



## ABSTRACT

*Information and telecommunications engineering projects available are big challenges in some of the cities related. Local planning as well as development focused on quality of living and of course efficaciousness of public contributions and management. This challenge needs attentions of everybody in the society. The study focus on*

# **D**ESCRIPTION OF INFORMATION AND TELECOMMUNICATIONS ENGINEERING PROJECT FOR A DIGITAL CITY: A CASE STUDY OF KATSINA STATE.

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## Introduction

Information and telecommunications engineering projects is one of the projects needed in some of the cities in Katsina State. The projects are needed to synthesize all sorts of information (social, economic, political, environmental, etc.) as pre-requisite for the organization and management activities of the cities. The Municipal Information Planning can be used as one of the tools for managing cities. In Katsina, because of lack of financial resources and management in city budgets, obedience to the specific stumbling blocks and pressures from people and social influences from the people in the city, investors like NGO's, among others) government can act in order to ensure that citizens are provided with good social and basic amenities that will enhance living standard of the citizens. The pressures mounted on the



*the description of information and telecommunication engineering projects from the planning of a useful digital city Katsina, Nigeria. It was built as a telecommunications infrastructure of the kind of open access metropolitan area networks that allows the integration of people in a single telecommunications environment. The research methodology was a case study. The results achieved describe, by means of a methodology, the phases, sub-phases, approval points and resulting products, and formalize their respective challenges and difficulties. The contributions have to do with the practical feasibility of the project and execution of its methodology. It was concluded that the importance of the project, implemented and embraced, as a gadget to help the development and management of cities of Katsina, in the implementation of strategic digital city telecommunication engineering projects for public management, and to improve the quality of and lives of the citizens. Government should provide maintenance services that will help in overhauling the Open Access Metropolitan Area Network in Mani Local Government Area of Katsina State. Powerful Open Access Metropolitan Area Network should be provided for an extension to villages in Mani Local Government Area of Katsina State.*

**Keyword:** Description, Information, Telecommunications, Engineering, Digital.

government by the citizens can trigger the government to implement information planning in the cities .The development and management of broadband communication networks and the establishment of information and communication technologies is of paramount importance for the economic development of any state and, therefore, its municipalities. Hawkins (2005) found in their work, that the increase of broadband penetration rate in developed and developing countries had a positive impact on the GDP. Firth and Mellor (2005) defended the importance of broadband infrastructures for developed countries. They



claim that ICT infrastructures are capable of generating economic development and contributing to digital inclusion processes. These ideas have led Nigeria to the decision of building up a common policy for the implementation of an “Information Society. The obstacle is that the building of high speed communications networks calls for a number of businesses and the interest of private investors may not be attracted unless business opportunities are equally devised in the business. In spite of this, the government is charged with the responsibility of establishing conducive environment through regulation and as a buyer that will incentive deploy of such investments from private organizations and, therefore, lead to the construction of broadband communications networks which are nationally available to the public. Several African governments have started to invest in broadband infrastructure through the establishment of Open Access Metropolitan Networks (Open Access MANs). The initiative of creating “open” communications networks of municipal proportions has turned to be attractive to various countries. Beyond pulling new investments to the city, the “open” networks have implemented a telecommunications engineering service network of its own, which results, at once, in money-saving with telecommunications servers. Along with those networks, other services can also be achieved, which reflects in efficiency gains and costs saving to the citizens (Hawkins, 2005). Nigeria has a significant part of its population without access to Internet Hawkins (2005). One of the ways to contribute to the solution of this form of problem is the construction of the Open Access Metropolitan Area Network (MAN). Such networks can promote the universalization of the access to the citizens. Through the Open Access MAN, thousands of citizens and municipal organizations will have the opportunity to be included in the so-called Information Society (Lederer & Mahaney, 2006). A relevant Brazilian initiative has been developed by the LaRCom



(Laboratório de Redes de Comunicações) from the State University of Campinas (UNICAMP), Brazil. This group has developed a number of studies on Open Access Metropolitan Networks and Smart Cities, tailored for high speed broadband engineering communications networks deployment in several Brazilians cities (Alexiou, Bouras, Papagiannopoulos & Primpas, 2009). Another issue is the inexistence of municipal information and engineering telecommunications resources in its environment, corroborating the problems of managing cities and count on the respective participation of citizens in the city management. Information and municipal information model for initial conceptualization, is a piece of information of any data or data set processed to have some significance added to it and such that it can offer a natural or logical sense for those who use that piece of information (O'Brien, 2011). To be useful for decision-making, any information should not be abstract and should not have verbs.

Information, and the systems which use them, perform fundamental functions in the management of cities, presenting themselves as a strategic resource for planning and management in an intelligent, competitive, and participative manner. To attribute strategic connotation to information, the organization usually goes through an evolving cycle in stages, such as: initiation, spread, control, integration, data administration, and maturity (Nolan, 1993; Turban et al., 1996). The information acculturation process in municipalities can be made ease and effective if public managers and citizens (clients or information users) are participative, aware and thoroughly engaged in the utilization of information technological resources. The strategic information supported by information technology may occur in an evolving way, where information systems can be classified in several manners (Laudon & Laudon, 2011). Information can have a highly significant value in society and those controlling it, a person, group or



organization can stand for great power in society. At least three steps are fundamental to add value to information: getting to know, selecting and using information. A badly prepared selection may cause major damages in the use of information. The Municipal Information Model describes all the necessary pieces of information for management of city halls or cities. Such pieces of information can be structured in levels or types, i.e., strategic, managerial and operational information. They can be distributed according to their respective organizational functions or public issues. The Municipal Information Model document describes the strategic (in a macro-related way with the external and internal environment), the tactic and managerial (grouped and synthesized) and the operational pieces of information (in detail or analytical). Also, the Municipal Information Model may contain integrated information of the kinds: conventional (trivial), personalized and timely. All and any peculiar or specific information can be used as personalized information, either being a natural or legal person or a differentiated product or service. It may also be regarding a single characteristic of a citizen. All and any information of unquestionable quality, however, anticipated can be named timely information.

### **Planning project of municipal information**

It is part of an ample project called Strategic Planning of Information and Information Technology for Strategic Digital City (MIP/IT Project). Mani has a population of 62,240 inhabitants. Before the implementation of this project, very little had been done concerned to the management of municipal information. Ganuza and Vicens (2011) say what existed in terms of information technology was the result of disconnected actions without a well-defined goal, just consisting of searching non-formal and short term solution of specific problems, normally obtaining only palliative solutions.



### **Information System and Information Technology**

An information system proposes as output the result of data or resource processing or transformed by any means (Atkinson, 2016). These information systems may be able to contribute to solve many municipal problems, as far as they are used to generate suitable and personalized information (Barbero, 2007). There is need for them to be seen as tools to determine differential informational factors for municipalities and are defined as systems of technical components that accept, store, process and transmit information, and can be based on any combination of human engagement, methods and information technology (Heeks, 2001).

### **Planning municipal information**

This phase was directed to the modeling of Mani's needs for timely information and personalized knowledge. It put together the sub-phase identify municipal information and its activities: list municipal information and model municipal information. This was one of the hardest activities as it covered 11 public or thematic municipal functions: administration; agriculture; science; technology and innovation; commerce; culture; education; sports; finance; government; housing; industry; juridical; leisure; environment; building; planning; health; sanitation, safety; municipal services; social; traffic; transport; and tourism. A total of 89 Lists of municipal activities were elaborated. The municipal activities can also be fished out as processes of municipal tasks existing in each Secretary, including all the other municipal units. By decision of the Management Project Committee, all the pieces of operational information and all the pieces of managerial information (grouped) were formalized, and the strategic information (macro-related to the city and City Hall internal and external environment) was



not formalized. The modeled information did not excluded redundant pieces of information.

### **Evaluate and planning information systems**

This phase was addressed to the identification and analysis of all current engineering information systems of Mani. This suggested adjustments to many systems and the planning of new systems of various kinds and levels. The sub-phase evaluates municipal information engineering systems encompassed the activities: elaborate a work plan; identify city systems; describe city systems; and evaluate and summarize the current systems status. In the Project Management Committee meeting was developed and recorded a work plan for the development of the systems encompassing the activities in the collective and individual way. The work plan minutes are filed in specific binders archived in the city of Mani. The identification and description of all the municipal information systems were elaborated in specific documents which showed that all the systems required additions, i.e., they were inadequate to the city needs. The evaluation and summarization of the current situation showed 180 systems distributed as follow: 14 systems of a service provider company; 20 of various suppliers; 26 of Governments and Public Organizations; 10 of Microsoft; and 60 of manual systems. The sub-phase Planning municipal information systems presented the activities: review and detail municipal information; name proposed municipal information systems, diagram proposed municipal information systems; describe proposed information systems; validate proposed the municipal information systems, evaluate acquisition and development of proposed municipal information systems; and elaborate a demonstrative framework of proposed municipal information systems. The proposed systems took in consideration the Government Plan 2018/2021 with 2 preferential thematic areas: social; economic; urban; and governmental



development. Fuentes and Inagaki (2006) showed that the Municipal Information Models were revised and altered by the Project Management Committee and completed with pertinent documents. Considering the Municipal Thematic, the Municipal Activities and the Information Models elaborated, the Municipal Information Systems were formalized also taking into account the debates held in the Mani Society. On the total, 110 proposed municipal information systems were named, diagramed, described and planned involving the City Hall, its Municipal Secretaries, a Municipal Water and Sewage Company and other municipal entities. As for the evaluation of acquisition or development of the proposed municipal information systems, all of them will be bidden and supplied by companies. These companies are specialized in projects, development and maintenance of information systems. No information system will be developed by insiders. At the same time, were sorted out and assessed 16 supplying firms of municipal information systems which could provide the modeled information and respective proposed systems. To finalize this planning phase, a priority was defined by the Project Management Committee: the systems were addressed to public functions and public or municipal thematic such as social, public finance, and health. However, as there is a principle of unified database, the system architecture should prevent the recording of redundant data in the database.

### **Statement of the Problem**

The problem of this study is that, a number of people in Mani Local Government do not have Open Access Metropolitan Area Network (MAN) and this has been creating a lot of problem them especially to their inability to communicate with their people within and outside their areas. It is in view of this the researchers want to describe how information and telecommunications project from planning of a digital



city can be established. This will unravel the process that can be followed in building this kind of project in the city of Mani Local Government Area of Katsina State with the aim of resolving communication problems faced the people in the area.

### **Objective of the Study**

1. To describe information and Telecommunications Project from the planning of a Digital City carried out in Mani, Katsina.

### **Research methodology**

This research work uses exploratory research design. The case study presented here, with emphasis in an action-research, used an applied research concept as well. It was an applied research work simply because it provides new reliable information, skills and knowledge for the advance of information and telecommunications and at the same time for practical works directed towards providing solution to problems concerned to the planning of municipal information with the participation of the people in the society and of the management of a city (Firmino, 2004.). The materials and methods utilized are pertinent to available resources of research-action case studies. Forms were used for data gathering (planning, organization, diagnoses, analyses and debates), information tab, follow-up, controlling and documentation. The researchers also used numerous techniques, such as observation, questionnaires, field survey which were attended by citizens, managers and public service providers. That way, the surveyors were, in a cooperative and participative way, fully engaged in the process. Besselaar and Beckers (2009) developing a city planning involves the participation of the citizens and heavy engagements of the local managers to expand social, urban and regional development.



### **Presentation of Result**

For the accomplishment of the plan, it is necessary to plan and provide information and communications in a suitable and transparent way. From the researchers' point of views, the manager, the planned information and respective telecommunications in the area can foster the management of the cities. As far as citizens' participation is concerned, it encourages them to make their contributions by promoting people participation in the planning, structuring, preservation and availability of information and their use and benefit regarding the enhancing of life quality of the citizens. This development can provide effective management leading to better quality of life of citizens. More so, the municipal information and telecommunications planning, like the municipal strategic planning, can become an indispensable participative management instrument of the cities. One can say that the overall goals for this work in the city of Mani Local Government have been reached as described in this paper. The bottom line of this planning was the participation of municipal citizens, namely, workers, students, retired people, housewives, city councilors, entrepreneurs, among others, in the creation of the Digital City of Mani. The social players involved propitiated the integration of technological resources with social participation in a democratic and popular experience. Together, citizens by means of an organized project, could model 1200 pieces of managerial and operational information for all the city, City Hall and respective units. Beyond these pieces of information, they could plan and prioritize 103 municipal information systems proposed. Regarding telecommunications and free of charge internet, the project already reaches over 68 residences and over 217 citizens.

### **Conclusion**

The implemented project by municipal citizens as an instrument effectively contributed to the management and development of cities



and in the implementation of strategic digital city projects. The effective implementation of this kind of project, the government management transparency, the effectiveness and the social development can be improved by contributing to improving citizenship and the quality of citizens' life. The project was accomplished from August 2018 to July 2021 by using the MIP/IT Project Methodology already carried out by other planning projects of municipalities. The sample of the research-action was applied in the city of Mani, Katana. The unit of observation involved municipal citizens (workers, students, retired people, city councilors, and entrepreneurs). The protocol of the research action is an integral part of the methodology employed in the project whose variables are its phases and sub-phases. The project has been being implemented since 2021. The Open Access Metropolitan Area Network (MAN) of Mani Local Government was started in March 2021.

### **Recommendations**

1. Government should provide maintenance services that will help in overhauling the Open Access Metropolitan Area Network in Mani Local Government Area of Katsina State.
2. Powerful Open Access Metropolitan Area Network should be provided for an extension to villages in Mani Local Government Area of Katsina State.

### **References**

- Alexiou, A., Bouras, C., Papagiannopoulos, J. & Primpas, D. ( 2009). Metropolitan broadband networks: design and implementation aspects, and business models. In: Bose, I. (Ed.), *Breakthrough Perspectives in Network and Data Communications Security, Design and Applications*, pp. 286–301.
- Atkinson, R., (2006). The digital technology revolution and the future of US cities. *Journal of Urban Technology* 4 (1), 81–98.
- Barbero, J.M., (2007). La ciudad virtual: transformaciones de la sensibilidad y nuevos escenarios de comunicai3n. *Revista de la Universidad del Valle* 14, Cali.



- Besselaar, P.V.D. & Beckers, D. ( 2009). Demographics and Sociographics of the Digital City. Disponível em: <<http://portal.acm.org/citation.cfm?id=701393>>(acesso em: 2.2.09).
- Brasil, (2013). Governo Federal – Ministério das Comunicações: Programa Nacional de Banda Larga (PNBL). Disponível em: <<http://www.mc.gov.br/acoes-e>
- Firmino, R.J. (2004). Building the Virtual City: the Dilemmas of Integrative Strategies for Urban and Electronic Spaces. Doctoral thesis, University of Newcastle.
- Firth, L. & Mellor, D. (2005). Broadband: benefits and problems. Telecommunications Policy, Elsevier – ScienceDirect 29, 223–236.
- Fuentes, B., M. & Inagaki, N. (2006). Reconfiguring public Internet access in Austin, TX: Wi-Fi's promise and broadband divides. Government Information. Quarterly, Elsevier – ScienceDirect 23, 404–434.
- Ganuzza, J.J. & Vicens, M.F. (2011). Deployment of high-speed broadband infrastructures during the economic crisis: the case of Xarxa Oberta. Telecommunications Policy 35 (9–10), 857–870.
- Hawkins, E.T. (2005). Creating a national strategy for internet development in Chile. Telecommunications Policy, Elsevier – ScienceDirect 29, 351–365.
- Heeks, R. (2001). Reinventing Government in the Information Age: International Practice in IT-enabled Public Sector Reform. Routledge, London/New York.
- Laudon, K.C. & Laudon, J.P. (2011). Management Information Systems: Managing the Digital Firm, 12th ed. Prentice Hall, New Jersey.
- Lederer, A.L. & Mahaney, R.C. (2006). Using case tools in strategic information system planning. Information Systems Management Journal (USA) 13 (4), 47–52