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A Systematic Review to Identify Influencing Factors and Directions for Future Researches about Adoption of ICT Based Health Services

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Abstract

Introduction: New methods and tools in healthcare sector are growing gradually due to the continuing innovation in medicine and technologies. Health care technology system adoption varies among health care professionals (doctors, nurses), patients, and potential users. Therefore, for increasing number of technologies in the health care field, the use of technology acceptance model is needed to guide implementation process across health care contexts and user groups. Therefore, understanding and creating the conditions under which information system will be grasped by human remains a high priority research issue of information systems research and practice. Moreover, due to the scarcity of medical infrastructure including doctors and hospitals, remote healthcare services by using advanced Information and Communication Technology (ICT) is getting popular around the world. Due to potential benefits and the various eHealth initiatives in place, many recent studies have been done to enhance acceptance of eHealth services by all citizens.

Objective: Therefore, the purpose of this review is to systematically review all published studies on investigating the users' adoption of eHealth to summarize results of previous studies and to show future direction for further research. This study reviews all published research on acceptance model in e-health.

Method: This study conducted a systematic search of the web of science database and google scholar to collect studies about the adoption of eHealth technology. The author selected 19 articles to review. This literature review is conducted to identify currently available eHealth adoption framework.

Conclusion: The result showed that understanding and creating the conditions under which information system will be grasped by human is a high priority research issue of information systems research and practice. Based

on the identified adoption factors in different eHealth technological context, it is suggested that the common investigated factors in the previous studies for each technological context and user group, need to be tested empirically in real settings. The confirmed factors are then recommended for apply as a basic model in each technological context and user group.

Originality: This study inform scope for future research by identifying gaps in literature in this field. To our knowledge this is the first study to systematically review to identify influencing factors, and future directions of adoption of ICT based health services.

Key words: eHealth adoption model, User acceptance of eHealth, User acceptance model of eHealth

Introduction

New methods and tools in healthcare sector is growing gradually due to the continuing innovation in medicine and technologies [1]. Remote health care systems such as e-health, m-health, telemedicine, tele-monitoring, electronic health records, and hospital information systems, are getting consideration due to the speedy advancement in Information and Communication Technology (ICT) worldwide [2]. Healthcare technology adoption varies among health care professionals (doctors, nurses) and patients [3]. User groups involved in the most of the studies to assess acceptance of ICT application in health-sector are nurses followed by physicians and patients [4]. Information Technology Acceptance research has developed many models, each with different sets of acceptance determinants. Therefore, for increasing number of technologies in the health care field, the use of technology acceptance model is needed to guide implementation process across health care contexts and user groups [4]. By testing an information technology acceptance model, it is possible to determine what

is more valued by users when it comes to deciding whether to adopt the system or not. The model could help managers to understand the determinants of acceptance of new technology in order to proactively design intervention for users those less inclined to adopt and use new system/technology. Therefore, the purpose of this study is to systematically review all published studies on investigating the users' adoption of eHealth to summarize results of previous studies and to show future direction for further researches. This study reviews a number of published researches on acceptance model of e-health. To our knowledge this is the first study to systematically review to identify reasons, influencing factors, and future directions of adoption of ICT based health services.

Therefore, understanding and creating the conditions under which information system will be grasped by human remains a high priority research issue of information systems research and practice. Moreover, due to the scarcity of medical infrastructure including doctors and hospitals, remote healthcare services by using advanced Information and Communication Technology (ICT) is getting popular around the world. Due to potential benefits and the various eHealth initiatives in place, many recent studies have been done to enhance acceptance of eHealth services by all citizens. Therefore, the purpose of this review is to systematically review all published studies on investigating the user's adoption of eHealth to summarize results of previous studies and to show future direction for further researches. This study reviews all published research on acceptance model in eHealth.

Methodology

This study conducted a systematic search in the web of science database and google scholar to collect studies about the adoption of ICT based Health care services. There are 192 'eHealth acceptance' studies and 91

'users' (doctors, nurses, patients) acceptance of eHealth' were found and among them 19 'eHealth users' adoption model' are selected (Fig. 1). Based on the identified adoption factors in different eHealth technological contexts, it is suggested that the common investigated factors in the previous studies for each technological context and user group, need to be tested empirically in real settings. The confirmed factors are then recommended for apply as a basic model in each technological context and user group.

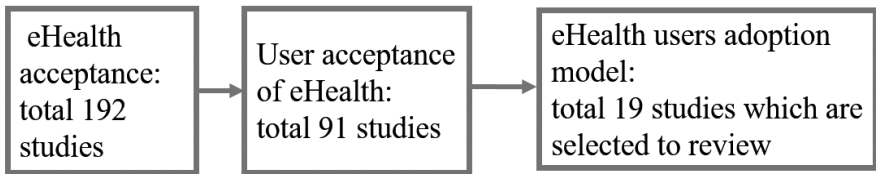


Figure 1 Study selection process

Results and Discussion

The result showed that understanding and creating the conditions under which information system will be grasped by human is a high priority research issue of information systems research and practice. This review showed that most of the adoption of ICT based health services were studied in developed countries like European countries, USA, Canada, and Australia etc. The commonly identified predictive factors were perceived usefulness, social influence, past experience, self- perception, and perceived effort expectancy. Perceived usefulness is defined as the degree to which a person believes that using a particular technology would enhance

his or her job performance [5, 6]. Social influence is the extent to which consumers realized that others, who are important to them, believe that they should use a specific technology [7]. Past experience means experience of using the service before. Perceived self-efficacy is defined as the judgment of one's ability to use technology to accomplish a particular job or task [8, 9]. Perceived effort expectancy or perceived ease of use means "the degree to which a person believes that using a particular system would be free of effort" [5]. Separate studies determined different R-square values for different user groups, different predictive factors. R-square means how much percentage of the variance in use or adoption of the system the model can explain. Therefore, future studies need to overcome limitations of existing studies by including large sample size, more factors, more geographic areas, and by using longitudinal survey. This study pinpointed the scope for future research by identifying gaps in literature in this field. To our knowledge this is the first study to systematically review to identify reasons, influencing factors, and future directions of adoption of ICT based health services. Table 1. describes the influencing factors and directions for future research cataloged after review work.

Conclusion

In order to increase users' acceptance or generalizability of the model future studies should use other developing countries. More detailed research is required to enhance the utility of the theoretical framework as a success predictive tool. So, this research suggested to make the model generalize, should include different locations, different user groups, and also recommended some potential antecedents such as healthcare awareness, tradition, and socio-economic status.

Table 1 Influencing factors of eHealth adoption and directions for future researches

Author	Country	Context/ Type of technology	Sample size	Data collection procedure	Methodology	DV	Main finding/ Influencing Factors	R-Square	Future research suggestions
[10]	USA & Portugal	HER Portal	597	Online survey	PLS- SEM	Behavioral Intention	Performance expectancy, effort expectancy, Social influence, hedonic motivation, price, & habit.	53%	Roger's Innovation Diffusion Theory and Covariance based (CB)-SEM should be used in future studies.
[11]	Netherlands	eMental health tools	12 Psychologists	Face to face, telephone and video call		eMental health adoption	Belief, and experience		Large sample size is recommended for further research.
[12]	Germany	Electronic Health Card (eHC)	502 Physicians	Online survey	SEM	Usage of eHC	Efficiency, usability of the system, and, cos-benefit ratio	98%	Scientific and practical implication could be derived.
[13]	Hong Kong	Telemedicine	400 U	Postal	Sample covariance matrices	BI	TAM is better than TPB for physicians technology acceptance decisions	42%	Need to include other users groups.
[14]	Portugal	Electronic Health Record patient portal	360 Patients	Online Questionnaire	PLS- Causal modelling approach	BI	Performance expectancy, effort expectancy, habit, and, self-perception.	49.7%	More geographic location could be added
[15]	Indonesia	Hospital Information System (HIS)	1983	Face to face interviewing	SEM	Acceptance of HIS system	non-technological factors, such as human characteristics (i.e. compatibility, information security etc.), and organizational characteristics (i.e. management support, facilitating conditions)		More user groups and geographic areas
[16]	Australia	Accountable eHealth system	334	Online survey	SEM	BI	Self-efficiency, Attitude, Anxiety, and, Performance Expectancy	47%	Longitudinal survey should be performed
[17]	Finland	Future my data based eHealth services	855	Web-based survey	SEM	Acceptance of future MyData based eHealth services	Self-efficiency, Effort expectancy, treat appraisals, and, perceived barriers	60%	Determinants of actual use should be identified wider coverage of consumers should be covered.
[6]	Maryland	Information technology	468	Face to face	Stepwise Regression	BI	Perceived usefulness was the most stable determinant	49%	Large sample size and SEM should be used
[18]	Bangladesh	mHealth	300 Adults	Face to face	SEM	Use behavior of mHealth service	Social influence, technology anxiety, performance expectancy, and, behavioral intention		Longitudinal study could be conducted further
[19]	Canada	eHealth system- Web based learning resource	500 Type 2 diabetes patients	Longitudinal field survey	PLS- SEM	Use of Web based learning resource		53%	Time lagging, large sample size
[20]	Canada	Electronic patient Health Record system	800	Cross-sectional study	SEM	BI	Perceived usefulness, security, privacy and trust in PHRs, and, computer anxiety	62%	Functionalities factor should be included
[21]	Netherlands	Patient Portal	439 Adult Patients	Cross-sectional study	Logistic regression analysis	Patient Portal use	Effort expectancy, performance expectancy		Longitudinal survey, more user groups
[22]	Israel	Media (digital vs printed)	103 65 or older aged people	Cross-sectional study	Path analysis using SEM	Use of two information technologies, SDM and ISDM	Perceived ease of use, Perceived usefulness, Self-efficacy, cognitive absorption and peer influence have an effect on the technology use	64%, 65%	Other potential user groups rather than particular assisted-housing residents should be considered
[23]	Finland	MyData-based preventive eHealth service	855	Cross-sectional study with web-based questionnaire	SEM	Behavioral Intention	Effort expectancy, Self-efficacy, Threat appraisals, and, Perceived barriers	59%	Influence of factors on actual-use should be investigated with wider coverage of consumers from different background

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