

Barriers And Opportunities In The Adoption Of E-Health Solutions In Zambia

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Abstract

The adoption of e-health solutions has the potential to revolutionize healthcare delivery, particularly in resource-constrained settings like Zambia. This study investigated the barriers and opportunities influencing e-health adoption within Zambia's healthcare system. Using a mixed-method approach, the researcher analyzed both quantitative data from healthcare professionals' surveys and qualitative insights from semi-structured interviews with policymakers and e-health specialists. The findings revealed barriers to the adoption of e-health, including insufficient ICT training, poor infrastructure, and cultural resistance. The study results emphasized the importance of integrated policy frameworks, enhanced training programs, and collaborative stakeholder engagement to bridge implementation gaps. However, opportunities such as government-led initiatives, public-private partnerships, and the increasing availability of mobile health (health) solutions indicate pathways for overcoming these challenges. Recommendations included scaling the development of the ICT infrastructure, fostering the acceptance of e-health technologies by the community, and using successful regional models from countries such as Rwanda and Malawi. This research provided information for policymakers, healthcare professionals, and stakeholders in the private sector to improve health equity and efficiency through health innovations in Zambia.

In order to identify research opportunities on the subject of e-health, the method of systematic literature review was performed using the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) methodological approach. The results obtained about barriers and benefits were structured from the sociotechnical (social - people/society; technical - machines/technology) systems approach. As a result, perspectives for the direction of new products development and opportunities for future research were identified.

Keywords: *E-health, sociotechnical systems, innovation, information technology*

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I. Introduction

Background to issue

The widespread use of e-health in industrialized nations has revolutionized healthcare delivery by increasing productivity and expanding access to care. The World Health Organization (WHO) defines electronic health as a collection of digital health tools, such as telemedicine, mobile health applications and electronic health records (Gregory & Tembo, 2017). By lowering expenses, improving patient outcomes and facilitating better health data management, e-health has contributed to the improvement of health systems (Ngufor & Ziraba, 2023).

High disease loads, lack of healthcare personnel, and inadequate infrastructure are all putting a lot of pressure on the Zambian healthcare system. In rural locations, where access to healthcare services is limited, these difficulties are exacerbated. By increasing the effectiveness and accessibility of healthcare services, e-health technologies present a possible means of addressing these issues. The Zambian government has integrated e-health into national health initiatives after realizing its potential. Only 34% of healthcare facilities use e-health solutions, and even fewer are completely functional, indicating that adoption is still low (Gregory & Tembo, 2017).

Many reasons, such as lack of infrastructure, poor interoperability of the system, insufficient training for healthcare professionals, and lax regulatory frameworks, are to blame for Zambia's slow adoption of e-health (Ngufor & Ziraba, 2023). Low adoption rates have also been caused by concerns about data security and the expense of implementing e-health solutions. Despite these obstacles, there are opportunities to increase the acceptance of e-health in Zambia, especially through government efforts to provide training programs and model e-health sites (Gregory & Tembo, 2017). By resolving these obstacles and taking advantage of these opportunities, Zambia could greatly enhance its e-health healthcare system.

Gap in existing research

Few research has been done on the subject matter and not conclusive data has been given to highlight the e-health system hence the researcher undertaking the research.

This problem matters academically because it will add to board of knowledge to the researchers.

Research Objectives

This study Aim to investigate the particular impediments impeding the effective implementation of e-health solutions and pinpoint opportunities to improve healthcare delivery in Zambia using digital solutions.

- 1)Determine the main obstacles to Zambia's adoption of e-health.
- 2)Examine the ways in which the Zambian healthcare system can improve the adoption of e-health.
- 3)Evaluate potential strategies to improve the deployment of e-health solutions in Zambia.

Structure of the paper

Title page, Main Body (Introduction, Method, Results, Discussion), References.

II. Literature Review

Theoretical foundation

Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT), which expands on TAM by adding elements including social impact, performance expectancy, effort expectancy, and facilitating conditions. In Zambia, where social and cultural variables greatly affect the adoption of technology, UTAUT's focus on social influence and enabling infrastructure is especially pertinent. Cultural viewpoints that prioritize conventional methods frequently cause opposition to digital health solutions in rural places (Nyoni, 2021). Furthermore, the practicality of e-health in Zambia is limited by the absence of enabling conditions, such as regulatory support and specialized resources (Gregory & Tembo, 2017).

Diffusion of Innovation Theory (DOI)

Rogers, (2003) Diffusion of Innovation (DOI) theory, which emphasizes elements including relative advantage, compatibility, complexity, trialability, and observability, provides insights into how innovations spread across social systems. The presumed complexity of e-health systems frequently discourages users due to a lack of knowledge of ICT, and DOI helps explain adoption rates in rural and urban healthcare settings in Zambia (Kiberu, Mars, & Scott, 2017). To increase acceptance and promote greater use, e-health innovations must be trialable and observable, as shown in pilot programs (Durodolu, 2016).

Limitation in existing literature

The gaps identified are that data have not been clarified, reported, or elucidated, there is incompleteness of data, timeliness of data, and there is lack of appropriate data coverage for policy decisions to shaky data flows of the research topic.

Clear rationale that leads to my research questions

The adoption of e-health has been gradual, with only 34% of healthcare institutions using some kind of e-health and only 1.8% of them functioning as fully functional model sites (Gregory & Tembo, 2017). However, the successful adoption of these technologies is hampered by several important obstacles, such as a lack of workforce training, a lack of technical infrastructure, and disjointed regulatory frameworks (Ngufor & Ziraba, 2023). The problem is also made worse by worries about interoperability and data security (Granja, Janssen, & Johansen, 2018)).

The problem is, adoption of e-health technology is still low in Zambia, despite the acknowledged promise of e-health solutions to address important healthcare issues such as insufficient access to healthcare, a lack of workers, and inefficiencies.

III. Conceptual/ Theoretical Framework

Relevant Theory

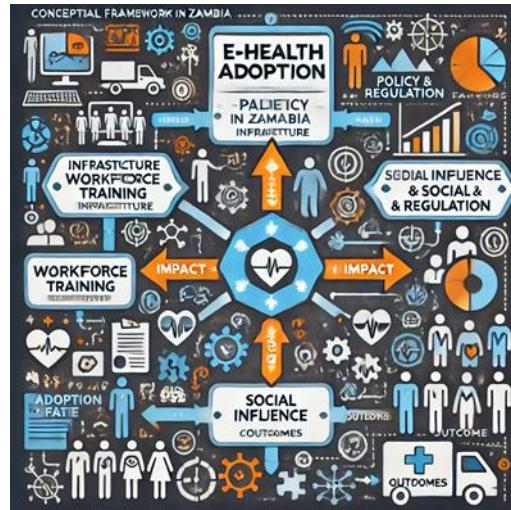
Institutional Theory

According to institutional theory, normative, regulatory, and cultural cognitive forces influence the acceptance of new practices (Scott, 2001). Due to disjoint policies, regulatory forces are minimal in Zambia, making it difficult to adopt e-health. These loopholes could be filled by standardized e-health laws, such as those in Rwanda, which would encourage a more uniform application (Gregory & Tembo, 2017). E-health may be further propelled by normative forces, such as international demands for higher standards of care, as part of a larger modernization initiative.

Stakeholder Theory

Freeman (1984) developed the stakeholder theory, which highlights the importance of considering the interests of all parties involved. The interests of patients, government agencies, private sector partners, and healthcare professionals are all involved in Zambia's adoption of e-health. According to stakeholder theory, it is crucial to harmonize these interests, especially when it comes to protecting data privacy, giving providers ICT skills and developing public-private partnerships (Oumlil, 2016; Muchelemba & Mwalimu, 2021).

Conceptual model and linkages between variables/themes



IV. Methodology

Research design

In general, there are two basic types of research conducted by researchers: primary and secondary. Primary research, as stated by (Sampson et al., 2018), is the research process in which researchers collect data for research directly from data sources with the participation of human participants. However, as argued by (Shields & Whetsell, 2018), on the other hand, there is a secondary research type, in which data and information are collected solely from the dominant literary sources that have already been presented by other prominent researchers, without the involvement of any human participant.

Population and sample for the study

Population of the Study

The study focused on Zambian technology providers, e-health policymakers, and medical professionals. The intended audience consists of Healthcare workers in public and private healthcare facilities, including physicians, nurses, administrative personnel and the Ministry of Health's policymakers and those from other regulatory agencies oversee putting e-health policies into action.

Sample for the Study

Quantitative: Cochran's formula for large populations will be used to calculate the sample size for healthcare professionals (Cochran, 1977). With a 95% confidence level and an estimated 10,000 healthcare professionals in Zambia, the study will focus on 384 healthcare workers in different locations.

Qualitative: A sample of 15 to 20 policymakers and e-health specialists will be chosen for interviews. This sample size is believed to be sufficient to gather a variety of points of view and to obtain a thorough understanding of the potential and challenges associated with the implementation of e-health (Guest et al., 2006).

Sampling method (s) for the Study

There are several sampling techniques, which are implied for selecting the relevant samples, such as random probability and convenience non-probability. The researcher has opted for the random probability sampling method for the survey participants so that each of them has an unbiased opportunity to respond to the questions and express their opinions.

Sampling technique (s) for the Study

In terms of interviews, the sampling technique has been convenience so that only the eminent and eligible participants could be selected, who have sufficient knowledge of the research topic or issue.

Data Sources

Depending on the way the data are collected in research, there are two major types of data sources, primary data and secondary data.

Data Presentation and Analysis

As described by (Uerz et al., 2018), they are collected directly from human respondents, while secondary data sources are collected from literary sources such as books, journal articles, newspapers, government reports, and peer-reviewed articles. In the current research, both secondary and primary data were collected. In the current investigation, the researcher has also used online and offline surveys, as well as interviews, as means of collecting primary data, which are qualitative and quantitative in nature, respectively.

Reliability and validity of the study

The reliability and validity of the study analysis data depend on the type of data analyzed. In the current investigation, qualitative and quantitative data were collected from interviews and surveys, respectively. Regarding the analysis of interview-based data, as mentioned by (Ma et al., 2018), the use of transcripts and logical considerations of the researcher are required, which help them to critically analyze the findings based on literature. For the survey data, the survey question-answers were arranged in a tabulated format, with the frequency of responses being put along with their response percentages, options, and total respondents. The statistical findings were calculated using mean, mode, and standard deviation, which were analyzed using descriptive statistics. Finally, charts, bar graphs, and diagrams were used for data representation

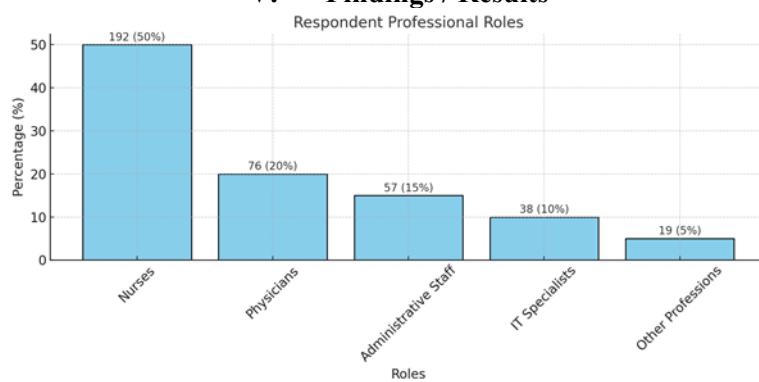
Ethical and legal considerations of the study

In the current research, the researcher has maintained a very strict norm of ethical consideration. Firstly, it has been observed that no biased data have been provided to the investigation and all data, regardless of whether they were primary or secondary, have been kept in their true form. During interviews and surveys, the identities of the respondents were kept confidential, no irrelevant personal questions were asked, and no personal data was used for any other purpose than the research itself, as per the 2018 Data Protection Bill (Lusaka Times, 2018). The respondents were not forced to do the research and were free to discontinue the same if they felt discomfort.

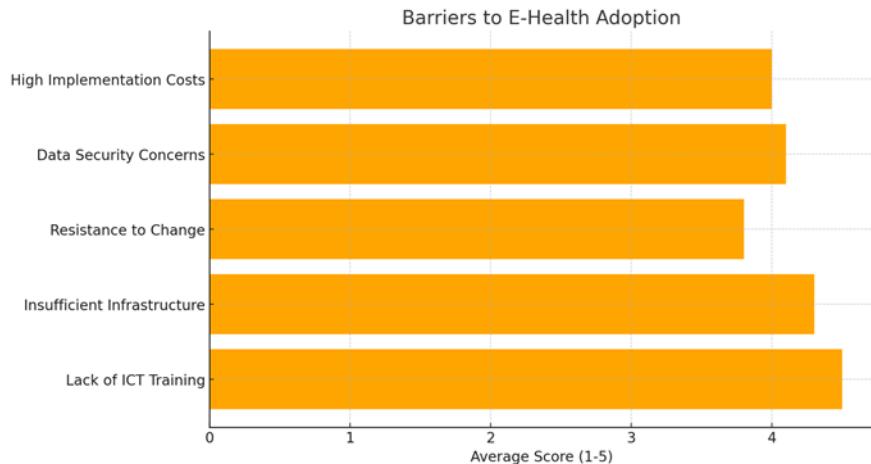
Study Limitation / Accessibility Issues

At the time of conducting research, researchers face the problems of accessing certain data sources, which is generally termed accessibility issues. As mentioned by (Ameen et al., 2018), accessibility issues arise as most researchers conduct their research with limited resources. In the current research, the researcher has mainly opted for interview and survey questions, the use of the internet, which at the time of the research was interrupted temporarily, making many respondents leave the survey in between. In terms of the interview, only a limited number of supervisors were available.

V. Findings / Results



Nurses made up the biggest percentage of respondents (50%), followed by physicians (20%), administrative personnel (15%), IT specialists (10%), and other occupations (5%). In terms of job experience, just 5% of respondents had less than a year's experience, 40% had one to five years, 35% had six to ten years, and 20% had more than ten years (Figure 4.2).



Barriers to E-Health Adoption

On a scale of 1 to 5, respondents ranked the main obstacles to the adoption of e-health. The results showed that the average scores were as follows:

- Lack of ICT training: 4.5 (major barrier)
- Insufficient infrastructure: 4.3 (major barrier)
- Resistance to change: 3.8
- Data security concerns: 4.1
- High implementation costs: 4.0

Qualitative results confirmed these worries. "A major roadblock in rural areas is the lack of trained staff and reliable internet," one policymaker said. Cultural opposition was brought to light by another participant, who mentioned that "patients often distrust digital systems due to fears about privacy."

VI. Discussion

This chapter highlights the summary, conclusion, and recommendation of the research, and the readers will be able to grasp the gist of the research.

The current research aimed to assess Barriers and Opportunities in the Adoption of E-Health Solutions in Zambian. These variables have been analyzed in this paper in the specific context of e-healthy practitioners and recipients and will add to the board of knowledge to be used by future scholars.

Linking Objectives with Finding

Objective 1

The first objective of the current thesis aimed at determining the main obstacles to Zambia's adoption of e-health healthy Institutions and consider their respective significance in organizational setting. In order to meet the requirements of the current objective of the thesis paper, the secondary sources that are mainly focused on thematic and variable-based discussions, which again are presented in the literature review section. The subheadings including empirical evidence, the factors leading to e-healthy barriers, and the drawbacks of e-healthy barriers along with the theories related to e-healthy barriers and opportunities provided detailed description about barriers and opportunities and its associated facts.

Objective 2

The second objective of the current research has aimed at Examining the ways in which the Zambian healthcare system can improve the adoption of e-health. In order to meet the requirements of the second objective, a combination of literary sources, survey question response, and interview question answers have been deemed necessary. The issues of e-healthy as observed in the context of barriers to e-healthy and Opportunities. The subheading, namely, challenges in providing e-healthy and challenges implementing e-healthy to increase access to e-healthy are considered useful for meeting the requirements of the second objective.

Objective 3

The current objective of the thesis tends to suggest evaluating potential strategies to improve the deployment of e-health solutions in Zambia. The highest contribution has come from the primary data, although the secondary data made available in the literature review section have also provided ample information. As for the primary data, the response to survey questions asked to recipients of e-healthy services along with same survey question asked to professional practitioner in authoritative positions have given ample idea about the preferences

for the e-healthy, as well as the practitioners who are engaged in authoritative actions. The detailed information gathered in the form of the responses to the interview questions has also made the meeting of the aim of the third objective possible.

VII. Conclusion

Summary of key insights

This study investigated Zambia's e-health adoption prospects and obstacles, offering a thorough grasp of the variables affecting adoption. In addition to pointing out potential like government programs, public-private collaborations, and health solutions, the findings also indicate major obstacles such as a lack of ICT training, infrastructure issues, and cultural reluctance.

Enhancing patient outcomes, addressing healthcare inequities, and improving service delivery are all possible with the incorporation of e-health into Zambia's healthcare system. However, to overcome current obstacles and realize this potential, tailored actions are needed. As demonstrated by regional examples from Rwanda and Malawi, the adoption of e-health in Zambia depends on the combined efforts of policymakers, medical professionals, and commercial sector partners.

Recommendations of the study

Opportunities for E-Health Adoption

Government Initiatives

70% of respondents emphasized the significance of constant policy support, which the study found to be a major enabler of government-led projects. Similar to Rwanda and Malawi, where targeted policies increased adoption rates, Zambia has incorporated e-health into its National Health Strategic Plan.

Public-Private Partnerships

One important avenue for increasing the uptake of e-health is public-private partnerships. According to the study's findings, partnerships with telecom providers could help fill infrastructure gaps.

Mobile Health (e-Health) Solutions

E-Health solutions offer a feasible option to alleviate healthcare disparities in underserved areas, as 90% of respondents support increased mobile connectivity. The success of Uganda's mTrac program, which used mobile technology to enhance disease surveillance and healthcare delivery, lends credence to this recommendation.

Scope for future research

The current research paper, with all its focus as well as limitations, has a significant degree of potential in terms of the future scope that is concerned. The current research dives into the assessment of the barriers to e-healthy, which makes it a source of secondary data for future aspirants striving to explore the same topic or topics closely resembling the current one. Considering the fact that the current thesis has its limitations, future researchers can take up the current research and enhance its qualities, as well as eliminate its shortcomings, for improving the degree of accuracy, it provides. To attain the highest degree of future scope for the current thesis paper, future researchers have ample scope to invest considerable amount of time to assess the essence of the literary work and take note, keeping in mind the ethical perspectives.

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