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# Factors Influencing the Adoption of Electronic Health Record Systems in Developing Countries: A Case of Uganda

Hussein Muhaise<sup>a\*</sup>, Dr. Margaret Kareyo<sup>b</sup>, Professor Johnie Wycliffe Frank Muwanga-Zake<sup>c</sup>

<sup>a</sup>School of Computing and Information Technology, Kampala international University <sup>b</sup>Senior Lecturer, School of Computing and Information Technology, Kampala international University <sup>c</sup>Professor, School of Computing and Information Technology, Kampala international University <sup>a</sup>Email: hmuhaise@yahoo.com <sup>b</sup>Email: magsterkami@gmail.com <sup>c</sup>Email: tebiggwawo@gmail.com

## Abstract

Electronic Health Records Systems are important Technology that is beneficial to improving the health care delivery inline of (i) providing accurate, up to date and complete data, (ii)sharing electronic information between patients and clinicians securely (iii) helping providers to effectively diagnose patients, reduce medical errors and provide safer care (iv) quick access to patient records for more coordinated efficient care (v) improving patient and provider interaction and communication (vi) enabling safer more reliable prescriptions (vii) reduction of costs, reduced paper work, reduced duplication of testing and general improved health. Despite all the benefits provided by Technology, there is little interest and limited adoption of Electronic Health Record Systems by the Health Sector in developing countries to compete in today's market globally geared by new technology. The aim of this paper is to review factors for low adoption of Electronic Health Record Systems in context of developing countries. The factors that can influence the adoption include the need for involvement and participation of all stake holders in the health sector, availability of dedicated users and having a good change management strategy and leadership, effective leadership and effective communication, training staff and time management are key, also evaluation of organizational needs is important for fostering the implementation of electronic health record systems.

Keywords: Electronic health record systems; EHR adoption; develooping countries; EHR implementation.

\* Corresponding author

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## 1. Introduction

The Health Sector around the world are increasingly adopting the Electronic Health Records systems (EHR) driven by the advancements in Information and Communication Technologies (ICTs). Electronic Health Records System is a digital mechanism of capturing patient information, storing and continued use by authorized health care providers to effectively deliver health care services [14]. However, it is a big challenge to implement the EHR systems in Health care service centre in context of developing countries because technology adoption and use depends on a number of factors. For example, the acceptance of technology at organizational and individual levels may be influenced by the factors in the area in which the EHR is implemented [13]. Low usage of EHR in the developing countries is a consequence of poor adoption by organizations and users [4,5]. Developing countries is a general terms used to refer to a group of countries that require equitable and sustainable social and economic growth. Reference [15] classified such countries as low income countries with the national income (GNI) per capita \$995 or less.

## 2. Methodology

A systematic literature review, based on papers published from 2010 to 2019, concerning the facilitators and barriers for the adoption and use of Electronic Health Records in developing countries was conducted. Data was gathered using five databases: Google scholar, Journals of Health and Medical Informatics, BMC Health services research, Pub Med Health, EBSCO. Studies were included in the analysis if they had issues relation to adoption facilitators and barriers of EHR in developing countries, implementation of EHR in developing countries.

## **3. Findings**

The findings were summarized in the facilitators and barriers table after the authors choice of articles for the literature review. Before creation of the findings table duplicate articles were taken care of not to confuse the findings. Then analysis of individual articles was done to identify the factors affecting the adoption and use of EHR in developing countries. The factors were compiled into a frequency table to aid the analysis and discussion of findings. Results are summarized in table 1 and the factors the frequency table 2. The systematic analysis of literature revealed many facilitators and barriers of adoption and use EHR in context of the developing countries. The facilitators to adoption and use of EHR included accesses to complete information, accurate and error free information, efficiency and quality health services cost saving, and information security while the barriers included inadequate ICT skills and training, inadequate financial and equipments, poor implementation planning, negative perceptions.

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			Unreliable power supply
Improper planning			Improper planning
Hsieh, 2015 Perceived ease of use Attitude	Hsieh, 2015	Perceived ease of use	Attitude
Perceived usefulness Risks		Perceived usefulness	Risks
Improper implementation			Improper implementation
Cost			Cost
Political influence			Political influence
Cultural			Cultural
Cucciniello, Lapsley, Nasi and Efficiency Attitude	Cucciniello, Lapsley. Nasi and	Efficiency	Attitude
Pagliari, 2015 Management & staff support Cultural	Pagliari, 2015	Management & staff support	Cultural
Training programs Costs	J ,	Training programs	Costs
Error reduction Technophobia		Error reduction	Technophobia
Improper planning			Improper planning
Understaffing			Understaffing

# Table 1: Results from the review of Literature

M to be and H to bin to 2016	Management	<b>G</b> ente
Muhaise and Habiinka,2016	Management support	Costs
	Quality	Attitude
	Efficiency	Skills and training
	Training staff	Lack of interoperability
		Resistance
		Unreliable power supply
Mosweu, Bwalva and	Perceived usefulness	Attitude
Mutshwewa 2017		Technophobia
111111111111111111111111111111111111111		Resistance
		Improper planning
Mathal Shiratudin and Sahal 2017	Quality	
Mathai, Shiratudin and Sohei, 2017	Quanty	Attitude
	Efficiency	Resistance
	Perceived ease of use	Costs
		Security
		Understaffing
Ondieki F, 2017	Efficiency	Time
	Quality	Resistance
	Time saving	Cost
	6	Skills and training
Muhaise and Kareyo 2017	Efficiency	Costs
Withhatse and Kareyo, 2017	Quality	Skills and training
	Quality Democived usefulness	
	Perceived userumess	Power suppry
	Resource supply	Security
	Management support	Attitude
	Training staff	Resistance
		Lack of expert support
Furusa and Coleman, 2018	Efficiency	Skills and training
	Quality	Understaffing
	Perceived usefulness	Costs
	Time saving	Power supply
		Lack of expert support
		Luck of expert support
Katurura and Cilliers 2018	Institutional pressure and	Skills and training
Katurura and Childrens, 2010	acompletion	Costs
	Completion	Costs
	Chromic care management	Power supply
	Perceived ease of use	Political influence
		Resistance
		Improper implementation
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Adedeji, Irionye, Ikono and	Efficiency	Skills and training
Komolafe, 2018	Quality	Resistance
	Patient follow up	Attitude
		Lack of expert support
		Security

# Table 2: factors frequency

Factors	Total Occurrences
Facilitators	
Better health outcomes	1
Change management	1
Chromic care management	1
Efficiency	14
Emerging payment methods	2
Error reduction	5
Good communication with EHR developers	1
Institutional pressure and competition	1
Management & staff support	1
Management support	2
Patient follow up	1
Perceived ease of use	5
Perceived usefulness	4
Quality	13
Resource supply	3
Time saving	4
Training programs	6
Barriers	
Attitude	13
Costs	13
Cultural	4
Improper implementation	3
Improper planning	4
Inadequate training and skills	5
Interoperability	6
Lack of enough time	2
Lack of expert support	4
Organisational barriers	1
Political influence	2
Power supply	3
Resistance	12
Risks	2
Security	5
Skills and training	12
Staff retention	3
Time	2
Technophobia	2
Unreliable power supply	4
Understaffing	5

#### 3.1 Facilitators

The facilitating factors identified included: better health outcomes change management, chromic care management, efficiency, emerging payment methods, error reduction, good communication with EHR developers, institutional pressure and competition, management & staff support, patient follow up, perceived ease of use, perceived usefulness, quality, time saving, training programs. The factors better health outcomes change management, chromic care management, efficiency, quality patient follow up form are concerned with ability of EHR to facilitate quality health services provision in terms of easy to access patient records and management, rapid information exchange, electronic schedule of patients' appointments and alerts for adherence to drugs and likely drug side effects. Error reduction was another benefit cited: the error reduction in form of patient prescriptions, drug dispensing and records capture. Perceived ease of use and perceived usefulness

## 3.2 Barriers

The barriers indentified through the review to influence the adoption and use of EHR in developing countries include: attitude, costs, cultural, improper implementation, improper planning, inadequate training and skills, interoperability, lack of enough time, lack of expert support, organizational barriers, political influence, power supply, resistance, risks, security, skills and training, staff retention, time, technophobia, unreliable power supply, understaffing. Negative attitude towards the technology innovations in health were identified as a critical issue, costs for start up of EHR projects in terms of purchase of required ICT infrastructures and resources like internet, inadequate financing, organizational cultures and resistance to change. Some health practitioners preferred the status quo of using manual forms citing insecurity about patient records and the practitioners' fallback position in case things go wrong about patient management. Lack of skills and training in ICT facilities usage was another issue seen. Lack of expert support related to technical support from the software developers, absence of ICT technical staff

## 4. Conclusions

The review examined factors that influence the adoption and use of EHR in context of developing countries. The information generated by this study is paramount for MoH Uganda to benchmark and effectively take decision as policy makers to increase the adoption and use of EHR in all health facilities in Uganda.

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