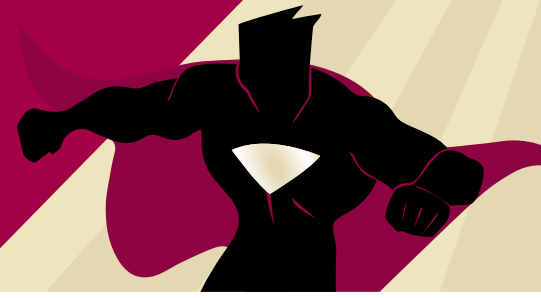# DISSERTATION METHODOLOGY:

ENHANCING MONITORING AND CONTROL THROUGH INFORMATION SYSTEM IN NIGERIAN MINISTRY OF ENVIRONMENT

The main purpose of the Federal Ministry of Environment is to ensure that all environmental matters are directed at enhancing developmental activities. It also relies on the Environmental Renewal Developmental Initiative that contributes to the development and protection of natural resources as well as evaluation and control of impact of various projects on environment (Federal Ministry of Environment n. d.). Additionally, the ministry seeks to reconcile the plans with the redevelopment and improvement of technological and scientific achievements for sustaining the activities that stabilize the environmental situation in the country. Certainly, the government makes every effort to enhance the monitoring and control of plan implementation, but the analysis of experiences and practices exercised in developing and developed countries can be helpful for enhancing these procedures (Federal Ministry of Environment n. d.). In particular, implementing an efficient management system within Nigerian government through IT advancement should be congruent with such aspects as organizational culture, resistance to change, availability support, and socioeconomic environment of such developing countries as Kenya and South Africa. It is also essential to take into consideration the strategies employed by the Ministry of Environment in such developed economies as the United Kingdom and the United States to understand how those enhance the controlling and monitoring mechanisms. Use of participatory ethnography, interviews, and observation would also be the solution in shaping the theoretical framework of managing ministry processes.

Due to the fact that the study acknowledges that control and monitoring in Nigeria fails to ensure efficient communication system for distributing information on the environmental situation to the relevant stakeholders, it is

necessary to consider how the implementation of a management system can contribute to enhancing the monitoring through information systems. The information control system, therefore, does not have a comprehensive model of operation and introduces inconsistent standards for monitoring operations within the ministry. Better understanding of the problem will be possible through implementing documentary analysis and observation as well as participatory ethnography (Klenke 2000). The choice of the qualitative method is justified by the possibility of using inductive and deductive techniques while considering similar samples.

In order to understand how participatory ethnography, observation, and interviews can contribute to strengthening the control and monitoring within the ministry, these methodological frameworks should be considered in more detail. In this respect, the method has been an urgent topic in the context of participatory design for over three decades when experts in sociology started cooperating with computer scientists in order to develop new techniques for managing information technology systems. As Simonsen and Robertson (2012, p. 87) state, "the question of appropriate relation between studying the work practices of the workers for whom new technologies are being developed and directly engaging them in design became a central concern within Participatory Design". Due to the fact that ethnography takes roots in anthropology, it reflects the everyday realities of life in various contexts and therefore, it serves as a powerful tool for establishing efficient communication across cultures. The main principle of ethnography involves such aspects as providing a descriptive comprehension, embracing a holistic view, and considering the participant's perspective. Since the concept of change is not always represented as the core ethnographic principle, the scientists' interest in this problem is enhanced. Although that commitment to descriptive understanding is believed to be a foundational principle of ethnographic research, the scholars often mistakenly agree that ethnographic methodology is non-interventionist. However, innovation is premised on the knowledge that is placed in a current context, which is in turn necessary for achieving a meaningful change. In this respect, the use of participatory research is the

key to understanding how to enhance the monitoring and controlling mechanisms within the government; it gives a fresh insight into the way the current context could be used for integrating efficient management of e-government activities.

The main principles of participatory design consist in opportunities for learning, respect for diverse knowledge, joint analysis of goals, and instruments for fostering design. For this reason, the importance of participatory perspective is defined as the necessity to create design directions by promoting spaces and places for interacting between practitioners and designers in which one type of knowledge does not prevail over the other. Simonsen and Robertson (2012) emphasize the three dimensions of participatory ethnography discourse, such as user's current work, which is confirmed through first-hand experience, new working systems that are based on user participation, and technological capabilities developed in the context of visions of perspectives. All these aspects enhance the importance of considering the background in which the researchers can gain understanding of the current work in a specific setting with the emphasis placed on exploring the participants' experiences.

While designing a participatory research, the focus should be on developing observations in combination with interviews to highlight the anthropological perspective in improving the information system management in the Ministry of Environment. While combining ethnographic approach and participatory design, it is possible to consider this synergy from several perspectives. From one viewpoint, ethnography should be regarded as interdisciplinary technique that deals with ethnographically informed design. From another viewpoint, ethnography as a part of participatory design should be considered in the context of multi-perspectival collaboration that relies on the commitment of participatory design to direct participation of IT users.

Early studies also provide a detailed assessment of the main advantages of participatory technology as a tool for uniting information technologies and

efficient management within the ministry. Specifically, Crabtree (1998) agrees that an ethnographic perspective is an increasingly popular technique which defines major problems through the use of participatory design and presents theoretical solutions in the context of designing a framework supporting activities of end-users. In this respect, engaging users directly into the development of a methodological model for enhancing the monitoring and controlling mechanism is the key to uniting management apparatus and human assets. Indeed, the latter aspect plays a crucial role in building a strong foundation for the given research. Additionally, the scholar believes, "participatory design has placed an emphasis on developing computer-based artifacts that resonate with or 'fit', and at the same time transform, the activities cum organization of work in which they are to be embedded" (Crabtree 1998, p. 2). The ideal synergy between ethnographic perspective and participatory design is possible through considering the form to be a tool for cultural representation of the problem and the latter to be the means of connecting the current user with the contextual issues.

The participatory design ensures the process of change and improvement. To enlarge on the issue, the analysis of cultural problems is possible through evaluating practices accepted in developed and developing economies to learn more about the schemes they use to control and monitor the ministry. What is more important is that the participatory perspective will make the study more reliable due to involvement of direct participants. In this respect, involving users in the ethnographic study has undergone radical changes. The transition has occurred from institutional notions of direct participation in the study to technological tools that shape the solutions to achieving organizational change within the ministry. Prototyping, as a part of this approach, has advantages over other tools in terms of its reference to the future and the possibility to formulate future objectives in cooperation with participants. In order to solve the design problem, participatory design is relevant for turning ethnography into a complementary instrument of conducting the research.

The evaluation of the existing information systems and databases in

Nigerian Ministry of Environment is the focus of the discussion because it shapes a powerful framework for monitoring and control of all activities directed at harmonizing economic initiatives with the environment in the country. In order to integrate efficient managerial systems, the emphasis should be placed on the analysis of existing business reports on environmental strategies adopted in Kenya and South Africa. In addition, attention should be paid to such aspects as plan structure, government's vision and challenges that the administrations should overcome. Evaluating the monitoring systems in the developing world and comparing them with those used in the developed economies can provide a fresh insight into how the Federal Ministry of Government in Nigeria can change their policy and implement the new information systems in the context of rapid globalization. The choice of these countries for evaluating practices is premised on several reasons. First of all, the analysis of information technologies in the developing countries can provide an insight into how these economies deal with environmental issues. This information can expand the government's understanding of cultural and social challenges because Nigeria's environmental problems are more typical of those experienced in the developing world. Therefore, assessment of Ministry's organizational culture as well as its outlook on organizational change can reveal a new path for redesigning the technological support within the department.

Overview of practices adopted by the United Kingdom and the United States is a valuable experience as well. In particular, the analysis of the strategic base of the ministries of environment in these countries can contribute to the government's understanding of how they can make the country adopt dramatic changes. It is logical that these ministries have more advanced technological support which insures efficient data share and communication between the department and the involved stakeholders.

Stakeholder analysis is an essential step for developing a new model of monitoring system for it is a way of gathering information about individuals or groups influenced by the decision. Stakeholder analysis assists in defining possible methods and strategies for solving and negotiating the conflicts

between the stakeholders. The analysis sheds light on capacity and size of the stakeholders who will be involved in the model development. In this respect, as soon as information about internal and external stakeholders is collected, it is possible to introduce a new model for enhancing and controlling ministry through e-government. Specifically, the IT model should take into consideration the participation of host communities, oil/gas companies, government agencies, and academicians/consultants. The task of the monitoring system is to provide information about the Niger Delta environment to the identified stakeholders. Constant interaction of the external stakeholders is essential for distributing information and understanding the impact of gas and oil activities on host communities and environmental situation. Academicians should also take an active part in information update because it contributes to monitoring and supervising. The role of governmental agencies is confined to managing the affairs within Nigerian Ministry and delivering feedback and annual reports. The documented information, along with the feedback from the community, should also be available in the governmental archive. Finally, oil and gas industry should be obliged to report to the Federal Ministry of Environment as well as to consultants and academicians. In such a way, the agencies will be able to provide immediate solutions to the emerged problems. Moreover, active interaction between these stakeholders is essential for improving information processing and storage.

Prior to the analysis of stakeholders and related practices in other countries, it is necessary to consider other aspects influencing information. These aspects involve: the level of education, extent of relevance to strategic enforcement and monitoring in oil and gas production in Nigeria, significance of consultations and research for environmental measures, relatedness to benefits and drawbacks of oil and gas industry, and the extent to which the ministry employs information system to monitor and control. All these factors play a crucial role in defining further paths for distributing information among the identified stakeholders. Additionally, it is essential to consider practices of environmental activities in Kenya and South Africa that also face the problems of water contamination and scarcity.

The Kenyan government expresses extreme concern for efficient management of water resources as well as existence of high quality standards, adequate treatment, and sanitation. In addition, the Ministry of Environment has adopted a new proposal on enhancing technology in the industry and agriculture for national growth and food security (Ministry of Environment, Water and Natural Resources 2010). Moreover, the government has introduced new approaches to data sharing that expand the community's awareness and encourages people to engage into environmental activities. As such, the participation of meteorological services, GIS systems, and other broadcasting mechanisms can significantly foster the adequate allocation of information and resources.

Implementing participatory ethnography based on the case study, observations, and interviews is also essential for understanding how this methodology can contribute to improving organizational culture, educational support, availability support, and socioeconomic environment in Nigerian Ministry of Environment. These factors could be analyzed separately to define further directions for development. To begin with, the principle of monitoring and control are premised on the richness of organizational culture within the organization. In this respect, Shivers-Blackwell (2006) asserts that managers' attitudes to organizational culture and structure have a potent impact on the way they understand leadership requirements. Moreover, the control and self-monitoring regulate this connection because of the evident relation between managers' diverse perceptions of organizational context and awareness of the transformational nature of leadership. The relations are much stronger once they are reconsidered in an external environment.

The organization context within which an information system is employed should consider shapes to be inherent components of the system. Therefore, practices, organizational arrangement ideas, and positions in the information system highlight broader political economic and socio-cultural context through which it develops. As an example, the Kenyan government decides to introduce a specialized information system that enhances

monitoring of financial issues. In addition, Jackson (2011) supports the idea that organization is an important factor defining the success of information system implementation. This is supported by the growing tendency in addressing cultural issues as well as challenges connected to it (e g. viewing culture as a shared and integrated phenomenon that is equally distributed among the managerial staff). The dynamics of information system culture can be strengthened via synthesis of theoretical approaches through which the weakness of one technique can be compensated by a strong side of another. To be more exact, Jackson (2012) proposes to combine three elements of culture, such as integration, fragmentation, and differentiation with the group cultural theory. Such a combination is especially important for developing an efficient information system that will enhance monitoring and control in Nigerian Ministry of Environment. Addressing the context of the study in more detail, it is also reasonable to consider how the nature of organizational culture influences the policy of change within the organization. The fact that the adoption of new managerial systems requires the ministry workers to be prepared for change is undeniable. As a result, resistance to change could be considered to be the leading problem in the case.

In the context of transformation of bureaucratic organizations like public and private services that should take greater control of human resource management, it is essential to examine the nature of resistance. In fact, Sims (2010) resorts to a simple explanation and defines resistance as a protest, friction, or reluctance to accomplish certain actions. While discussing the issue in the context of introducing new technology, the problem of resistance comes to the forth because of the challenges to adjust to the rapidly developing world of information technologies. The task of the ministry is to keep abreast of the recent changes and align them with the cultural and social context of managing environmental issues.

The concept of technology management and information system adjustment is relevant in the context of project management. Specifically, Olateju, Abdul-Azeez, and Alamutu (2011) discuss the importance of using efficient project management. The discussion can correlate with the

problem of enhancing the monitoring and control through information system of Nigerian government because online channels of communication are essential for coordinating each aspect of project management. Moreover, the authors assume that project management ensures an innovative approach to practices because they seek to achieve various objectives within a certain time limit and with specific resources available. Finally, the phases of project management realization could serve as a basis for enhancing and restructuring the monitoring and control through an electronic database.

Availability support is another controversial issue that should be tackled in the context of adjustment of information system, which would improve the management and control within the ministry. At this point, it is necessary to refer to the possibility of establishing geographic information system for ensuring effective control and management. For instance, Chanda et al. (2012) emphasize the advantage of using geographic information system for enhancing control of disease rates in the country. This technology can also complement the existing managerial system. Additionally, it will also insure efficient control and increased knowledge of interactions within the ministry. What is more important is that the proposed system requires availability of spatial and attributes data which supports surveillance, evaluation, and monitoring. The concept of availability support should be presented because it explains how managerial system could be improved without tangible shifts in recruitment. Therefore, GIS-based framework can narrow down the foci of problematic areas in the country.

As soon as introduction of technological devices has been implemented, educational support is indispensible for enhancing the monitoring system in the Nigerian ministry. The task of the manager is to provide assistance to the staff that is expected to adjust to a new technological environment. Akomolafe et al. (2009) also encourage the opportunity to provide people with necessary educational assistance within the ministry to handle sophisticated issues related to monitoring and management. Contributing to the intelligent management system must be a priority for the government

because it will allow the authorities to regulate such issues as transportation and exchange of goods and services. The influence of academic achievements on social and economic conditions is enormous because it generates new human resources with fresh ideas. Competence and qualified staff can contribute significantly to the development of an efficient management system that can enhance the control and monitoring within the industry. For this reason, the implementation of a new electronic database which could be regulated online and advancement of the security control can facilitate the process of checking and inspecting.

The analysis of social and economic environments within the country is essential for understanding of what problems and challenges the government should overcome prior to implementing new managerial strategies to controlling information system. This is of particular concern to the rural areas of Nigeria where access to the World Wide Web is limited. In this respect, the task of the government is to invest in the development of new technologies for enhancing the accessibility of the Internet in such areas and improving the monitoring of the environmental sector. The point is that the development of economic and social sectors is impossible without proper management of rural areas. Therefore, the analysis of these problems is essential for understanding how the monitoring system can be enhanced through information system. At this point, the country which ignores this aspect can fail to ensure meaningful control and development through e-government. Lack of access to these regions will not provide the authority with the necessary information on the issue.

The above-presented information gives a fresh insight into how the information system could be enhanced through adoption of various theories and best practices. The analysis of other countries' information frameworks is also of paramount importance because it can expand the government's experience in processing and storing information. As such, it is highly essential to reconsider the case of South African and Kenyan information systems of governance to trace any possible solutions for the given research (Department of Environmental Affairs 2013). To enlarge on this issue, the

Department of Environmental Affairs focuses on the development of the global framework that would enhance monitoring through the information system. The proposed design does not only provide the implications for supporting GIS and meteorological systems, but also ensures sufficient management of climate change response (Department of Environmental Affairs 2013). Moreover, it encourages the development of coherent integration and collaboration in delivery of services at both local and national levels. The head of the department deliberates on the efficient management of the workshop which offers steps to an ongoing improvement.

While considering the state of affairs in Kenyan government, attention should be given to the challenges that it overcomes on the way to improvement. In particular, the major problem consists in lack of adequate resources for collecting, analyzing, storing, and dissemination the important data. Therefore, the managers should reconsider the policy and rely on the creation of new knowledge networks (Ministry of Environment and Mineral Resources 2013). In addition, the report also shows that the Kenyan government manages to classify the sources and types of incoming information.

In conclusion, it should be stressed that the analysis of theoretical and empirical dimensions of the proposed methodology can provide a deeper understanding of how the government can enhance monitoring and control through the information system. In particular, the introduction of participatory observations, interviews, and experiments plays a vital role in receiving feedback from the population. Further, the assessment of such qualitative aspects as organizational culture, resistance to change, availability support, educational support, and socio-economic factors have a direct impact on the quality of monitoring through electronic databases. Apart from these evaluations, attention should also be paid to the analysis of similar practices in developed and developing countries. In this respect, it is appropriate to review the practices in such countries as the United States, the United Kingdom, South Africa, and Kenya. Due to the economic and

social discrepancies, the obtained information can contribute greatly to the development of new strategies for managing the information technologies in the Ministry of Environment in Nigeria. What is more important is that the information system within the government should be adjusted to social and economic factors.