

**THE EFFECTIVENESS OF THE USE OF
TECHNOLOGY IN PATIENT-CENTRED
CARE FOR COUNTERFEIT
DRUG CONTROL**

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**ASIA e UNIVERSITY
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THE EFFECTIVENESS OF THE USE OF TECHNOLOGY IN PATIENT-
CENTRED
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MORUFU AMUSA

A Thesis Submitted to Asia e University in
Fulfilment of the Requirements for the
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ABSTRACT

Counterfeit drugs impose risk to human life and properties. Many organizations globally are involved in counterfeit drugs control with focusing on pharmaceutical production and supply chain, while less or rare efforts are invested at terminal intervention by the end users. This study focused on end users in the six geopolitical zones in Nigeria. A prototype Information System (IS) developed using Short Message Services of Mobile Telecommunication System. The Unified Theory of Acceptance and Use of Technology (UTAUT) model was adopted with new two relevant variables namely, Zero-Cost and Health Condition introduced to fit the context of this study. UTAUT employed to investigate the key factors affecting the users' intention to use the Patient-Centred System for Counterfeit Drug Control (PACSCDC) using Questionnaires Survey. Two groups involved in the investigation on fake drugs awareness and factors influencing users' intention using the system and its effectiveness. Random sampling technique adopted for participant, 1391, 2593 respectively, the reliability of data collected and survey achieved with Cronbach's Alpha value of 0.713 and 0.949 respectively. Descriptive and inferential analytical methods employed via the Statistical Package for the Social Sciences (SPSS). Hypertext Pre-processor (PHP) used as scripting language. Study discovered the need of users to have awareness on counterfeit drugs, to have tailored information system and factors affecting intention of user to use the system revealed. The novelty of this work resides in the design of a system that works on unsophisticated mobile telephones, simplicity communication with users, and assisting in patient-drug education beside detecting fake drugs. This work contributes theoretically & practically to the knowledge.

Keywords: Counterfeit drugs, Health Information System, UTAUT

APPROVAL

This is to certify that this thesis conforms to acceptable standards of scholarly presentation and is fully adequate, in quality and scope, for the fulfilment of the requirements for the degree of Doctor of Philosophy

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DECLARATION

I hereby declare that the thesis submitted in fulfilment of the PhD degree is my own work and that all contributions from any other persons or sources are properly and duly cited. I further declare that the material has not been submitted either in whole or in part, for a degree at this or any other university. In making this declaration, I understand and acknowledge any breaches in this declaration constitute academic misconduct, which may result in my expulsion from the programme and/or exclusion from the award of the degree.

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LIST OF ABBREVIATION

0G	Zero Generation
1G	First Generation
2G	Second Generation
3G	Third Generation
4G	Fourth Generation
5G	Fifth Generation
AIDC	Automatic Identification and Data Capture
ASCII	American Standard Code for Information Interchange
DSS	Decision support systems
EDGE	Enhanced Data for Global Evolution
EPC	Electronic Product Code
ETSI	European Telecommunications Standards Institute
FDA	Food and Drug Administration
FDMA	Frequency Division Multiple Access
FIP	International Federation of Pharmaceuticals
GMP	Good Manufacturing Practise
GNSS	Global Navigation Satellite System
GPRS	General Packet Radio Service
GPS:	Global Positioning System

GSM	Global System for Mobile Communications
HSPA	High Speed Packet Access
ICT	Information and Communication Technology
IDP	Internally Dispersed People
IMPACT	International Medical Products Anti-Counterfeiting Taskforce
INTERPOL	International Criminal Police Organization
ISO	International Standards Organizations
ITU	International Telecommunication Union
LBS	Location Based Services
LTE	Long Term Evolution
MAS	Mobile Authentication Service
NAFDAC	National Agency for Food and Drug Administration and Control
NDLEA	National Drug Law Enforcement Agency
NBS	National Bureau of Statistics
NITDA	National Information Technology Development Agency
NCC	Nigerian Communication Commission
NMT	Nordic Mobile Technology
OSS	Open Source Software
OTC	Over The Counter
PFIPC	Permanent Forum on International Pharmaceutical Crime

RFID	Radio Frequency Identification
SMS	Short Message System
SMS	Short Message Services
SMSC	Short Message Service Centre
TAM	Technology Acceptance Model
UNODC	United Nation Office of Drugs and Crime
USAID	United States Agency for International Development
UNFPA	United Nations Population Funds
UTAUT	Unified Theory on Acceptance and Use of Technology
UTF	Unicode Transformations Format
WCDMA	Wideband Code Division Multiple Access
WHO	World Health Organization

Counterfeit Drug:

“A counterfeit medicine is one which is deliberately and fraudulently mislabelled with respect to identity and or source. Counterfeit can apply to both branded and generic products and counterfeit products may include products with the correct ingredients or with wrong ingredients, without active ingredients, with insufficient active ingredient or with fake packaging” as defined by WHO.

Information System:

“A field of study (Professional discipline) that draws its importance from the distinctiveness of computer-based information and communication tools and their place in influencing modern human, social and organizational history. It includes people, procedures, data, software, and hardware that are used to gather and analyse digital information”.

Fake Drug Prevention:

Process or means of using Information Technology to prevent the production of fake drug.

Fake Drug Detection:

Process or means of using Information Technology to detect the circulation of fake drug when preventing its production is failed.

Fake Drug Control:

Process or means of using Information Technology to manage the effect of production and circulation of fake drug.

Open Source Software:

Open Source Software is software whose source is open, and user is free to use it, modify it and distribute it.

mHealth :

Medical and public health practice supported by mobile devices, such as mobile phones, patient monitoring devices, personal digital assistants (PDAs), and other wireless devices.

Smartphone :

A mobile phone with advanced features, such as Bluetooth and the ability to program, install and/or run third-party applications.

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter presents the basic introduction to the research work on the control of Counterfeit drugs and sub-standard drugs which pose risk to human life and properties. Although many organizations globally are involved in campaigning for counterfeit drugs control through some sophisticated tools or business-oriented approach, the approach in this thesis is fundamentally different. This study emphasizes on the development of an information system via a hand-held means for end users to be able to authenticate the products before administering them. Also, to investigate the factors influencing the users' intention to use the information system.

1.2 Background of the study

The key to preventing disease and promoting health care is to provide timely, well-documented and useful information.

The employment and utilization of machines, tools and computer-based technologies in health-care services have passed through the evolutionary process. Advancement in information, communication, as well as network technologies gave birth to the emergence of a new trend in health care service namely e-health. The involvement of e-technologies in all part of health care and medicine gives one clear understanding why a course in e-health (electronic health) and related courses are necessary and it is highly demanding for the health information systems course outline in medical schools, allied health institutes, engineering schools, and business field of studies. (Tan, 2005)

Information Technology has become essential in our daily life activities, especially the services provided by new generation of mobile communications systems. Cell phones (Mobile Phones or Handsets) considered as an essential element of the new world; they provide human connectivity easily in a means that was never possible before. Besides that, consumption of drugs has become a normal part of daily life in modern society. And the official or drug regulatory body has important roles to play by ensuring a supply of effective and safe medicines whether by selection from amongst those used in traditional systems or by modern invention. Unsafe or ineffective medicines should be identified and eliminated from the circulation. In the context of this study, NAFDAC – National Agency for Food and Drug Administration and Control in the Federal Republic of Nigeria is concerned with quality, safety, efficacy and supply of medicine to the public. To achieve its goals and mandatory there must be a well-formed reliable system.

There are two major schools of thought in ICT Industry. The first school of thought takes a study of ICT and uses the knowledge acquired to build ICT based systems to enhance the performance of human experts in their problem domains. Though, the second school of thought takes a study of the structure and function of the human body and uses the knowledge acquired to build human like intelligent ICT system. It is clear today that ICT is applied in almost every field of human endeavour such and the scope and area of this study is not left behind. Other fields where ICT is applied include public administration, urban and regional planning, law and justice, environmental control, transportations, communications, health care and delivery, crime investigation, religious field, security of life and property and leisure activities.

Currently, however, the breakthrough in information and communication technology (ICT) is now making accessibility to timely and relevant information