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Transforming Marginalized Communities through Virtual Healthcare during a Pandemic

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Research-in-progress

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Abstract

The COVID-19 pandemic has encouraged governments and public health administrators to rapidly adopt digital solutions and advanced public health information systems. Sub-Saharan African countries have also made transitions to the digital platforms in response to the unprecedented challenges related to the delivery of health services. However, acceptance and use of such digital solutions was found to differ between countries. Based on these gaps, we build a conceptual representation that is based on the Technology Readiness Index. This conceptual mapping highlights the technological optimism, associated with innovation, while showing the perceived usefulness and usage of Telehealth. In this research, we elaborate a set of proposals to increase the body of knowledge regarding the implementation of technologies for health and to provide decision makers with key evidence for the implementation of policies for the development of community digital solutions.

Keywords: Virtual Healthcare, Marginalized Communities, Telehealth, COVID-19, Global South

1 Introduction

Since the beginning of 2020, the African continent and several countries in the world have been facing a deadly epidemic called Coronavirus from severe respiratory syndrome (SARS-Cov2), which appeared for the first time in Wuhan (China). This epidemic is not only the cause of a disruption of the immune system causing many deaths, but also a total dysfunction of human activity and life. In view of the second wave of this deadly virus, and the increase in confirmed cases in several countries in Sub-Saharan Africa, many restrictions have been imposed on people, to contain the virus and thus limit its spread. South Africa, Nigeria, Rwanda and Tunisia were among the first nations to impose restrictions on citizens. However, the health crisis has had a strong structural and social impact on hospitals. We have witnessed a structural reorganization of several health facilities in order to adapt to the context. For example, medical, nursing and pharmaceutical care have undergone circumstantial adaptation to be able to protect medical personnel, as well as patients at risk. This is how in many health facilities in Africa, patients suffering from diseases such as hypertension, diabetes and cancer have had their screening suspended or treated on an outpatient basis.
Since the emergence of web 2.0 technologies, and the diversification of digital tools to other sectors of activity, multiple applications of technology to address health-related issues have emerged: mobile health (M-Health), digital health, online health (Kostkova 2015; Kuika Watat and Jonathan 2020a). This new revolution was therefore designed to address health concerns in areas where technology is booming. Moreover, multiple studies have shown that the hype around the use of information and communication technologies to regulate and provide solutions to health problems did not wait for the advent of health crises to bloom and show their importance (Dorsey and Topol 2016; Shergold et al. 2015). Nevertheless, their use has been most successful in developed countries, which have a significant digital maturity, creating an important gap with the countries of the global south, which still face significant social and economic problems. This disparity in digital development between the regions has seen the emergence of several medical fields through technology, such as dermatology, psychiatry, radiology. In light of technological developments and the interest of states that are increasingly turning to digital technology to achieve sustainable development goals and win the bet of economic, social and cultural development, we have seen a considerable increase in use during different pandemics in Sub-Saharan Africa (Kasle et al. 2020; Russi et al. 2020). Recently with the Covid19 health crisis, medicine through the use of technology has strongly contributed to the transformation of marginalized communities, and the raising of health standards in rural areas.

2 Theoretical Background

2.1 Sub-Saharan Africa - Land of opportunities for digital health

One of the major challenges slowing down the exponential social and economic growth of sub-Saharan Africa is the very high rate of morbidity, with nearly 50% of deaths of children aged 5 years or younger and 49% of maternal deaths for a world population estimated at nearly 12% (Kim et al. 2016; World Health 2019). Although significant progress has been made in the development chain over the past several decades, a brief analysis shows that many efforts still need to be made compared to developed nations. The results obtained so far should therefore allow us to take note of the lessons (failure and success) obtained along the way in order to improve the various strategies for engaging development mechanisms in a strategic manner and thus achieve the set objectives.
In recent years, we have seen an emergence of digital solutions for health in Sub-Saharan Africa. numerous digital solutions are emerging, with the aim of improving the daily lives of patients, and ensuring more coherent social and organizational management of health facilities. In this region of Africa where the burden of morbidity turns out to be the highest in the world, the use of digital tools is increasingly noticed, necessarily in the provision of health care, teleconsultation, coordination health information system and health data management.
The use of technologies in health is diverse and varied. For example, in South Africa, mobile telephony has been heavily used to support different maternal health strategies (Seebregts et al. 2018). It has also been used in Ghana to detect fake medicines, and in Kenya to promote access to health financing platforms (Afarikumah 2014; Mekuria et al. 2019). Numerous advanced technologies have expanded the possibilities and given rise to new methods of effective health diagnosis, facilitating the monitoring of patients in urban and rural areas. As an illustration, the use of artificial intelligence in health has been

shown to be effective in the fight against epidemics and the treatment of several diseases in Sub-Saharan Africa (Holst et al. 2020).
Thus, African populations need digital health content adapted to situations and contexts, to prevent diseases, and facilitate access for all to health care systems. This is why any digital health solution must be designed according to the human-centered approach, to ensure their ease of acceptance, understanding, use and recommendation.

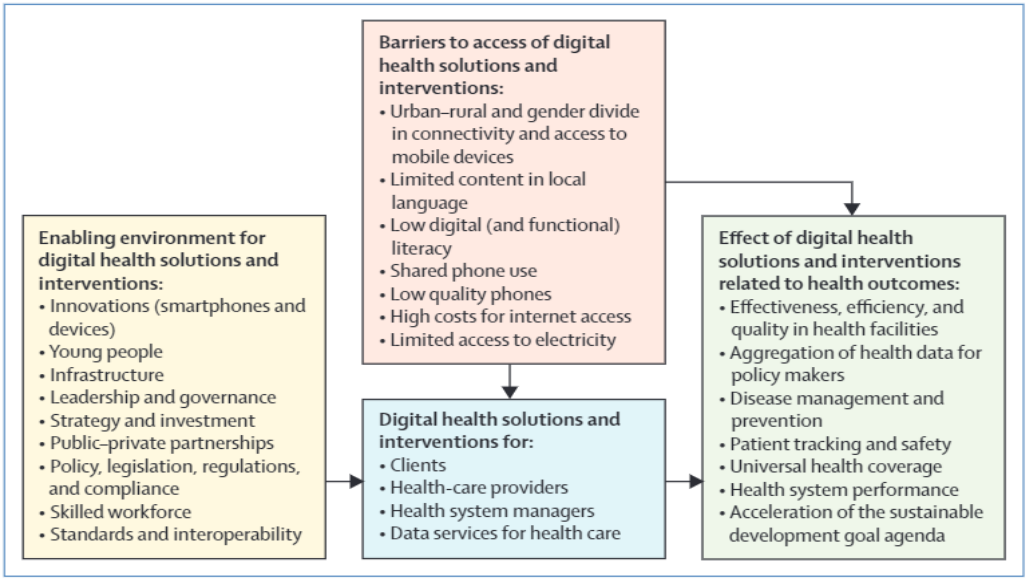

Figure1: Digital health landscape within the Global South (Holst et al. 2020)

2.2 Core Constructs

The research model is developed and modelled based on the Technology Readiness Model (TR) and the Technology Acceptance Model (TAM), resulting in the TRAM model (Lin et al. 2007). The TR model sets itself up as an initiator with the objective of influencing the perceptions of rural communities according to the perceived usefulness and ease of use, leading to a positive impact on the acceptance of telehealth. Two constructs of the TR model are defined as inhibitors, while the other two are associated as contributors to telehealth acceptance. The two constructs contributing to the acceptance of telehealth are defined as follows (1) optimism which refers to the degree of assurance that an individual or a rural community has in the use of telehealth which gives it efficiency, control and vital benefit, (2) Innovativeness which refers to "a tendency to be a technologically pioneering and thought leader" (Lin and Hsieh 2007 p.1600). The two inhibitors constructs namely Insecurity & Discomfort refer respectively as being a negative feeling of the use of technology and a non-belief in its functionality and "a perceived lack of control over technology and a feeling of being overwhelmed by it" (Lin and Hsieh 2007 P.1600) Numerous previous works like that of (Lin et al. 2007) have determined that there is a positive causal link between Technology Readiness and Perceived Usefulness. Furthermore, Kamal et al. (2020) revealed that Perceived Usefulness was an important key factor in the use of a technological system. In addition, an empirical study of E-learning technologies had revealed that the intention to use a technological system and the satisfaction that results from it are strongly influenced by the Perceived usefulness. Thus, we propose the following hypotheses:

H1a: Optimism is positively correlated with Perceived Ease of Use

H1b: Optimism is positively correlated with Perceived Usefulness

H2c: Innovativeness is positively correlated with Perceived Ease of Use

H2d: Innovativeness is positively related to Perceived Usefulness

H3e: Insecurity is positively related to Perceived Ease of Use

H3f: Insecurity is positively related to Perceived Usefulness

H4g: Discomfort is positively related to Perceived Ease of Use

H4h: Discomfort is positively related to Perceived Usefulness

H5i: Optimism is positively related to Electronic Word of Mouth

H5j: Innovativeness is positively related to Electronic Word of Mouth

H5k: Insecurity is positively related to Electronic Word of Mouth

H5m: Discomfort is positively related to Electronic Word of Mouth

H6n: Perceived Ease of Use is positively related to Satisfaction to Telehealth

H6n: Perceived Usefulness is positively related to Satisfaction to Telehealth

H7: Electronic Word of Mouth is positively related to Satisfaction to Telehealth

H8: Electronic Word of Mouth is positively related to Intention to Use Telehealth

H9: Satisfaction to Telehealth is positively related to Intention to Use Telehealth

3 Research Model

The present study draws its conceptual foundations from the emerging literature in the field of Health Information Systems (HIS) following the theoretical representation below. It presents the causal links between Technology Readiness, and the Technology Acceptance Model, to explore the use of telehealth in rural communities in times of global health crisis. In addition, the study takes as a reference the previous work on e-health in Sub-Saharan Africa and the impact on rural and indigenous communities.

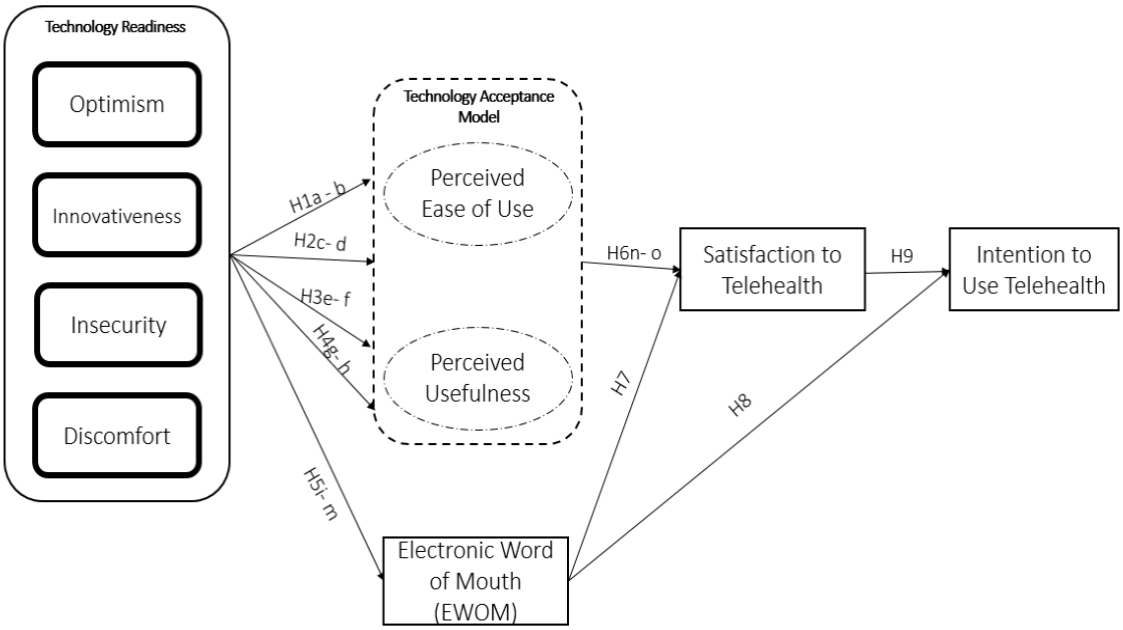

Figure2: Research Model

4 Methodology

A mixed research approach combining qualitative and qualitative investigations will be used for this research. This approach turns out to be the most appropriate for our research with regard to the specificities that it will bring out, and the shortcomings that it will fill in the light of the existing literary gap on the use of telehealth in times of health crisis in the global south (Jason and Glenwick 2016; Tashakkori et al. 2020).

4.1 Data Collection Design

For our study, data collection will be done at three levels. Initially, a literature review was carried out in order to model our theoretical representation and formulate our elements of measurements. As

recommended by (Webster and Watson 2002), a review of the systemic literature makes it possible to identify previous work on the use of virtual healthcare in Sub-Saharan Africa. Second, interviews/focus groups will be conducted in several rural areas, and with marginalized communities. The objective is to understand how traditional authorities have played a major role in raising awareness and promoting the use of digital tools for remote health care consultations during a global health crisis such as Covid19. The choice to conduct this research in rural areas is not insignificant. Indeed, marginalized communities in rural areas in Sub-Saharan Africa constitute an important source of development on a national and global scale. The informal economic activities that are carried out there, the social and financial potential that exists there, as well as the digital transformation that has been taking place in recent years are all reasons that have contributed to conducting our study in this geographical area. In addition, in order to carry out our study, we undertook to recruit translators specialized in the local language so that they could clearly and precisely explain the process of our study and gather as much information as possible for our analyses. Also, the choice to be accompanied by local translators will give us a certain credibility with our target groups, in order to install a comfortable climate during the data collection phase. Third, quantitative data will be collected according to the elements of measures developed from citizens of rural communities in Cameroon.

4.2 Measurement Elements and validations Steps

The measurement elements resulting from our research model come from the emerging literature on E-Health in the Global South, and the contribution of technology in the fight against epidemics. As for illustration, the items resulting from technological innovation in e-health come from the work of (Chiu and Cho 2020). As shown in the table below, 26 measurement items were carefully designed for our study to assess the 9 Constructs forming our research model.

Constructs	Measurement Elements	Source
Optimism	Quality of Live Freedom Productivity	(Melas et al. 2014)
Innovativeness	Digital autonomy Digital focal point Digital Update	(Chiu and Cho 2020)
Insecurity	Privacy Financial Safety Confidentiality	(Chen et al. 2013; Chiu and Cho 2020)
Discomfort	Embarrassment Spying	(Chen et al. 2013; Melas et al. 2014)
Perceived Ease of Use	Knowledge Improvement Digital Versatility Digital Facility	(Kim and Chiu 2019; Tubaishat 2018)
Perceived Usefulness	Increase productivity Forcefulness Daily Utility	(Melas et al. 2014; Tubaishat 2018)
Electronic Word of Mouth	Telehealth recommendation Complacency Propaganda	(Chen et al. 2018; Gu et al. 2018)
Satisfaction to Telehealth	Digital Entertainment Digital Fun Digital Interest	(Chen et al. 2013; Tubaishat 2018)

Constructs	Measurement Elements	Source
Intention to Use Telehealth	Digital regularity	(Chen et al. 2013)
	Digital forecast	(Chiu and Cho 2020)
	Digital continuity	(Chen et al. 2013)

Table1: Measurement Elements & Sources

The measurement elements of our research model will be tested and evaluated according to the Partial Least Square-Structural Equation Modelling (PLS-SEM) approach. The PLS-SEM method has long proved its worth in quantitative techniques, particularly in previous work on teleconsultation or telemedicine (Hair et al. 2017; Kamal et al. 2020; Kuika Watat and Jonathan 2020b). We are going to use a graduated scale from 1 (strongly disagree) to 7 (strongly agree') in the appreciation of our measurements elements. Two levels of analysis were retained for our research: we will first assess the elements of measures (items), then an assessment of the structural model. Next, we will proceed to an examination of the discriminant and convergent validity of our conceptual representation. The interpretation of the path coefficients will be performed during the structural analysis of the research model.

5 Expected Contributions

Our study focuses on examining telehealth at the height of the Covid19 crisis in marginalized rural communities and chiefdoms. The study makes both theoretical and practical contributions. In light of the epidemics that are shaking the economic, social, and health landscapes of developing countries, this study fills the gap in the literature on the use of advanced technologies to combat epidemics. Following global trends of increasing technological change, developing states have undertaken a profound restructuring of their digital strategies in order to cope with future disasters, where technology will play a decisive role in protecting people and property.

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