

Application of Grounded -Theory Concepts in Analyzing Organizational Readiness and Barriers for Mobile Health (M- Health) Adoption in Nigeria

¹Nachandiya, N., ²Che, F. & ³Longe, O.B.

Department of Information Systems
American University Nigeria(AUN)
Yola, Adamawa State, Nigeria.

E-mails: ¹nachandiya.nathan@aun.edu.ng, ²ferdinand.che@aun.edu.ng, ³olumide.longe@aun.edu.ng

ABSTRACT

Mobile Health (M-Health) refers to any medical and public health practice aided by smart phones, tablets, or any mobile device. These devices are able to move about which allows communication anytime, anywhere. M-health is considered as the next step beyond E-health systems. In recent times, M-health is gradually becoming popular in healthcare settings in both the developed and developing countries. Despite the proliferations of M-health, there are few literatures that talked about readiness and how to deploy this technology to health institutions in Nigeria. Even though there are some researches on mobile health, only few addressed readiness and theoretical models that guide's deployment and adoption of the technologies in Nigeria. A descriptive statistic was used (3- Likert scale) to analyze readiness of Health Institutions for M-health in Nigeria, the results revealed that Technological readiness, Motivational readiness, Preparedness. Resource readiness, Human Resource readiness, Policy readiness, Societal readiness and Accessibility readiness are the basic factors considered for M-health adoption. The study also explores the possible barriers for M-health. The result revealed that Technical expertise, Infrastructure, Operating Cost, Legal Issues, Government policy, Priority, Demand, Knowledge and Culture are key factors that affects the acceptance of M-health in health Organizations in Nigeria. Some basic concepts of Grounded theory were used for investigating actualities from the real-world data that led to drawing conclusion on organizational readiness and barriers for M-health in Nigeria.

Keywords: M-Health, Adoption, Readiness, Organization, Grounded theory, Technology, Deployment.

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1. BACKGROUND OF THE STUDY

The use of technology has a great impact on the health institutions anywhere around the world. These days, technology plays a significant role in consulting with patients and reporting health issues. The revolution in Information systems aided by computers and internet has led to efficient and easy access to health care facilities and information. The technologies are available in some health institutions while others have not. The advent of mobile devices (smart phones, PDAs, tablets) etc gave people the opportunity to access healthcare resources anytime and anywhere. Mobile devices are now cheaper, effective and easy to use (Azhar and Dhillon, 2016). These devices make it possible to communicate in an easy and flexible manner between people in the health sector.

Despite the emergence and proliferations of mobile devices in the healthcare sector and the enormous benefits it offers, it cannot replace the traditional one-on-one consulting, rather it can serve as a support to the traditional-conventional systems (Alalwan, 2018). The potentials of M-health have been noticed all over the world and many studies attempted to look at the adoption of this technology and how the system facilitates healthcare delivery. Notwithstanding, M-health is still in its early stage of development attracting the attention of many researchers. A study done by Byomire (2014) proved that M-health has not been adopted in many organizations more especially in developing countries. There are several factors affecting the adoption of M-health amongst which are the : technical limitations; the connectivity (network); the phone size(screen), insufficient memory, and transmission speed (Canonico, 2016). The list is incomplete if user's acceptance (both staff and the organization as a whole) is not mentioned, since the rejection of this technology by the users can cause drastic failure and of no benefit to the health institutions. A report by (Cheryl, 2016) opined that the success of this technology depends totally on users.

The deployment of this technology requires a lot of effort to challenge all the factors militating against its success: there are other factors worth mentioning like readiness: awareness, organizational culture, motivation (Haenssgen, 2015), technical aspect e.g sustainability of the mobile phone, internet connectivity issues (Estuar, 2014) and resistance to change(Hameed and Arachchilage, 2017). Thus, the deployment of M-health in organizations necessitates thorough analysis of **readiness** to accept this technology and also an established guideline on how to organize a good and viable M-health system that attracts users and provides them with essential services that will meet their demands. While dealing with infrastructural challenges and organizational resistance to change syndrome, it becomes imperative to explore all the critical success factors that supports a smooth deployment/ adoption of M-health in organizations.

This paper comprises of three sections. Section one (1) introduces the topic and presents an overview of the research background, section two (2) briefly reviews existing literatures relevant to M-health adoption, .Section three(3) captures the data collection and general methodology to be use in the research while section four presents results, discussion/ finding and conclusion.

1.1 Research Direction

The aim of this paper is to investigate the readiness of Health Organisations in Nigeria for M-Health services. The specific objectives of the study are as follows:

- a) To study the barriers to successful implementation of M- Health in health organizations
- b) To explore the factors responsible for successful implementation and adoption of M-Health in Health Organizations.

2. LITERATURE REVIEW

The flexible access to wireless technologies has encouraged health organisations to use mobile technology to improve healthcare delivery. In recent years, the use of mobile and wireless technologies for health care service delivery has increased drastically (Zhao, Ni and Zhou, 2018). These devices facilitates communication between patients and the health system as a whole (Ribeiro and Dias-Neto, 2017). The concept "M-health" was attached a lot of meaning by different researchers based on their "weltanschauung" worldview (Latif, 2017). Some scholars are of the view that M-health depends on the use of mobile devices to facilitate healthcare delivery anytime, anywhere. Tuon(2017) defined mobile health as health care delivery that integrates the use of wireless devices like smartphones, PDA, Ipad, laptop, camera, palmtop in health care delivery.

Mobile health can also be defined as the intersection between mobile technologies and web-based health knowledge systems to provide services anywhere and anytime (Zhang *et al.*, 2014). However, Uddin, *et al.*, (2017) view M-health as a channel to help users gain knowledge and skills with support of wireless technologies. Despite the variety of perceptions about M-health, its benefits are enormous. It is effective, mobile and collaborative (Zhao, Ni and Zhou, 2018). It improves interaction between different parties involved. It encourages feedback for both users and organizations (Wu *et al.*, 2016).

The acceptance of mobile devices and wireless networks within health system makes M-health suitable and flexible tool for use in the health institutions (WHO, 2018). M-health that makes use of ubiquitous devices will be successful now and in the future. This is possible because (PDA, tablets, PC, and smartphones) are becoming cheaper, portable and attractive amongst health institutions. They also proved to be more flexible than the traditional PCs, and they are easy to carry about and also economical (Susan, Reid, and Monic, 2016) The most important factor in determining the success of implementing a new system in the context of health systems is the Readiness towards the adoption of the new technology (Latif *et al.*, 2017).

Since M-health is still in its early stage of development, a lot of challenges are bound to surface (Rajan *et al.*, 2016). In other for M-health to succeed in health institutions, there is a need to assess the organizations readiness for this new technology (Latif *et al.*, 2017). Quite a number of studies has been done to investigate organisations' readiness for M-health (Wu *et al.*, 2016) yet few were done in developing countries. Although there are lack of academic studies concentrating on the factors that influence the adoption of mobile health information system in Nigeria, a number of studies have not been used in the domain of mobile health care system (Wu *et al.*, 2016; Latif, 2017; Rajan, 2016). A publication by (Kuttimani and Yogesh, 2017) identified different factors that are quite dissimilar to those discussed in technology adoption theories and model, he argue that the relevant literature on technology adoption did not lead to any hypotheses, but rather broaden the understanding of the issues in technology readiness and adoption".

2.1 Grounded Theory

The term Grounded Theory means different thing to different people. Many students think that the concept is a methodology since methodology is attached to the name Grounded Theory. This is not far away from the fact since Grounded Theory Methodology is a Method and can also serve as methodology within a particular context (Egan 2020). The Grounded Theory Methodology has been used to by IS scholars to generate theory from Data. The theory will be so much grounded in data within the context of the research. This approach is usually adopted when a researcher wishes to investigate a phenomenon within a context that little or no literature is available about the phenomenon under investigation. Figure 2.0 below illustrates the processes involved in Grounded Theory Methodology.

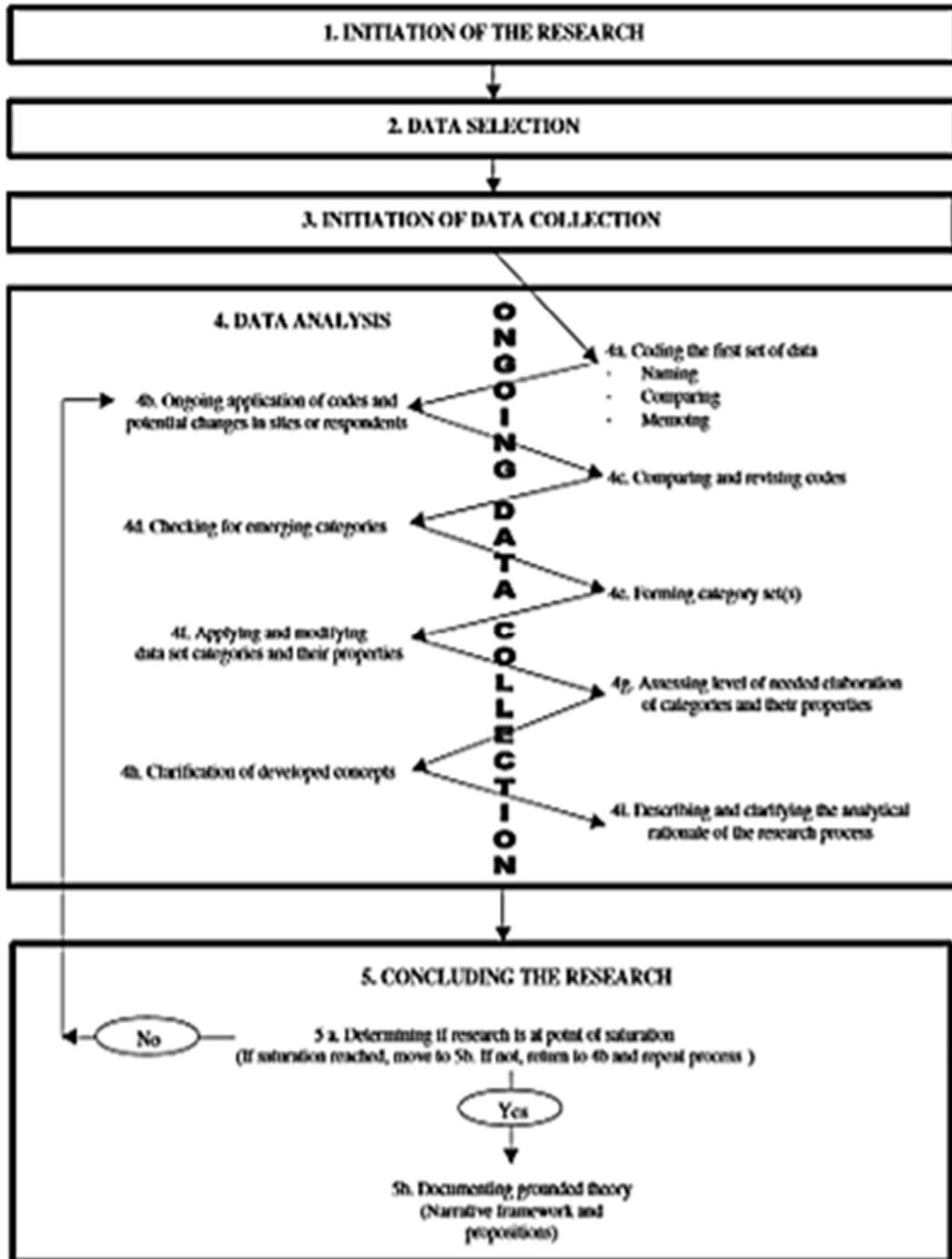


Figure 22.0 Processes of Grounded Theory.
 Adopted from Egan (2002)

The researcher in this context used the basic concepts of this Grounded Theory Methodology to develop tools that would be used for data collection. The researchers directly engaged the respondents in developing the tools for data collection. Their perception about M-Health was what was used to develop the questionnaire and interview schedule as supported by Egan (2002) .

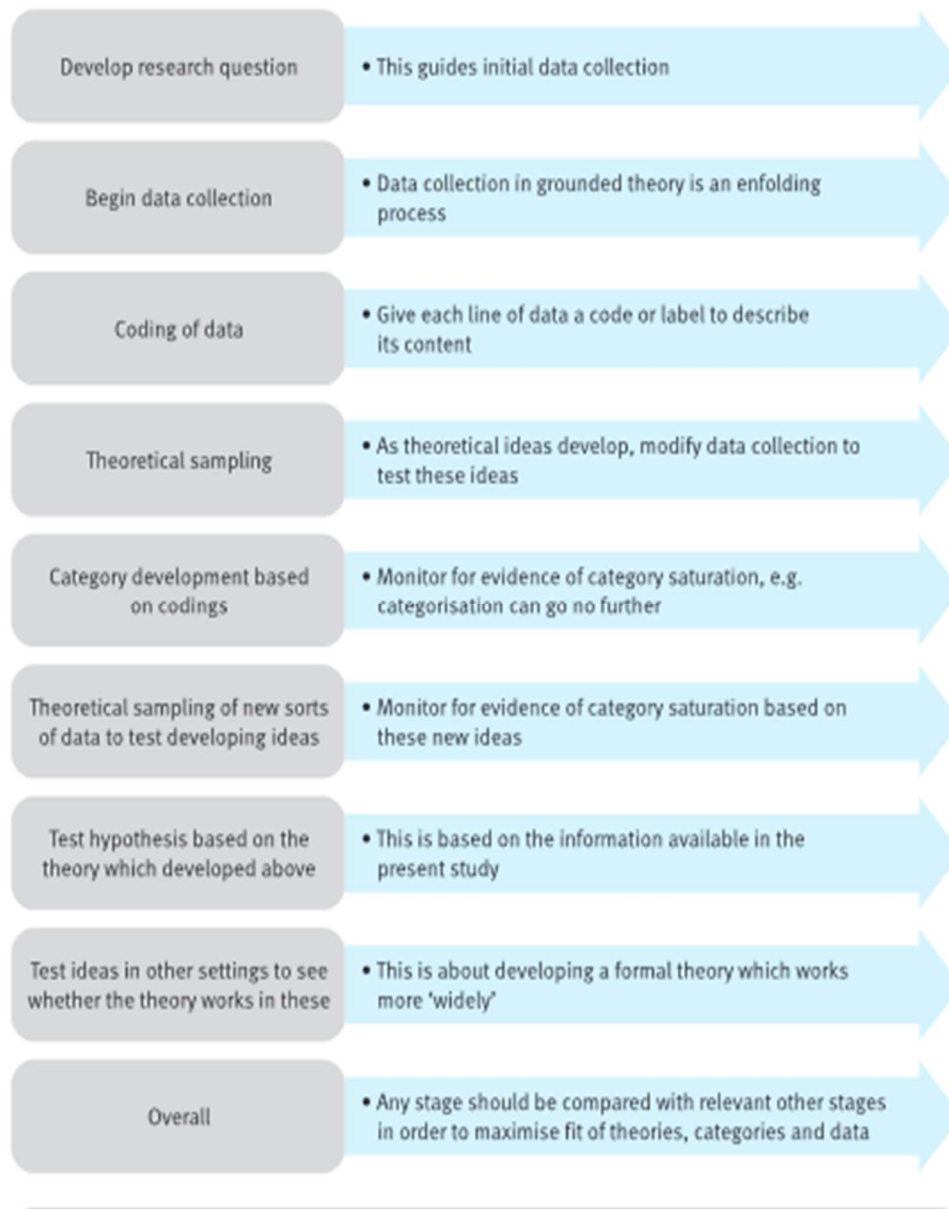


Fig 2: Stages in Grounded Theory Methodology
 Source: Howith and Grammer, 2011

3. DATA COLLECTION AND ANALYSIS

This study presents exploratory which is an Information Systems (IS) approach to problematic situation. Quantitative data was collected via the use of questionnaire, while a focus group discussion was also conducted to obtain more data. A purposive random sampling was conducted on the respondents. A sample of twenty (20) health care providers, eight (8) directors of health (representing government), 20 community leaders and 20 household were interviewed. Qualitative data was also collected via focus group discussions with respondents at separate and then combine state. A grounded theory methodology was used to obtain organizations' attitude, thoughts, culture, facts and perception. This important data collected assisted in the systematic investigation and determining the organizations' readiness and other attitudes towards M-health adoption. Descriptive statistics such as age, sex, occupation, level of education and perceptions towards m-health readiness and barriers were obtained. A 3-point rating scale: 3- agree, 2-not agree and 1- undecided was used. A benchmark score was obtained by totaling the weights and taking average of the weights. The table 2.1 below shows the demographic characteristics of the respondents.

Table 2.1 : Distribution Based on Age and Occupation of Respondents (N= 68)

Variable	Frequency	Percentage
Age range(years)		
≤ 20	00	0.00
20 – 24	03	4.41
25 - 29	06	8.82
30 - 34	05	7.35
35 - 39	01	1.47
> 40	51	75.0
Occupation		
Director of Health	08	11,76
Household	20	29.41
Community Leader	20	29.41
Healthcare provider	20	29.41
Sex		
Male	7	10.29
Female	59	86.76

Source: Field survey, 2019.

Table 2.2 Themes from the Codes of Interview as practiced by (Egan, 2002; Glaser and Holton, 2004)

Lack of policy	Capability to use phones	Norms
Very useful	Concerns and fears	Culture
Highly beneficial	Could be afforded	Awareness
No laws	Demography	Trust
Too open	Own a phone	Belief
Posterity at heart	Shortage of infrastructure	Accessibility
Usage of mobile phones	Need training	Belief system
Asking questions	Lack of resources	Family responsibilities
Confidence	Socialize	Communication barrier

Table 2.3 Sorted Codes According to the Theme for Discussion

Cultural readiness	Motivational readiness	Human resources	Technology Readiness	Environment supporting policy
Norms	Dependability	Cannot afford	Easy to use	Unavailability of policy
Values	Trust	Literacy level	Very useful	
Socio cultural	Returns	Knowledge of M-Health	Network issues	Laws are compromised
Barriers	Confidentiality		Repairs of the device	

Table 2.4 Illustrating Respondent's Opinion about Policy Issues on M-health

Distribution of the respondents on the basis of constraints to M-health services						
Barriers to M-health.	3	2	1	Total score	Mean score	Benchmark score
Technical expertise	15	42	11	140	2.06	2.00
Infrastructure	14	47	7	143	2.10	2.00
Operating cost	14	47	7	143	2.10	2.00
Legal issues	14	47	7	143	2.10	2.00
Government Policy	14	47	7	143	2.10	2.00
Priority	27	35	6	157	2.31	2.00
Demand	19	40	9	146	2.15	2.00
Knowledge	36	31	1	171	2.51	2.00
Culture	18	40	10	144	2.12	2.00

Table 2.5: Illustrating Respondent’s Opinion about Barriers to M-health Analyzed based on 3-point rating scale.

Distribution of the Respondents on the Basis of Constraints to M-health Services						
Barriers to M-health.	3	2	1	Total score	Mean score	Benchmark score
Technical expertise	15	42	11	140	2.06	2.00
Infrastructure	14	47	7	143	2.10	2.00
Operating cost	14	47	7	143	2.10	2.00
Legal issues	14	47	7	143	2.10	2.00
Government Policy	14	47	7	143	2.10	2.00
Priority	27	35	6	157	2.31	2.00
Demand	19	40	9	146	2.15	2.00
Knowledge	36	31	1	171	2.51	2.00
Culture	18	40	10	144	2.12	2.00

Table 2.6 Respondents Opinion About Willingness to Accept M-health

Category	Would you accept M- health as an innovative technology			
	Directors of Health	Community leaders	Healthcare providers	House holds
Responses	Yes (100%) No (0%)	Yes (70%) No (30%)	Yes (100%) No (0%)	Yes (80%) No (20%)

Table 2.7 Respondent’s Opinion about Factors to be Considered for Successful M-health Adoption, Analyzed Based on 3-point Rating Scale.

Distribution of the respondents on the basis of readiness for M-health adoption							
Factors to consider	3	2	1	Total score	Mean score	Benchmark score	
Technological readiness	37	22	9	164	2.41	2.00	
Motivational readiness	35	25	8	163	2.40	2.00	
Preparedness	60	0	8	188	2.76	2.00	
Resources readiness	18	40	10	144	2.12	2.00	
Human resources readiness	18	41	9	145	2.13	2.00	
Learning readiness	23	36	9	150	2.21	2.00	
Policy readiness	26	32	10	152	2.24	2.00	
Societal readiness	46	13	9	173	2.54	2.00	
Accessibility readiness	22	33	13	145	2.13	2.00	

4. RESULTS AND DISCUSSION

The result showed that most of the participants are between the ages of and are basically community leaders, households, healthcare providers and directors of health from different communities. Majority of the respondents are males. On the others hand, none of the respondents is sure about the existence of policy on m-health services or adoption. A viable M-health system will flourish where there are policy statement to guide the adoption and use of this technology. These findings affirm the report of the WHO 2017 on policy readiness as important factor for adoption of M-health services.

More so, on the aspect of barriers to adoption of this technology(M-health), Technology have a mean score of 2.06 against the benchmark score of 2.00, this shows that technology is a barrier or constraint to the M- health technology. The Infrastructure also have a mean point of 2.10 against a benchmark of 2.00 which proves that Infrastructure is a barrier towards the successful implementation and adoption of these technology. The Operating Cost also have a mean point of 2.10 against a benchmark of 2.00 which also positively support that Operating Cost is a barrier towards the successful implementation and adoption of these technology. The Legal Issues also have a mean point of 2.06 against a benchmark of 2.00 which also positively support that Legal Issues are barriers towards the successful implementation and adoption of these technologies. Government Policy have a mean point of 2.06 against a benchmark of 2.00 which also positively support that Government policy constitutes barriers towards the successful implementation and adoption of these technology.

Priority also have a mean point of 2.31 against a benchmark of 2.00 which also proves that the preference attached to M-haealth technology can constitute a barriers towards the successful implementation and adoption of these technology. Demand also have a mean point of 2.15 against a benchmark of 2.00 which also positively support that attitude towards Demand is a barriers towards the successful implementation and adoption of these technology. Knowledge also have a mean point of 2.51 against a benchmark of 2.00 which strongly support that lack of about the new system (M-health) is a barriers towards the successful implementation and adoption of these technology. Culture also have a mean point of 2.12 against a benchmark of 2.00 which also positively support that Culture is a barriers towards the successful implementation and adoption of these technology. Culture is the belief and the value system regarding the use of the M-health technology. The concern that the technology opens more forum for discussion with unknown people has been the worries of most households and even some of the traditional rulers. The stringent rules and established bureaucracy in more especially civil service was identified as a cultural barrier to the M-health technology

On the the issue of readiness, results from the analysis showed that Technological readiness have a mean score of 2.41 against a benchmark score of 2.00 which strongly support that Technological readiness is an important factor to be considered before implementing or adopting M-health technology. This aspect deals with the ownership and use of mobile phones. The technology readiness encompasses the ease of use of the technology. The perception that the use of this technology can influence M-health adoption agrees with study of Kim et al. (2016). Motivational readiness have a mean score of 2.40 against a benchmark score of 2.00 which strongly support that Motivation is an important to factor to consider before implementing or adopting M-health technology. Fear concern, trust, and desire to use the phone in the mere future are attributes of the motivational readiness as captured in the study. If this aspect is well taken care of, the remaing aspects will be go right. Preparedness have a mean score of 2.71 against a benchmark score of 2.00 which strongly support that Preparedness is an important to factor to considered before implementing or adopting M-health technology.

Human resource readiness has a mean score of 2.13 against a benchmark score of 2.00 which strongly support that the availability of Human resources is an important to factor to considered before implementing or adopting M-health technology. **This** aspect integrates socioeconomic factors such as: age, educational level, gender, self-confidence, and the awareness of divers' services offered by M-health, this aspect should be taken seriously when exploring readiness. None of these attributes should be taken for granted. Learning readiness have a mean score of 2.21 against a benchmark score of 2.00 which strongly support that willing to learn is an important to factor be considered before implementing or adopting M-health technology. Policy readiness have a mean score of 2.24 against a benchmark score of 2.00 which strongly support that Policy issues are important factors to consider before implementing or adopting M-health technology. The policy regulates and determine the extent to which the technology flourishes in a government-controlled system. Societal readiness has a mean score of 2.54 against a benchmark score of 2.00 which strongly support the fact that societal readiness is an important to factor to consider before implementing or adopting M-health technology. Accessibility readiness have a mean score of 2.13 against a benchmark score of 2.00 which strongly support that Accessibility of the technology is an important to factor to consider when implementing or adopting M-health technology.

5. CONCLUSION AND RECOMMENDATION

5.1 Conclusion

The issue of readiness is of significant importance when it comes to adoption of a new technology. A smooth acceptance, use and continues use of M-health strongly depends on how ready the organization is for adoption. The study captured technological readiness, motivational readiness, preparedness, resource readiness, human resource readiness, learning readiness, societal readiness and accessibility as most important factors to considered when thinking of implementing or adopting M-health technology. The study also mentioned some constraints or barriers to successful m-health adoption amongst which are the technical expertise; infrastructure; operating cost; legal issues; government policy; priority; demand; knowledge and culture. These factor when mitigated will make health organizations have a hitch free M-health system.

5.2 Recommendations and further studies

Based on the findings from this research, studes shoud be carried out to address to bring up additional or other factors for successful implementation of M-health or more researches be done to bring up more barriers that will hamper successful implementation of M-health in our health organizations. Also data mining techniques can be used to investigate the effect of each response against the entire results of the general respondents

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