) policy is in its infancy, focusing on meeting the needs for basic telecommunications services, building modern infrastructure to attract multi-national corporations (MNCs), and building upon advanced network facilities to extend The Gambia’s economic potential. These policies evolved in line with changes in technology, progress in national development, steady growth in the economic and social importance of the information services sector, and fundamental shifts in global economic structures.

African economies have not been able to make significant progress toward the development of an industrial base and are now faced with the dawn of an information-based economy, e-business and e-commerce and e-government. The transformation from diverse traditional societies subsisting in agricultural base economies, to rapidly modernizing societies functioning in integrated industrial and consumer economies, has generated demand for new services, and for the information imbedded in or even constituting these services. Thus, the evolution of a global economy fundamentally altered the economic, organizational, and production structures of multinational firms (see, e.g., Dunning, 1993), restructured the basis of the competitive advantage of nations as suggested by Porter (1990), and increased the global demand for timely business information. These trends have altered both the ends of policy, and the means by which it will be implemented.

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Developing a National Information Infrastructure for The Gambia

The 2020 Vision plan signaled a new technology policy with specific targets for infrastructure. It is important for the government to establish a target; increase the number of information technology professionals, research scientists, engineers, and R&D expenditure via joint public and private participations. The Gambian government needs to formulate a National Information Technology Board (NITB), armed with a budget and competent professional staff responsible for guiding The Gambia towards these goals. This Gambian national information infrastructure (NII) could then be built through the expansion of the current National Internet Gateway, funded by the United Nations. Figure 2, below, illustrates the different elements of a possible Gambian “infostructure.”

The base of the National information infrastructure (NII) model represents a large, heterogeneous network infrastructure supporting the common network services layer, which provides standard functions such as access control, transaction engines, GroupWare, and various general- and special-purpose intelligent engines. This base is bounded by two critical “soft” elements, a policy and legal context within which technical infrastructure and applications operate, and a standards regime, which mediates between the current and future technological contexts. National applications, of which two will be an ecommerceNet, and EduNet, run in a transparent environment.

Small size and limited R&D experience limits The Gambia’s capacity to develop the new technologies required building this infrastructure. To acquire such tools, The Gambia should leverage its long-term relationships with multi-national corporations (MNCs), invest in production and distribution activities within its borders, and formulate a strategy for utilizing the country’s technical talent abroad. The MNCs not only employ its workforce and patronize its financial, business service, and logistics industries, but also act as a major channel for acquiring new technology. The government could establish joint ventures with major information technology companies, such as Cisco, Microsoft and Oracle bringing them on board as partners in developing its National Information Infrastructure (NII) and getting help to develop the human, information, and technological resources necessary to help The Gambia realize its information technology vision.

By exploiting such external linkages, The Gambia will be able to expand the current Internet Gateway and offer a standardized, relatively high-bandwidth with integrated digital access capability to provide service-on-demand access to customers – whether governmental or private. The country will then be able to lead the way by using technology to support videoconferencing, long-distance learning, and interactive multimedia services and other services on demand. These suggestions might seem unrealistic given that The Gambia is a poor economy, one worrying about sustenance and survival. However, that was the economic development strategy adopted since independence (over thirty years ago) and the economy never improved. Thus, it is the position of this paper that information technology-led development should be central to the economic development paradigm for developing economies and that it will stimulate and enhance efficiency in the economic sectors. The Gambia is and should continue progressing with digitized transmission, digital switching, and digitizing its local loop, serving major business, and industrial and rural districts.

Conclusion

The Gambia case reveals two lessons: Firstly, national telecommunications and information technology policies are inseparable, even when their formulation is not well integrated. Secondly, information technology policies are dynamic, and shift as the internal and external context changes. Information infrastructure is obviously an important source of economic and social value, even though it is difficult to quantify precisely the economic value of information services. The strong, two-way link between economic growth and investment in telecommunications infrastructure (see Karlsson, 1993) resonates with the theoretical views of Reich (1991), who sees human capital and infrastructure as key determinants of development, and Porter (1990), who identifies a strong link between economic success and the development of national infrastructure and support. The Gambia is partly equipped to be a major player in the information economy given its Internet gateway/infrastructure, modern fiber-optic laid infrastructure. However, the following are recommended:

- Gambian policy makers should plan for an information technology human capital stock to reap the benefits of information technology and to remedy the challenges of shortage of capital and technology know-how;

- Adequate knowledge of information technology and the adoption of appropriate information technology management principles in addition to building and implementing a sustainable information technology infrastructure in all government entities;
Create an environment to harness private sector investment through partnership with the public sector, including strategic equity partnerships, joint operating schemes and business co-operation contracts;

Increase the use of information technology in the public sector via computerization of all government entities and the school system

Establish information technology community centers across the country to enhance access equity

Network all education institutions and institute a mandatory computer literacy programs in all educational entities in the country coupled with continues training of all educators

Strategically position the newly established University of The Gambia as an “IT training hub” not only for the Gambia but also to the entire West Africa region. This requires huge investments and a commitment on the part of policy makers, but the long-term returns are huge. Information technology skills must be a mandatory requirement and integrated in the entire curriculum.

Market liberalization and openness is crucial to allow the injection of competition and investments. Competition leads to better technical solutions, better delivery of services and lower prices.

The telecommunication sector should be re-structured and strategically aligned in order to expand, maximize utility of its modern infrastructure and attract investment.

Establish an independent regulatory authority with competent non-political personnel in addition to appropriate legal framework (copyright, security and intellectual property)

Develop a Gambian information infrastructure strategy

In order to transform The Gambia into a viable economic and competitive power in this information economy, they must conceive and implement a national information technology strategy. This will facilitate furthering its economy to move-up the value-added chain by driving and aligning information technology into all sectors.

This will also facilitate the process of appropriate and sustainable computerization and then “informatization” of The Gambia. A strategic IT for The Gambia also facilitates the role of government to develop the appropriate IT infrastructure and to maintain a positive investment climate to attract investors as well as sophisticated users to be part of and benefit from the thriving info-economy.

References

Available upon request from the first author.