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AN INITIAL MODEL FOR TELEMEDICINE ADOPTION IN DEVELOPING COUNTRIES

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ABSTRACT

Telemedicine has proven to be a success in some developed countries. This assumption has been backed by over 12,000 reviewed articles which have been published during the past 25 years. Unfortunately, despite being a useful and thriving area of Information Systems research, Telehealth has not been fully implemented in the developing countries owing to several factors which have militated against it. In this paper, we adapted to using combinational approaches and guidelines to provide a systematic way to establish factors affecting telemedicine adoption for health workers and establish suitable theoretical model for telemedicine adoption. Although there are a quite number of guidelines for conducting such reviews in other research fields, few entirely meet the unique needs of Information Systems research. In response to this shortage of guidelines, we present here the attributes and significance of telemedicine adoption model in the context of IS domain. The outcome of the study is expected to establish a suitable theoretical model that will investigate the obvious barrier affecting telemedicine implementation and provide recommendation for health care providers.

Keywords: Telemedicine adoption, developing countries, systematic literature review, information systems.

INTRODUCTION

Information Systems (IS) research is continually progressing, and its swift propagation has been followed by an increasing body of research traversing both prospect and pitfalls associated with the model and utilization of Information System. This continual progression of IS, requires researchers in this field to find a way to rapidly bring together and combine the existing knowledge about topics of interest and discourse related gaps [1]. Analysis of research literature is being driven for a number of reasons. They include giving a theoretical foundation for future research; learning the extent of research on a topic of delight; or answering empirical questions by comprehending what existing research has to offer on the issue of concern. A valuable, in depth, innovatory literature review is a precondition for doing meaningful, rigorous, innovatory research. "Good" research is good because it advances our collective perception.

To advance our collective comprehension, a researcher or scholar needs to understand what has been done before, the strengths and pitfalls of existing studies, and what they might mean. researcher cannot perform outstanding research without first understanding the literature in the field [2]. A good approach is pertinent for an all inclusive and precise literature review [3, 4] for a particular IS study. However, "*information systems (IS) scholars tend to be unaware of the need for structure in literature reviews*" Okoli and Schabram (2010 p.3). However, in the health field a good literature review can help us to assess existing knowledge on the effectiveness of a mediation that is based on the preferred method for treatment of a particular ailment or the reaction to a social menace[5]. Telemedicine is one of the most powerful concepts for enabling access to specialist health services in rural areas which are in most cases hard-to-reach. Telemedicine is the use telecommunication means to transfer medical information from one place to another[6]. At advanced levels, telemedicine may involve conducting clinical practices using multimedia technology such as teleconferencing. Simple applications of e-medicine are obvious in medical record keeping, data processing, and information sharing. At a lower level e-medicine may also involve tele-consultation, whereby health workers can offer consultancy services to patients from a distance [6]. Levy and Ellis [3] and Webster and Watson [7] complained and expressed the fact that information systems (IS) scholars tend to be incognizant of the need for formation in literature reviews. Lately, the thorough, systematize methodology for conducting a systematic literature review (SLR) which has evolved from the health sciences and other fields is practically unknown in IS research.

Many researchers have conducted literature reviews over the years using many approaches; however, gradual approach on how to gather, combine and evaluate literature in developing countries is very limited taking into consideration peer review journals published between the period telemedicine service became available in the scope of this study till date. The researchers aim to provide bit-by-bit approach adapted from the identified experts on systematic literatures' review in the study to establish the current status of telemedicine adoption within the context of Information systems. The study will support the body of knowledge by throwing light on proper way to identify relevant IS papers suitable for the current trend of telemedicine adoption for health workers in developing countries in terms of obvious factors stalling its adoption by disparate health workers. The study also highlights how to extract necessary content from the selected papers and analyze the findings, presents the result guided by research questions using a systematic approach. The paper hopes to establish research gaps from the findings and justify the

choice of suitable theoretical model for this study and provide recommendation for future work.

RESEARCH METHODOLOGY

This study has been tackled as a systematic literature review using combinational approaches and guidelines adapted from [1, 3, 4, 7-9]. The authors of this study follow four phase methods to plan, obtain, explore and explain the literature based discoveries. The researchers aim to use systematic approach to review the selected related publications and elucidate on the under listed research questions.

RQ1: What are the factors that have contributed to slow rate of adoption of telemedicine in developing countries?

RQ2: What are the theories used in telemedicine adoption context?

RQ3: What initial model can be adopted for telemedicine adoption context in general?

Systematic Literature Review Approach

In this study, we embark on systematic Literature Review using research flow chart with seven major steps such that each of them is pertinent to the study. The flow chart is illustrated in Figure-1.

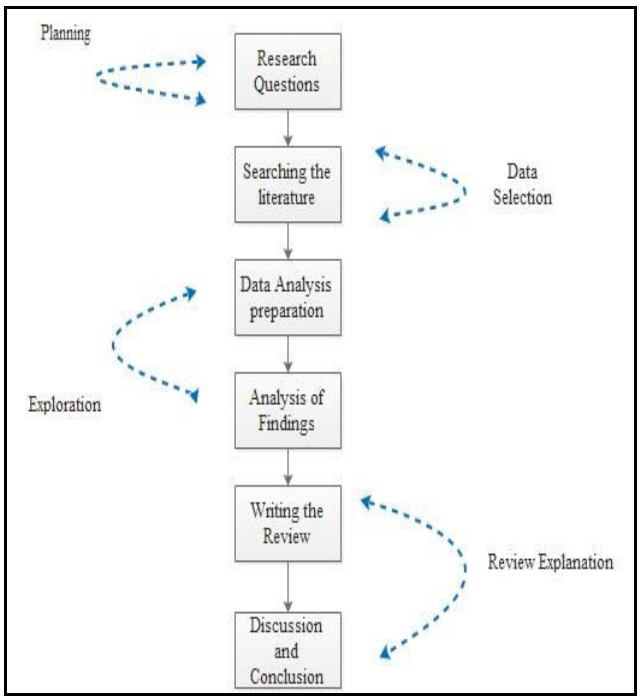

Figure-1. Systematic Literature Review Approach.

Search Process

We conducted a manual search of high quality journal with considerable impact factor indexed in Scopus, Scimagojr, Web of Science and journals from Medline were also considered. Retrieved full-text studies were appraised to identify those to be included in the review. Full publications subsequently found not to meet the inclusion criteria were excluded. Search key words are "Telemedicine" AND Adoption, "Telemedicine" AND Acceptance, "Telemedicine Developed" AND Developing Countries were used to search the relevant papers. Figure-1 and Table-1 shows the search process of relevant papers and the summary of the search process, respectively.

Table-1. Review Search Process and Description.

S/N	Search process	Description
1	Search Strategy	Journals indexed in, Scopus, ScimagoJr, Web of Science, Elsevier, IEEE, Medline, Springer
2	Search Keyword Three search strings	"Telemedicine" AND Adoption. "Telemedicine" AND Acceptance. "Telemedicine Developed" AND Developing Countries.
3	Outcomes	Studies were included if they examined patient outcomes (including access to health care services and quality of health care), research and evaluation processes, or the education of health-care providers
4	Date of Publication	Literature considered eligible for inclusion and critical appraisal was restricted to studies published from January 2010 to 2015
5	Language of Publication	Studies included were restricted to those published in English.
6	Study Inclusion Criteria	Clinical studies, feasibility studies, and review articles were considered for inclusion.
7	Study Exclusion Criteria	The review excluded studies that have only abstracts and not full text.
8	Participants'	Specialist and health-care practitioners from any medical field using telemedicine to treat patients in developed countries, and patients in developing countries, regardless of where the service emanated from.
9	Intervention	The review included studies examining any form of telemedicine technology application designed for Developed, or involving Developing Countries.

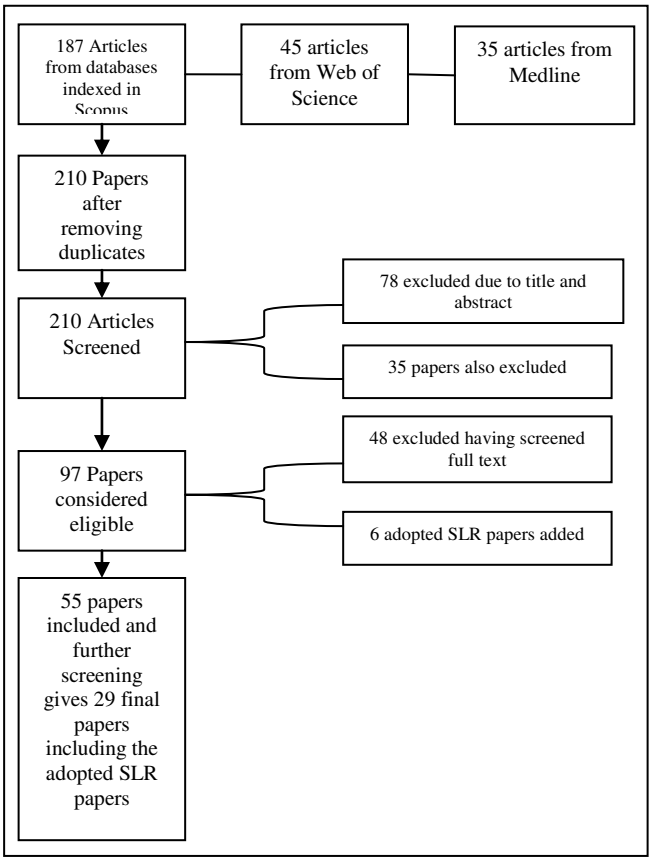

Figure-2. The process of the final papers.

Data Analysis Preparation

Before proceeding with the data analysis process, we identify several schemes as a guideline to capture and report the literature findings. The goal of the study was to derive factors that have contributed to slow rate of adoption of telemedicine in developing countries and theories used in telemedicine adoption. Hence, the pre-codification scheme was based on the following:

- Publication Year
- Research Context
- Adoption Factors
- Theory Adopted
- Results/Findings

DATA ANALYSIS

The researchers conducted data analysis based on the data collected from the study. In this study the year 2012 has the highest number of publications as shown in Figure-3. Most of the reviewed papers discussed factors affecting telemedicine adoption such as environmental, technological, reimbursement, e-health readiness, human behavior towards telemedicine adoption in general [10-15]. The theoretical models used are theory of readiness, Diffusion of innovation theory, extended TAM, and extended TPB. The study of technology adoption, sustainability and incentives continued in published journals till 2014 using a more robust and external influence accommodating model such as UTAUT [16] to further study other salient telemedicine adoption factors in general. Similarly year 2015 has the fewest published journal on telemedicine in the context of this study.

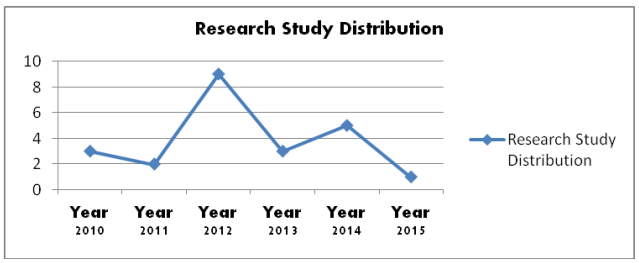

Figure-3. Number of Study by Year of Publication

Figure-4 depicts Malaysia as a country has the highest number of research context in this study. The interest of researchers in this area may be due to the fact that there are quite considerable technological facilities in place to drive telemedicine systems and Malaysian Government remarkable investment in healthcare sector. The issues often discussed are Technological, Social and Organizational adoption [10, 14, 17, 18]. China and Norway's authors discussed on [11, 12, 19, 20] technology, human and reimbursement adoption factors, while South Africa and United Kingdom[21, 22] discussed technology, Human, Organization and incentives adoption factors. United Kingdom and Norway's emphasis on financial incentives have further proven that even countries that are endowed with abundant technological facilities and human resources still have issues with health care workers full adoption of telemedicine services.

Out of all developing countries reported in this study, several countries such as India, Nigeria, and Uganda are still under the review. Malaysia remains the only country where the study related with telemedicine is relatively stable. However, there is need to examine other factors that might be stalling the full adoption of telemedicine in Malaysia. Issues of reinforcement in form of incentives for health workers have not yet received much academic attention compared with developed countries such as Norway and United Kingdom.

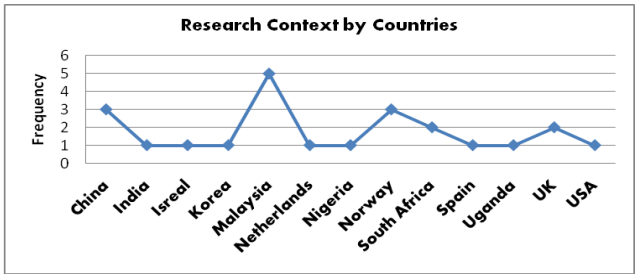

Figure-4. Research context distribution of primary studies.

RESULTS

This section explains the results of the study using the research questions. RQ1: What are the factors that have contributed to slow rate of adoption of telemedicine in developing countries?

Telemedicine is a field that enhances medical practice through telecommunications devices integrated sometimes with software application or working independently. This thriving area of health information systems has been implemented and proven to be a success in developed countries and some developing countries. However, despite the immense benefits, full scale adoption of telemedicine is still very limited most especially in developing countries. Table-2 shows the extracted factors from the literatures which affect telemedicine adoption in general and developing countries in particular.

Table-2 Telemedicine adoption factors.

	Authors Name, Year & Affiliations		Technological Factors	Human Factor	Organizational Factor	Social Factor	Reinforcement Factor
1	Kachieng'a [21]	University of Pretoria, SA.	√	√	√		
2 3	Maurice Mars [23, 24]	Department of Telehealth, University of Kwazulu, South Africa.	√ √	√ √	√ √		
4	Esmaeilzadeh [18]	Graduate School of Management, University Putra Malaysia	√	√	√		
5	Maarop [10]	Universiti Tecknologi, Malaysia	√			√	
6	Isabalija [25] [6]	Department of Business Administration, Makerer University Business School, Uganda.	√ √	√ √	√ √	√ √	
7	Lin & Roan[26]	National Chung Cheng University, Taiwan China.	√	√			
8	Zanaboni and Wotton [11], Lasierra et al .[12], Zanaboni et al .[20]	Norwegian centre for integrated care and Telemedicine, Faculty of medicine, University of Tromso, Norway.	√ √ √				√ √ √
9	Zailani et al.[17], Bhatia and Singh[27]	CDAC, Pune and Punjabi university, Patiala. & University of Malaya, KL, Malaysia.	√ √	√ √	√ √		
10	Woodward [22]	King's college, London	√	√			√
11	Justice [13]	Lautech Ogbomosho, Nigeria	√	√			

Obvious obstacles confronting information technological innovation adoption can be classified into three which are the organizational, human, and technological issues [28] . This is also supported in [29] research where there are three characteristic in technology acceptance which are individual characteristics, technological characteristics, and organizational characteristics. Also, Social influence is another factor [10, 30],[6, 25] which have been found to have positive or negative influence on individual acceptance of telemedicine system. Paolo Zanaboni, Richard Wotton and Lasierra mentioned in their works that the issue of incentives in form of motivation for health workers is a great factor to be studied in future research [11, 12, 20]. Despite the inherent benefits telemedicine service has to offer, these mentioned factors might contribute greatly towards stalling adoption of telemedicine in general and developing countries in particular if not properly addressed. Based on these, in this study the researchers have carefully categorized the identified factors into Technological, Human, Organizational, Social and Financial Factors.

Technological Factor: Doubtlessly, technology makes our life better and easier by introducing new approach to replace the obsolete ones. However, integrating ICT in healthcare allows healthcare service to be reorganized and make possible high quality medical care. Electronic patients' health record, eHealth, and mHealth (mobile health) are those technical terms resulted from technology integration that transforms the traditional method of healthcare delivery to the people at large. Notwithstanding, how great a technology is depends on the frequency of usage on the technology itself. Therefore, some technological issues arise when people interacting with the technology or what we called human computer interaction (HCI). The issue includes the usability, ease of use, usefulness of the technology and compatibility of the technology with reality. Rogers[31]suggested some technological factors need to be considered during technology adoption, the factors are relative advantage, observability, compatibility, complexity, and trialability of the technology. Benjamin and Levinson [32] also indicated that more level of adjustment and learning are required to use an IT system if the IT system possessed greater functionality. Generally, technological factor ascertain users comprehension of usefulness and ease of use which are the most crucial antecedents[14] of technological innovation acceptance in technology acceptance model(TAM). Reasonably, user will rather use a system that is friendly rather than one which require extra efforts to comprehend.

Human Factor: Human capital is one of the most important resources in an organization. However the role of the human capital can hinder the transformation agenda of an organization. People may be reluctant to be troubled from their comfort zone when changes are made to the existing process especially when an organization devised new approach or technology in doing things. They may perceive the innovation as being alien and threatening thereby exhibiting high level of bias towards it**.** This human factor can be categorized in two distinct categories which are user attribute and user awareness [28, 33] . According to Zakaria and Yusof [28], elements like motivation, anxiety, user knowledge, prior experienc**e,** and user skill to use the technology fall into the category of user attributes. They also mentioned that user curiosity, growing interest, disorientation, and discomfort along the process of integrating new technology into their daily routines are factors that affect user perception. The more intolerable people feel about the technology itself, the more likely they are not going to use it. The general adoption of telemedicine is a huge challenge that needs to be nourished through new research paths. The term "adoption" refers to the resolution of prospective users to make complete use of an innovation as the ultimate channel available [31]. A particular innovation is evaluated to be fully adopted when the majority of prospective users embrace it. So therefore, user acceptance is critical to telemedicine diffusion.

Organizational Factor: There are two aspects relating to the issue of organization challenge in the context of technological innovation adoption in healthcare. First of all, the organization culture which refers to the distinctiveness and the nature of organization in affecting the way people go about activities around them [34]. It is also a set of shared values and norms among the individual within the organization which guide them in interacting with each other and the stakeholder of the organization [35]. According to Zakaria and Mohd Yusof [28], "an organization culture which emphasize on changing will promote a nurturing environment for their employees to adopt a new technology faster than an organization culture which emphasize on stability and certainty". This is supported by Jean Lee and Yu [36], where organization culture possessed a positive relationship with performance and effectiveness of an organization. User behaviour occur in organization therefore an organization need to create a suitable environment by providing sufficient support and encouragement to their employees in order to accelerate technology adoption. Technological innovation awareness in form training will increase employees knowledge in operating the IS and subsequently creating positive attitude in interacting with the system in their workplace. Aside that, informal training like knowledge collaboration has the tendency to increase the willingness to adopt a information system (IS).

Social Factor: Social factors are circumstances that affect lifestyle, such as religion, family or wealth. These are often changes over a period of time (bbc.co.uk, 2014). Changing people beliefs, culture and tradition requires gradual approach. Social influence also known as subjective norm [37, 38] is sometimes defined as the recognition of significance others beliefs about someone's use of the system [39]. In health care settings, it is often associated to connote the degree some groups think the medical practitioners should consider using the telemedicine system. The difference is the identity of the groups ranging from "People whose opinion I value" to "People who are important to me" to "Pediatricians' who influence my behaviour" to "Colleagues," "Supervisors," as well as other similar permutations. One of the advantages that made the researcher to support Venkatesh's UTAUT is because of the voluntariness of usage which is strongly considered in this study. The cultural influence and perception of disparate health workers towards influencing other peers negatively or positively is an important component to be investigated independently and objectively. In this study, Social Influence is defined as the degree to which clinicians and caregivers support participant's use of the tele-health equipment. SI includes three conceptually identical constructs mapped from the previous models: subjective norm (TRA, TAM2, TPB, and C-TAM-TPB), social factors (MPCU), and image (IDT). SI was shown to be a significant factor in determining the acceptance and use of technology.

Financial Factor: Financial reinforcement or incentive have also been considered as significant factors that have helped to intimate the relative benefits of telemedicine to potential adopters [40], thus encouraging health professionals to use it [41] & [42]. One way of viewing the strict evidence of the cost-effectives of telemedicine is to regard the issue of incentives as representing an advantage to society as a whole. Nevertheless, this is not the same as the benefit to the healthcare workers (e.g. doctor or nurse) who makes a decision to employ telemedicine when managing a patient. The question is usually what sort of impetus to use telemedicine might be suitable? They could include both financial[12, 20] and professional motivation [11]. Financial incentives in healthcare may take the form of direct payments to health professionals (e.g. fee-for service) or indirect payments (e.g. income to spend on clinical activities, flexibility over a cash-limited budget. Financial or reinforcement factor in telemedicine adoption is an important factor that affects principal users of telemedicine both in developed and developing countries. B.F.Skinner (1904-1990) Professor of Psychology and behavioural Science elaborated Thorndike's law of effect which states that "Rewarded behavior is likely to recur. Behavior followed by a negative consequence is less likely to recur". It is pertinent to examine and differentiate the perception of disparate health workers identifying telemedicine usage as a continuous care which transcends from hospital to home monitoring or remote tele-consultation in voluntary context and telemedicine which

is seen as extra workload vis-a-vis dual responsibility that necessitates corresponding reinforcement.

RQ2: What are the theories used in telemedicine adoption context?

Table-3 shows some of the theoretical models used in telemedicine adoption context both in developing and developing countries.

Table-3 Theoretical models from selected studies.

	Authors Name & Year	Affiliations	TAM, TAM2,TA	TPB	TIPB	DOI	UTAUT
1	Saigí-Rubió, Torrent-Sellens, & Jiménez-Zarco [43]	Department of Health Science and Interdisciplinary Institute, open University of Catalonia, Spain	√				√
2	Chang, Pang, Tarn, Liu, & Yen [44]	Graduate institute of Library & Information Studies, National Taiwan Normal University, Taiwan	√				
3	Rho, Choi, & Lee [45]	Catholic University of Korea Colleg of Medicine, Korea	√				
4	Paolo Zanaboni & Wootton [11]	Norwegian Centre for Integrated Care and Telemedicine University Hospital of North Norway.				√	
5	Esmaeilzadeh [18]	Graduate School of Management, University Putra Malaysia	√				
6	Kohnke, Cole, & Bus[46]	Lawrence Technological University, College of management, USA					√
7	Lee [14]	School of Management, university Sains Malaysia, Penang, Malaysia.	√				
8	C. Lin [26]	National Chung Cheng University, Taiwan China.	√				
9	Heart & Kalderon [47]	Department of industrial engineering and management, Israel	√				
10	Peeters, de Veer [48]	Netherlands Institute of Health Services Research, Netherlands		√			

Technology acceptance model (TAM)[53] shown in Figure-5, represents an important theoretical contribution toward understanding IS utilization and IS acceptance behaviors [37, 49]. the adoption and usage of new information systems[50]. Many preliminary studies are established mainly on technology acceptance theories and models such as the Theory of Reasoned Action (TRA) [51], the Theory of Planned Behaviour (TPB) [52], the Technology Acceptance Model (TAM) [53], the Diffusion of Innovation (DOI) [31] and the Unified Theory of Acceptance and Use of Technology (UTAUT) [16], which provide useful insights and implications for understanding a health workers intention of using telemedicine services (Orruño, Gagnon, Asua, & Abdeljelil, 2011).

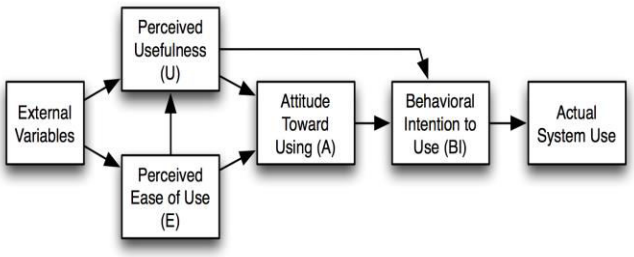

Figure-5. Technology Acceptance Model (TAM) [53]

The most recent model to emanate from research on the adoption, deployment, management, and efficacy of a technology is the Unified Theory of Acceptance and Use of Technology (UTAUT). The UTAUT integrates eight user acceptance models: theory of reasoned action (TRA), the technology acceptance model (TAM), the motivational model (MM), the theory of planed behavior (TPB), a model combining the technology acceptance model and the theory of planned behavior (CTAM- TPB), the model of PC utilization (MPCU), the innovation diffusion theory (IDT), and the social cognitive theory (SCT). Venkatesh et al. [38] shown in Figure-6 found that the relationship among Perceived Ease of Use, Perceived Usefulness, and Behavioral Intention are not judged by attitude and thus removed attitude construct from TAM. He extended TAM with additional variables such as subjective norm, image, job relevance, output quality and result demonstrability to determine the power of perceived usefulness in influencing intentions to capture the social influence and cognitive instrumental processes, the TAM now is called TAM2. The effort to remove attitude construct is to make the TAM a more sparing model [54].

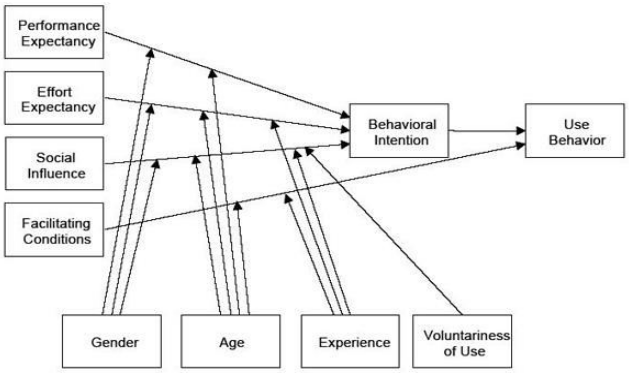

Figure- 6. Unified Theory of Acceptance and Use of Technology Model (UTAUT) [16]

Many researchers have shown that we cannot simply ignored influence from external variable because it possesses a significant affecting power to technology acceptance [55]. Therefore, studies have been carried out to identify the antecedents of the two important TAM construct, Perceive Usefulness and Perceive Ease of Use. Thus the framework of TAM model has been extended (TAM2, TAM3, and Unified Theory of Acceptance and Use of Technology (UTAUT)) to overcome the limitation in the original model.

RQ3: What initial model can be adopted for telemedicine adoption context in general?

The comprehensiveness, validity and reliability of the UTAUT model have encouraged the current authors of this study to adopt and validate it in the context of telemedicine adoption in general, and developing country in particular. The original UTAUT model will be enhanced to suit the context of this study by adding Human, Organizational and Reinforcement constructs derived since Venkatesh has shown that Performance Expectancy, Effort Expectancy, and Facilitating Condition are attributes of technological innovation adoption factor and SI which is a necessary component of Social factor. However, the choice of theoretical model for a particular study is dependent on the suitability of such model to address the obvious missing gaps. Although many studies have focused on TAM which originated from the field of sociology and psychology has been the most frequently used model to tackle technological innovation behavioural intention and actual use. Technology Acceptance Model (TAM) tries to explain user acceptance and to predict the adoption of technologies [53], relatively few have used TAM in healthcare setting. This is due to the complexity associated with this category of health information systems. Hospital information system, electronic medical records, telemedicine and computerized patient order entry are those which fall into the category of complex information systems. In a complex information system, the efficacy of usefulness and usability of the system cannot be felt immediately but can only be realized through a long term process of usage and integration in a user work process. [56].

The US National Research Council concluded in 2009 that current health IT is not designed to sufficiently support the cognitive work of medical specialist [57] & [39], the time to unmask distinct, exploratory, and triable constructs is now. Holden And Karsh opined that "Overall, there is great interest in TAM in health care and ample opportunity for its success, but whether TAM evolves into a theory of health IT, as opposed to a theory for health IT, is still to be seen" [39]. Considering the complexity associated with telemedicine service as a necessary component of health information systems, the miserly nature of original TAM which prevents it from considering the influence of external variables that are other factors and also dibber an individual from using information systems if he or she chooses to do so [58] and since many researchers have shown that we cannot simply ignored influence from external variable because it possesses a significant affecting power to technology acceptance [55] made the authors to look towards Unified Theory of Acceptance and Use of Technology (UTAUT) model which was derived from longitudinal data obtained from 215 individuals in six organizations who were exposed to a new technology innovation in an establishment. from an initial set of 32 main effects and four moderators (gender, age, experience and voluntariness of use), [16] derived a model that composed of four primary constructs that were direct deciding factors of intention and usage behavior: Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FC).

PU as the Perceived Usefulness of a technology, which is the degree to which an individual believes that using the telemedicine technology will help him or her manage health and enhance job performance. Performance expectancy is conceptually and empirically similar to perceived usefulness from TAM. Studies of technology acceptance in other fields have consistently identified that when participants perceive a technology as useful, then the probability of accepting the technology increases [16, 59]. EE is defined as the perceived ease of use of a technology, and specifically, the degree to which the technological innovation is easy to use**.** Effort Expectancy is conceptually and empirically identical to perceived ease of use from TAM. Prior research suggests perceived ease of use is a positive predictor of technology acceptance [60, 61]. SI is defined as the degree to which specialists and health care givers support participant's use of the tele-health technology. SI was shown to be a significant factor in determining the acceptance and use of technology [38, 62-64]. Consequently, FC, Facilitating Condition is defined as the degree to which the users believe they have the cognitive and physical ability to use the telemedicine technology, and that technical assistance is available when needed**.** Similar to SI, FC also includes three conceptually identical constructs mapped from the previous models:

perceived behavioral control (TPB, CTAM- TPB), facilitating conditions (MPCU), and Compatibility (IDT). Studies examining acceptance and use of technology have proven that FC significantly predicts acceptance and use of technology[64, 65]. In this study, UTAUT's Venkatesh model (Figure-6) was extended for consideration (Figure-7) towards investigating identified factors threatening telemedicine adoption. This model came as an extension of TAM to overcome limitations observed in the original model of TAM, TAM2 & TAM3.

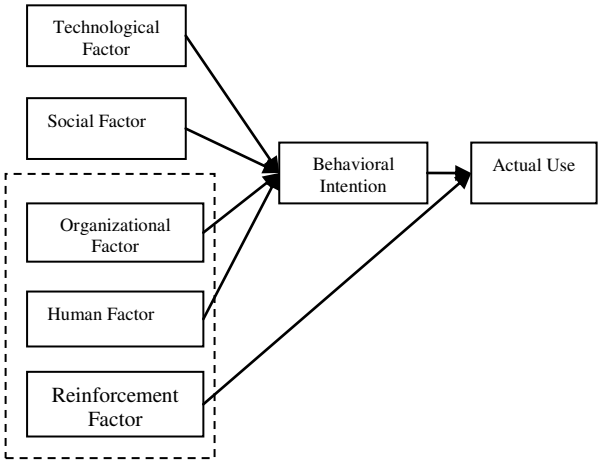

Figure-7 Extended UTAUT model.

CONCLUSION

The widespread adoption of telemedicine most especially in developing countries is very limited. The challenges are numerous but not insurmountable. There is need to channel obvious identified telemedicine challenges through new research direction in the context of IS field. Having identified factors such as technological, organizational, human, social and reinforcement which might have significant effect on telemedicine adoption in general and also discussed commonly used technology acceptance model with justification for the researcher choice of model; the researchers conclude that since telemedicine belongs to the category of complex health information system which cannot be made mandatory, there is need to investigate the perception of prospective users towards identifying telemedicine usage as extra workload vis-à-vis dual responsibility which ultimately calls for necessary reinforcement.

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