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# Factors Affecting Application of ICT by Managers in the Nigerian Public Sector

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## Abstract

*The global revolution in Information and Communications Technology (ICT) experienced in the last two decades paved way for massive improvements in the manner management functions are executed worldwide. This study evaluates the impact and impediments to maximum utilization of ICT in enhancing management functions in the Nigerian Public Sector. With the aid of a questionnaire survey covering senior civil servants in the public sector and analysis of their responses, the paper empirically investigated causes of the officers' inability to adopt ICT adequately in performing their functions. Among the findings one should mention that poor state of infrastructure, lack of technical know-how and non-availability of latest technology hinder the use of ICT in performing managerial functions in the Nigerian Public Sector.*

**Key words:** global ICT revolution, Information and Communications Technology, management functions, Nigerian public sector

**JEL Classification:** M12

## Introduction

It is evidently noticeable that over the last two decades, activities relating to Information and Communications Technology (hereafter, ICT) experienced an unprecedented evolution leading to increased sophistication in both computer hardware, and software and the emergence of high technology driven communication facilities such as the Global System Mobile (GSM) phones, the Electronic Mail (Email), and the Internet. Consequently, a combination of these evolutionary processes made it possible for modern organizations to consider the development of strategic information systems. As defined by Jackson (1998), a strategic information system is that which helps an organization creates value by enhancing its ability to achieve its strategic goals. While it can be argued that the application of ICT in developing Management Information Systems (hereafter, MIS) is more visible in the private sector, there are available evidence to suggest that operations in the public sector can also be enhanced through the development of effective MIS. On the other hand, it is quite visible that most of the literature relating to ICT and MIS developments concentrates on the developed countries that apparently spearheaded the development of both the ICT and MIS. However, this notwithstanding, it is equally important to take cognizance of the situations of developing countries especially of their

public sectors where there are serious necessities for ICT and MIS applications for purposes of performance improvements but which based on the observations of international bodies like the World Bank and the International Monetary Fund (IMF) appears to be lacking especially in a country like Nigeria (see World Bank, development index, 2007). Therefore in the light of this observation, this paper seeks to provide empirical evidence regarding factors mitigating against the development of effective MIS based on latest ICT for purposes of improving public sector operational performance within the nation's Federal Public Service. Having identified possible reasons why MIS in the Nigerian public sector has not lived up to expectation, we carried out a questionnaire survey covering Deputy Directors in charge of information and administration within the Nigerian Federal Public service. Our analyses brought to fore the fact that the ineffectiveness of MIS within the Nigerian public service are attributed to factors including: inadequacy of funding for ICT and MIS projects, lack of expertise and training opportunities, and the personal attitudes of public officers among others.

The rest of the paper is structurally organized as follows: in the second segment we provide a review of relevant literature pertaining to ICT and MIS in general and the way such facilities are utilized to ensure qualitative service delivery. The third section is used to bring to light the structure of the Nigerian Federal Public Service which was also to provide the basis for argument regarding the need for the development of effective MIS if the functions of public servants in the country are to be enhanced for better service delivery. Details of our methodological approach are provided in the fourth section which specifies among others; the sources of data methods of collection and analysis, and also a discussion of our findings. Conclusions from the study and suggestions for further research formed the concluding section of the paper.

## Literature Review

The term Information has been severally defined in the literature. For instance, according to Wilson (2005) it is simply knowledge derived from study, experience or instruction. On the other hand, Communication has to do with the process of conveying information from a sender to a receiver through the use of a medium in which the communicated information is understood by both sender and receiver (Armstrong, 2006). This supposes that the effectiveness of communication is crucial to information management a situation that also explains the recent explosion in the application of computer based technology to enhance the flow of information within and outside organizational networks.

Studies in the literature relating to ICT and its impact on MIS and organizational performance (Reponen 1993; Fuller-Love and Cooper 1994 and Harry 2001) have provided volumes of findings and conclusions regarding such perceived relationship. However, as noted by Taylor and Williams (1994), the relationship between change in organizations and the introduction of new technology still remained to be deeply researched and analyzed. Our study thus seeks to extend this research frontier by analyzing the factors accountable for the inability of the increasing wave of ICT development to have a significant impact on the Nigerian public service. Already existing in the literature are three models pertaining to the impact of ICT development on organizations. The first which is referred to as *the technological impact model*, assumes that technology can perform the work of managers more efficiently than humans, which means new information systems enforce rigorous discipline on individuals especially managers (Kimble and Mcloughlin, 1995).

The second model, also known as the *Social impact model* has to do with the social effects of ICT on organizational behavior. Based on the assumptions of the model, it is argued that the impact on managers as a result of the introduction of ICT is not necessarily from the ICT, but from the way an information system using ICT is designed and used. This presupposes that

corporate values are inevitably built into systems with the intension of bringing about certain outcomes (Dobson and Stewart 1993). With the third model the basic opinion is that, it is not rational to assume that technology changes organizations, or that organizations shape technology. Rather, it appears each tends to help in shaping the other even though the nature of such a relationship is still considered complex and probably needing further empirical investigations (Jackson, 1998). Therefore, based on this assumption, we presume in our study that the interaction between an ICT enhanced MIS and public service organizational values is capable of enhancing the efficiency and effectiveness of personnel in the Nigerian public service.

## **Structure and Operations of the Nigerian Federal Public Service**

Nigeria is one of the countries located in the West African sub-region and shares boarders with four other countries; Benin Republic to west, Niger Republic to the north, Chad Republic to the north-east and Cameroon Republic to the south-east. With a population about 140 million, it is the most populated country in Africa and also has the largest civil service employment in the continent (International Labor Organization, (2006). The history of the country's Public service dates back to 1914 when as a British Colony, the British Government created an administrative structure for purposes of ensuring a smooth administration of the then colonial territory. When the country eventually gained political independence from Britain in 1960, the public service structure inherited from the colonial days was retained. It is this structure that had over the years been reviewed and amended to accommodate some of the peculiarities of the country and which as at today, serves as the public service structure for purposes of governance in the country. Although the country's public service comprises three segments viz; Local, States and the Federal levels for purposes of limiting the scope of the study to a manageable level, we concentrate only on the federal level.

### **Operations of the Nigerian Federal Public Service**

As the peak of the Nigerian public service, the federal ministries provide the administrative structures for the implementation of government programs and plans. The respective ministries are structured to accommodate staff from grade levels 01 to 17. The federal public service comprises 23 ministries all of which operate using the above structural pattern.

Going by the structure and operations of the federal ministries it becomes apparent that senior managers in course of their day to day activities do engage in such conventional management including: planning, organizing, controlling, coordinating and taking major decisions. With a view to carrying out these functions effectively, there is certainly a serious need for the ministries to have in place effective management information systems which also need to be high technology driven.

### **Area of Application**

Managers and employers realize that every organization needs information in order to function and that the type of information required by an organization depends upon the organization's activities. To supply, process and communicate this information in an organized and purposeful manner, organizations devise a suitable series of routine and non-routine processes collectively referred to as an Information System (Cleary, 1998, p. 218).

It has been argued that the computer has the capacity to record, collate, analyze and process data with high speed and efficiency. Therefore, the *areas of application* in the public sector include the following:

- planning;

- decision making;
- human resources management system;
- database management system (DBMS);
- quotation.

Most studies that focused on the performance of the Nigerian public service have remained critical about the massive inefficiencies and general operational failures that characterized the entire service not regards to the performance of the Nigerian necessary in all by all in role of information technology in the reengineering of a process should be as an enabling mechanism (Dobson and Rosemary, 1993). An important element in any process restructuring is therefore to improve the management of information associated with the process (2000). Summary information on process activities must therefore be made available to senior management. This information may well be in a form different from the current format. According to Seidmann and Sundararajan (1996), the three areas where IT can facilitate the re-engineering effort are: a) Productivity enhancement, i.e. computer based tools can be used to increase workflow speed, workflow automation can provide improved access to job-related information, or, decision support systems can help improve decision making; b) Job scope expansion: information systems can be used to expand the scope of tasks an employee can perform and, c) Information sharing: Information systems can help management and employees obtain consolidated information from cross-functional processes.

One of the difficulties with the application of information systems is that with such systems people tend to incline towards concentrating on the technological aspects and a general lack of understanding of business processes. Most managers tend to have problems with information management in which case, managing the creation, flow and delivery of organizational information often constitute a problem, flow of information, funds to facilitate access to latest technology can also constitute a problem. The business environment in general witnessed an explosion in ICT technology and given the new technologies and concepts, it made little sense to support the traditional IT application architecture. Organizations began to rethink the way and manner in which they used IT to provide information and support operations. These new applications began to allow organizations to develop sophisticated information system networks that gather detailed business data and apply rules that govern the execution of business activities in real-time basis. With this approach, the business environment appeared have changed significantly both globally and at individual country levels. The drive towards the development and improvement of management information systems (MIS) is equally noted among organizations in both public and private sectors.

The Federal Ministries (23 in number) provide the administrative structures for the implementation of government programmes, plans and policies. Based on the operations of the ministries conventional management activities including; planning, organizing, controlling, coordinating and decision making are undertaken routinely. It is therefore apparent that in order to carry out these functions effectively, all the ministries require MIS that are high technology driven. In terms of specific areas of application, effective MIS is arguably required in all ministries for the preparation and communication of annual budgets regarding revenues, expenditures and other public policies. In recent years there are criticisms reported about poor information management, inaccuracies and often non-availability of data and lack of information for purposes of monitoring, regulating and controlling of public service operations (Akindele 2006). In line with these criticisms therefore, our study was designed to investigate the reasons for the reported failures in the public service communication network by identifying the likely reasons that responsible, conducting an opinion survey to obtain relevant data, analyzing and drawing appropriate conclusions.

## **Research Methodology and Approach**

This paper is basically an investigation into the factors affecting adequate application of Information and Communication Technology (ICT) by Managers in the Nigerian Public Sector. This study is partly descriptive and partly survey in nature. It seeks to obtain information covering the current status of the phenomenon being studied, which is the nature of the situation, as it exists at the time of the study.

### **Sources of Data**

#### **Primary Sources**

The primary sources of data are preliminary surveys and investigation, structured personal interview, which was conducted, with randomly selected Senior Managers within the twenty three (23) including the Federal Ministry of Federal Capital City and the use of questionnaires. This instrument of data collection was found appropriate for this study because it helped to get the views of the literate population in concise terms. Secondly in a research of this nature, where data collected will eventually be analyzed, we deemed it wise to use the questionnaire in order to avoid gathering data that may have little or no bearing to the subject under study. Considering also the kind of respondents being addressed, it was found most suitable because it does not require elaborate answers. However, we relied on this source for the analysis of the data, the formulation of recommendations and calculations.

#### **Secondary Sources**

For the collection of the secondary data and other background information necessary for this study, the following sources proved useful:

- text books materials and books on Business Information Technology, Communications etc.
- magazines and periodicals;
- newspapers and journals;
- Internet.

### **Methods of Collection of Data**

Data for the study were obtained through a survey questionnaire to the officers who are in the rank of senior positions that is the Senior Managers (Information) in the twenty three (23) ministries of the Federal Republic of Nigeria. Multiple choice questions were preferred since it was our opinion that consistency of the reactions of the respondents could be ascertained and maintained through this method. Further, in some instances, open-ended questions were used.

### **Questionnaire**

The questionnaire covers the likely factors that might affect the use Information Communication Technology in the public sector such as:

- infrastructure: such as types of equipment available and power supply;
- technical know-how: Availability of training facilities such as institutions, trained ICT personnel and so on;
- funds: availability of funds;
- personal attitude: personnel willingness to change;
- operational impediments: maintenance and monitoring.

With the use of close-ended and semi-open-ended questions, the questionnaire is designed in such a way that respondents will find it very easy to understand and complete promptly.

Our research design calls for a methodological approach in which primary data has to be collected for purposes of obtaining information regarding the current status of the phenomenon being studied. Consequently, we had to derive data from primary and secondary sources. Primary data was obtained through a questionnaire survey and personal interviews involving Deputy Directors in charge of information and administration in the twenty three (23) Federal Ministries in Nigeria as at December, 2009. This method of data collection was found appropriate because it helped to get the views of the literate population in concise terms. Secondary data from relevant books, journals and other periodicals were also consulted.

A total of forty six (46) questionnaires were administered among the selected Deputy Directors in the sample. Following the elimination of incomplete and invalid responses, our final sample size for testing hypothesis one was N=40, while the sample size for testing hypothesis two was N=34. The two statements of *hypotheses* are as follows:

- H<sub>0</sub>: Lack of infrastructural facilities has no impact on the utilization of ICT-based MIS by Nigerian federal public servants.
- H<sub>1</sub>: Lack of infrastructural facilities has impact on the utilization of ICT-based MIS by Nigerian federal public servants.
- H<sub>0</sub>: The level of technical know-how and availability of training facilities has no impact on the utilization of ICT-based MIS by Nigerian federal public servants.
- H<sub>2</sub>: The level of technical know-how and availability of training facilities has impact on the utilization of ICT- based MIS by Nigerian federal public servants.

### Test of Hypotheses

Chi-square statistical test was used in testing these hypotheses and the test statistic is calculated thus:

$$\chi^2 = \sum_{i=1}^k \left( \frac{O-E}{E} \right)^2 \quad (1)$$

where:

O = Observed frequency,

E = Expected frequency, and

K = Number of groups

$$\chi^2 C \geq \chi^2 t \quad (2)$$

Decision Rule: Reject Null hypothesis if calculated chi-square is greater than the value in the chi-square table otherwise accept the alternative.

**Table 1.** Computation of Chi-square ( $\chi^2$ ) for Hypothesis One

Variables	O	E	O-E	(O-E) <sup>2</sup>	$\left( \frac{O-E}{E} \right)^2$
1	5	13.5	-8.5	72.25	5.351852
2	5	13.5	-8.5	72.25	5.351852
3	20	13.5	6.5	42.25	3.12963
4	10	13.5	-3.5	12.25	0.907407
$\chi^2$					14.74074

Source: questionnaire administered.

As shown by the results in Table 1, the value of chi-square computed is 14.74 with a degree of freedom (d.f) of 3 which is higher than the critical value of Chi-square at the 0.05 level of significance. In view of this, we reject the null hypothesis and accept the alternative hypothesis

which states that lack of infrastructural facilities has impact on the utilization of ICT-based MIS by Nigerian Federal Public Servants.

**Table 2.** Computation of Chi-square ( $X^2$ ) for Hypothesis Two

Variables	O	E	O-E	(O-E) <sup>2</sup>	$\left(\frac{O-E}{E}\right)^2$
1	3	14.3	-11.3	127.69	8.929371
2	7	14.3	-7.3	53.29	3.726573
3	18	14.3	3.7	13.69	0.957343
4	6	14.3	-8.3	68.89	4.817483
$X^2$					18.43077

Source: questionnaire administered.

As indicated in Table 2, the Chi-square calculated is 18.43 with a degree of freedom (d.f) of 3 while Chi-square critical value is 7.82 at 0.05 level of significance. In view of this, we reject the null hypothesis which states that the level of technical know-how and availability of training facilities has no impact on the utilization of ICT-based MIS by Nigerian Federal Public Servants and accept the alternative hypothesis.

## Result and Discussion

Results from the two hypotheses tested indicate that: the lack of ability to apply ICT-based MIS by public servants in the Nigerian public service can be partly attributed to two factors. These are: the lack of infrastructural facilities and the level of technical know-how and availability of training opportunities. These findings invariably suggest that the affected public servants are not given access to state-of-the art technology such as latest versions of computer software applications and neither are they opportune to acquire adequate training towards skill acquisition and enhancement.

As one would reasonably expect, these problems are also likely to be connected to other developmental problems such as: insufficiency of funding, attitudinal problems of individual staff and lack of policy and administrative stability among others. Implication wise, the problems must have significantly affected the levels of performance in the Nigerian public sector in general, a situation that had been observed by many previous researchers. However, in view of the limitations of our study especially the facts that the survey was restricted to very senior personnel and the use of only two hypotheses, it is required that the results need to be interpreted with caution.

## Conclusion

Information and Communications Technology (ICT) recently created opportunities for organizations to develop highly effective Management Information Systems (MIS) for better service delivery. However, the situation with the public service in Nigeria suggests that such a window of opportunity is not effectively utilized thereby reducing the efficiency of service delivery in the country. Going by the circumstances in the country, it appears that the inability to make use of the opportunities created by the global evolution in ICT is linked to problems ranging from lack of needed infrastructural facilities to inadequacy of training opportunities and other developmental inadequacies.

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## Factori care influențează aplicarea Tehnologiei Informaționale și a Comunicării (TIC) în sectorul public din Nigeria

### Rezumat

Revoluția globală a Tehnologiei Informaționale și a Comunicării (TIC) din ultimele două decenii a deschis calea unor îmbunătățiri semnificative în ceea ce privește maniera de lucru în funcțiile manageriale, la scară mondială. Acest studiu evaluează impactul și impedimentele unei utilizări maxime a TIC pentru îmbunătățirea funcțiilor manageriale în sectorul public nigerian. Prin intermediul unui chestionar de examinare adresat funcționarilor publici și a analizei răspunsurilor, s-a investigat în mod empiric incapacitatea acestora de a adopta într-un mod adecvat TIC în exercitarea funcției lor. Astfel, se relevă faptul că o stare proastă a infrastructurii, lipsa cunoștințelor de ordin tehnic și a tehnologiei de ultimă generație împiedică folosirea TIC în desfășurarea funcțiilor manageriale din sectorul public nigerian.