



Organisational Factors Associated with Electronic Health Information Management Systems Success in two Nigerian Teaching Hospitals

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Background and Purpose: Electronic Health Information Management Systems (EHIMS) are seen as crucial in public health institutions today, as they enhance quality care delivery. Efforts at implementing this system in public health institutions of developing countries have usually been fraught with failure, thus preventing it from delivering its intended benefits. One reason adduced to be responsible for failure is that more attention is given towards technological factors at the expense of organisational factors. Hence, this paper examined the relationship between organisational factors and EHIMS success in Nigerian Teaching Hospitals.

Methods: A correlational survey research design was adopted, while the study's population comprised 212 health information management (HIM) personnel in two south-western public teaching hospitals in Nigeria. Total enumeration technique was used to cover the 212 personnel who served as respondents. A self-developed instrument titled "EHIMS Success Organisational Factors" was used for data collection, while simple correlation analysis was used in analysing the collected data.

Results: It was revealed that a positive relationship exists between all the identified organisational factors and EHIMS success; organisational structure ($r = 0.443, p < 0.05$); top management support ($r = 0.613, p < 0.05$); leadership style ($r = 0.645, p < 0.05$); users' training ($r = 0.521, p < 0.05$); financial resources availability ($r = 0.331, p < 0.05$); and users' involvement in system design ($r = 0.633, p < 0.05$).

Conclusions: It was concluded that an understanding of the identified organisational factors are crucial in attaining successful implementation of EHIMS in Nigeria Teaching Hospitals.

Keywords: Electronic health information management system, Organisational factors, Information system success, Teaching hospitals, Nigeria

1 Introduction

Teaching Hospitals are tertiary level health care providers inherent in the Nigerian health care delivery referral system. They are known as sites of education and research, also providing qualitative and affordable tertiary health care to the nation's citizenry. Without an organised, effective and efficient health information management system in place, the functions expected of these hospitals become difficult to accomplish.

Over the years, the information required for evidence-based decision making in health care institutions has continued to increase, while its organisation and accessibility dwindles. This has led to inappropriate decisions and medical errors [1], thus calling for electronic health information management systems (EHIMS) to enhance accessibility and management of medical information [2].

The healthcare sector is no doubt an information intensive one, hence there's a need to have in place an organised information system to ensure quality of care delivery [3]-[5]. Also, as noted in the revised

version of Nigeria's National Health Policy [6], "the availability of accurate, timely, reliable and relevant health information is the most fundamental step towards informed public health action (p.43)."

Investing in information technology as a means of delivering high quality care through rapid information retrieval and data management, have been recognised by health care organisations around the world. This, studies have shown that traditional paper-based health information system can be replaced with flexible electronic means which could lead to cost reduction and effectiveness in terms of timely delivery of health care services [7]-[10]. The application of information communication technology (ICT) for the management of health information in healthcare organisations in hospital is tagged Electronic Health Information Management System (EHIMS) in this paper.

EHIMS can be defined as a massive, integrated system that supports the comprehensive information requirement of hospitals; including patient, clinical, ancillary and even financial management. It is an instance of a holistic health information system which has been designed to store, manipulate, and retrieve clinical and administrative information [11]. Studies have shown that the use of EHIMS will bring about increased digitization which makes the management of comprehensive medical records easier; and has significant potential to improve patient safety, patient satisfaction and organizational efficiency, thereby improving health outcomes for patients [12]-[15]. Furthermore, an objective correlation between the degree of adoption of technologies in health care and reduction of complications and mortality in hospitals has also been shown [16][17].

As lofty as the introduction of EHIMS seems, attempts by developing countries governments in its introduction in public health institutions has usually been a difficult process of change, recording more failure instead of successes [18]-[20]. It is important however, that for public health institutions to benefit from their investment in EHIMS implementation, it must attain a state of success. A successful EHIMS in this paper is seen as that which is serving its intended purposes after implementation and subsequent use. The success of EHIMS can be measured along several themes of quality dimension (system quality, information quality, and service quality) [21]-[24]; which were adopted as means of measuring EHIMS success in this paper.

A number of factors have been identified as impeding EHIMS success in health institutions of developing countries. While efforts have usually been concentrated on technological factors, studies have shown that the successful implementation of EHIMS in hospitals is more of a human endeavour than technological sophistication. This is so, because according to Lorenzi in Aarts et al. [25], information systems implementation is subject to the vagaries of the human mind and the culture, politics and power that tie human groups together. While organisational factors in technology implementation especially in healthcare settings of developing countries are not receiving adequate research question, studies have shown that successes and otherwise failure of EHIMS are due to organisational factors and not just technological factors which always seem to be the focus of attention [25].

In a study conducted in Tanzania and Nigeria, proper planning, good managerial skills, top management commitment, leadership styles and end-user consideration were considered as organisational factors necessary to ensure EHIMS success [26]. Furthermore, many systems fail because of issues related to the organization itself. In developing countries, this means that issues like the national and organizational culture play a big role in EHIMS implementation. Kuhn and Giuse [27] allocate the success rate of a technology project as 80 percent dependent on the development of the social and political interaction skills of the developer and 20 percent or less on the implementation of the hardware and software technology. Also, a formative evaluation study of EHIMS conducted by Herbst, Littlejohns, Rawlinson, et al. [28] concluded that concentrating on technological issues (i.e. hardware and software) to the detriment of human ware is a risky strategy for implementing and sustaining EHIMS. However, there are challenges related to understanding and optimizing the complex interaction between people (healthcare professionals, patients and laypeople) and computer systems. While efforts have been made to implement EHIMS in the nation's health sector, there are issues challenging its continuous use and overall use. It is therefore crucial that this system is successfully implemented and continuously used over time if it is to bring about any of its intended benefit to healthcare delivery.

The objective of this study therefore is to ascertain the relationship between organisational factors and EHIMS Success in Nigeria Teaching Hospitals. It is believed that understanding these organisational factors could help to contribute to the discourse on factors affecting EHIMS Success in health institutions, especially in the context of developing countries. It is pertinent to state that this study surveyed the perceptions of EHIMS end-users, which in this study are health information management personnel. This

is because the use of EHIMS is not in a steady state yet among other supposed users like physicians and nurses. Health information management personnel in Nigeria are professionals who have undergone a specialized training in the management of patients' data. However, for the purpose of this study, data entry personnel though not having been trained in health information management are also considered users. This study focused on two University Teaching Hospitals in South-West, Nigeria that have had experience implementing an EHIMS. The Hospitals are Lagos State University Teaching Hospital (LASUTH), Ikeja, Lagos State and University College Hospital (UCH), Ibadan. More importantly, this study focused on organisational factors such as organisational structure, top management support, leadership style, users' training, financial resources availability, and users' involvement in system design which were all derived from a review of existing literature.

2 Materials and methods

This paper is guided by the conceptual model below:

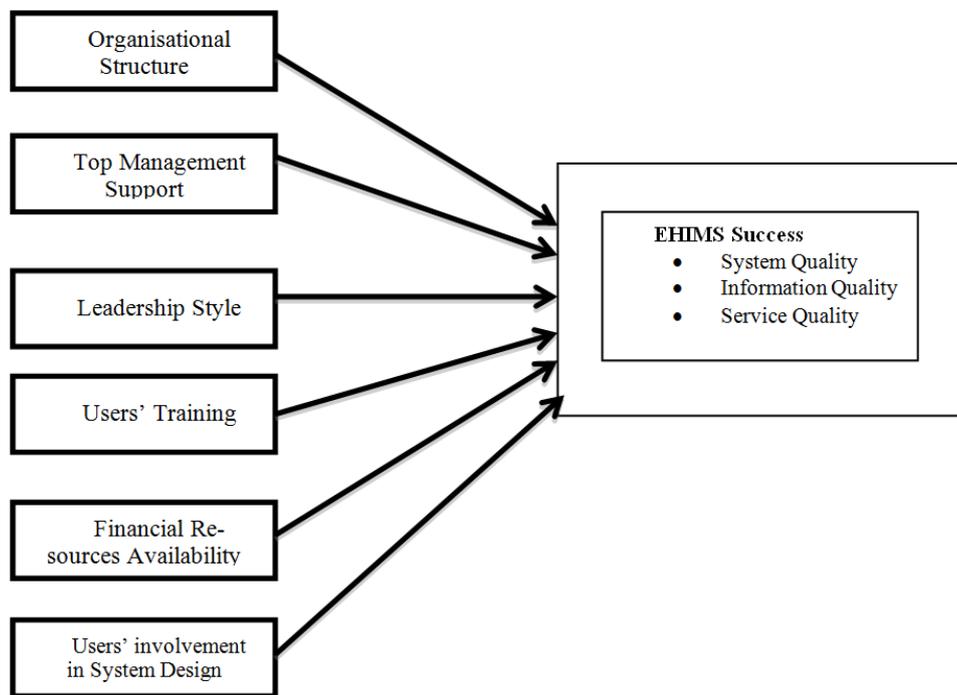


Fig. 1. Researcher's Conceptual Model

In line with the conceptual model (Fig. 1). The following null Research Hypotheses were formulated to guide the study:

1. There is no significant relationship between organisational structure and EHIMS success in Nigerian teaching hospitals.
2. There is no significant relationship between top management support and EHIMS success in Nigerian teaching hospitals.

3. There is no significant relationship between leadership style and EHIMS success in Nigerian teaching hospitals.
4. There is no significant relationship between users' training and EHIMS success in Nigerian teaching hospitals.
5. There is no significant relationship between financial resources availability and EHIMS success in Nigerian teaching hospitals.
6. There is no significant relationship between Users' involvement in System Design and EHIMS success in Nigerian teaching hospitals.

A correlational survey design was used in this study, while responses were sought from health information management personnel who are the primary users of the system. Since this study was focused on two teaching hospitals (LASUTH and UCH), the study population therefore comprised of 212 health information management (HIM) personnel in the hospitals. Specifically, 110 and 102 HIM personnel from LASUTH and UCH respectively. A total enumeration technique was therefore employed to survey the responses of the 212 HIM personnel.

A researcher-developed measuring instrument tagged "EHIMS Success Organisational Factors" questionnaire was used for data collection in both hospitals. The questionnaire was subjected to reliability test using the Cronbach's alpha reliability technique. In line with the research hypotheses, a section by section reliability test yielded the following results: organisational structure – 0.87, top management support – 0.80, leadership style – 0.84, users' training – 0.71, financial resources availability – 0.63, users' involvement in system design – 0.76, and EHIMS success – 0.76.

212 copies of the questionnaire were thereafter administered to health information management personnel in the studied teaching hospitals by the researcher. A total of 205 copies of the questionnaire (representing a 96% response rate) were retrieved and found to be eligible for analysis. This was then analyzed using the simple correlation analysis. The analysis was done using the Statistical Package for Social Science (SPSS v 15).

3 Results

The results from the correlation analysis revealed a significant relationship between each constructs of organisational factors and EHIMS success. That is, there exists a positive relationship between organisational structure and EHIMS success ($r = 0.443$, $p < 0.05$); top management support and EHIMS success ($r = 0.613$, $p < 0.05$); leadership style and EHIMS success ($r = 0.645$, $p < 0.05$); users' training and EHIMS success ($r = 0.521$, $p < 0.05$); financial resources availability and EHIMS success ($r = 0.331$, $p < 0.05$); and users' involvement in system design and EHIMS success ($r = 0.633$, $p < 0.05$). This is summarised in **Table 1**.

Table 1. Correlation between Organisational Factors and EHIMS Success

		Organisational Structure	Top Management Support	Leadership Style	Users' Training	Financial Resources Availability	Users' involvement in system design
EHIMS Success	Pearson Correlation	.443**	.613**	.645**	.521**	.331**	.633**
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000
	N	205	205	205	205	205	205

** Correlation is significant at the 0.01 level (2-tailed).

4 Discussion

Results from the analysis shows a relationship between the identified constructs of organisational factors and EHIMS success. A number of studies have corroborated the findings from this study. Tsiknakis and Kouroubali [29] for example in a study of the Organizational factors affecting successful adoption of innovative eHealth services found that the two most influential factors for the success of ICT implementations were training and organizational support. The amount and type of training as well as the level of leadership and management were direct and/or indirect predictors of success. Ang et al. [30], also affirms that organizational factors such as organizational structure, organizational size, managerial IT knowledge, top management support, financial resources, goal alignment and budgeting method all influences IT usage. Biehl [31] as well, highlights top management support, well-understood work processes, the use of a cross-functional team, and maintaining cross-functional cooperation and communication as important organizational factors to be considered for successful information systems.

This result again supports the findings of Berg [32], who concludes that health information system implementation is a mutual process where both organization and technology influence each other. This should be supported by both management and future users. In the same light, Guy and Marie-Claude [33], found that a planned and rational implementation strategy centered on technological considerations, with a relative exclusion of wider organizational and human concerns, is most likely to lead to an EHIMS project failure.

This study was an attempt to understand the relationship between organisational factors such as organisational structure, top management support, leadership style, users' training, financial resources availability, users' involvement in system design; and EHIMS Success in Nigerian Teaching Hospitals. The healthcare sector is an information intensive one, as such requiring investment in EHIMS. While efforts have been made by governments, hospital managements and donor agencies alike to implement EHIMS in some of the nation's public health institutions – it has usually been fraught with failures. Hence, calling for an understanding of the factors responsible for EHIMS success, in order to prevent further failures.

While this study does not claim to be novel in this area, it contributes to the discourse on factors that could contribute to EHIMS success in public health institutions of developing countries. It also theoretically explains the organisational factors essential for EHIMS success, thus providing empirical evidence. The results of this study could help hospitals on the verge of implementing EHIMS understand organisational factors to be considered, consequently helping to prevent wastage of human and financial resources. Also, the call for an eHealth policy in most African countries is a legitimate one, the results of this study could contribute to the discourse on formulating and implementing such policies.

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