“An extension of the Expectation Confirmation Model (ECM) to study continuance behavior in using e-Health services”

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AN EXTENSION OF THE EXPECTATION CONFIRMATION MODEL (ECM) TO STUDY CONTINUANCE BEHAVIOR IN USING E-HEALTH SERVICES

Abstract

Given the negative utilitarianism and difficulty in maintaining long-term loyalty, hospitals resort to a variety of images that define and redefine their relationship strategies in order to stay patient-centric. As in any other sector, in healthcare, patients play an important role in service design and delivery. The basic services of medical appointment scheduling, online payment and health information search are recognized as one of the most important elements that increase patient footfall, service planning, patient satisfaction and their continued usage, in particular in developing economies such as India. This study seeks to understanding the basic e-Health services continuance usage intention among patients by integrating the Expectation Confirmation Model (ECM) and the Technology Acceptance Model (TAM) and extending them by including certain external variables. With a well-structured questionnaire, a survey of 453 respondents – out-patients and care-givers, who should have used e-Health services at least once, in particular, visited multispecialty hospitals, revealed that along with the ECM and TAM constructs such as satisfaction, confirmation, perceived ease-of-use, and perceived usefulness, the external variables such as trust, social influence, perceived service quality, and perceived privacy and security had a significant influence ($p < 0.05$) on e-Health services continuance usage. The main findings of the study contribute to developing and empirically testing a model that explains the basic process of motivating the e-Health service users for continuance usage intention.

Keywords healthcare, patients, technology acceptance model, developing countries, trust, privacy and security

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INTRODUCTION

Healthcare sector, in emerging economies like India- where health rate is poor, potential is more and technological advancements are faster, hospitals competitively seek newer avenues to deliver new, effective and efficient healthcare services (Martínez-Caro, Cegarra-Navarro, & Solano-Lorente, 2013). Emergence of internet technologies has made health care sector dynamic in providing in-person and remote services, Emami (2017) defines "*e-health is an emerging field in the intersection of medical informatics, public health and business, referring to health services and information delivered or enhanced through the Internet and related technologies*". However, e-Health is a broader field that includes digitalization of several tasks and processes of healthcare, which also includes use of internet to store, access, and modify healthcare information, resulting in new terms such as e-records, e-prescription, e-payment, e-billing and e-appointments. In healthcare sector, it is extensively acknowledged that the use of internet technologies has offered a great potential for reducing organizational expenses, improving effectiveness and efficiency of the personnel,

and enhancing quality of services provided (Davis, Bagozzi, & Warshaw, 1989; Ramprasad, Tamariz, Garcia-Barcena, Nemeth, & Palacio, 2019). The applications of internet technologies in this sector are numerous. This study pertains to e-Health services (online healthcare services) offered by private hospitals in India, to their customers, such as making a doctor's appointment; hospital payment transactions; and health related information search. Due to competitive pressures and customer expectations, private sector hospitals have shown keen interest in establishing continued services with improved standards in offering effective services to their customers. These services are considered as a basic e-services in hospitals, which are more felicitous to healthcare end-users (e.g., patients and care-givers) as these services are more and easily accessible, requires less effort, and saves their time (Martinez-Caro et al., 2013). Altogether, the usage of e-Health services results in achieving better patient satisfaction and cost-savings (Campanella, Serino, Mustilli, Crisci, & D'Ambra, 2020).

However, the introduction of these e-services is effective only when the end-users use these e-Health services on a regular basis. Yet, these services inherit huge investment and risk of rejection by customers. According to many authors, the continuance usage is significant due to the following reasons: (a) Non-acceptance of e-health services (adoption and post-adoption), would lead to huge financial / resource losses for the hospitals (Boyce, Browne, & Greenhalgh, 2014); (b) Though the consumers adopt the e-services, the technological developments compel hospitals to continuously upgrade for sustained continuance usage (Zhang, Lu, Gupta, & Gao, 2015).

It has become essential for the healthcare sector to identify and understand the requirement of the patients to sustain in the competitive market. In the marketing literature, considerable research has been carried out in understanding the key factors that impact and drive practitioners to use e-Health services (Furusa & Coleman, 2018). Though the e-Health services are highly helping the people to effectively manage their health, the use of these technologies often lasts only for a short span of time. Since e-Health services is a booming phenomenon, there is still not a clear picture about the post-adoption behavior i.e., continuance usage intention. This sheds light on the requirement to delve more deeply on e-Health services post adoption behavior. In addition, the study of Wang, Liu, Gao, and Zhang (2020) states that there is an insufficiency of study that recommends pertinent factors influencing patients' satisfaction towards technology usage in high credence services like healthcare. Therefore, this study focuses on exploring the psychological mechanism that determines the e-Health services continuance usage intention through application of technology acceptance model (TAM) and expectation-confirmation model (ECM). TAM model explains on the factors that make the users' to adopt the technology and ECM model relies on explaining the post adoption behavior i.e., continuance usage intention of e-Health services.

1. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

1.1. Research on e-health services

Along with the introduction of information and communication technologies in the health sector, e-Health services are becoming an increasingly relevant research topic. Healthcare encompasses medical equipment, health insurance, medical tourism, telemedicine, outsourcing, medical devices, and hospitals. E-Health services include appointment scheduling, health information search, online payment, telemedicine, electronic health records, etc. Although health systems in developing countries strive to provide easy access to healthcare services, there are barriers even in the adoption of the basic services such as medical appointment scheduling and online payment (Varshney, 2009; Goh et al., 2011). These basic services are recognized as one of the most important elements that increase patient footfall, contribute to effective service planning, and enhance patient satisfaction and their continued usage of e-services (Varshney, 2009).

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Empirical research review initially emphasized the need to study the factors that facilitate the users' adoption and continuance usage of the basic e-Health services (Cho, Quinlan, Park, & Noh, 2014). Later, it was asserted that the factors influencing the technology adoption behavior through motivational theories include theory of planned behavior, technology acceptance model, theory of reasoned action and theory of diffusion and innovation. Nevertheless, the factors influencing technology acceptance behavior and its continuance usage varied across developing and developed countries. With respect to developed countries, several studies identified that factors, such as personal factors, technology characteristics, organizational characteristics, and characteristics of external environment, influence the acceptance and usage behavior (Kim & Park, 2012). Similarly, studies in developing countries explored the factors of the initial acceptance of e-Health services using the Technology Acceptance Model (Lee & Chen, 2014). However, there is very little research to identify the factors affecting the continuance usage of basic e-Health services (Cho, 2016). To fully comprehend the ease of access of e-Health services, it is necessary to identify the factors influencing the continuance usage behavior. Due to this need to identify the post-adoption behavior (continuance usage behavior), this research explores the factors determining CUI of patients in adopting the basic e-Health services in India.

1.2. Theoretical background

1.2.1. Continuance intention with the Post-Acceptance Model (PAM)

Bhattacherjee (2001) proposed a distinguished Post Adoption Model (PAM) to improve continuance usage by synthesizing the components of TAM (initial adoption behavior) and ECT (post-purchase behavior) (see Figure 1). Specifically, PAM includes key ECT components, namely confirmation and satisfaction, as factors that determine continuance usage behavior. Therefore, confirming the IS (information system) by individuals with their initial expectations (by experience) leads to their satisfaction. Thus, the PAM theory proposed by Bhattacherjee justifies the relevance of confirmation and satisfaction in explaining the CUI of adopted IS. Besides, PAM relies on TAM to explain the logic behind continuance intention. According to Davis, Bagozzi, and Warshaw (1989), individual behavior on initial adoption depends on two major factors: First, perceived usefulness (PU), which states that "the extent an individual believes in using a specific technology/system improves their related performance" (Kim & Park, 2012). Second, the perceived ease-of-use (PEOU), which emphasizes, that the usage of a specific system/technology will be free of effort. Of these two factors, Bhattacherjee (2001) initially focused only on perceived usefulness (PU) in determining the behavior of an individual. Following this base of PAM, rigorous research in continuance behavior is further explored. Among which, the recent study by Cho, Quinlan, Park, and Noh (2016) proved the importance of PEOU as another factor and extended the PAM model with PEOU in the health care context.

The logic behind considering both of the TAM constructs (PU and PEOU) is because an individual believes that the technology adopted enhances his/her job performance, then PU increases. Subsequently, if the technology manages the work to be done effortlessly, then PEOU plays a significant role in adopting and CUI. In addition, to extend ECM, the TAM model is considered, as it is the preferred model over other behavioral intention models such as the Theory of Planned Behavior (TPB) and the Theory of a Reasoned Action (TRA). In addition, substantial theoretical and empirical support has accumulated in favor of TAM, compared to other models (Chuah, Rauschnabel, Krey, Nguyen, Ramayah, & Lade, 2016). Some of the studies have discreetly anticipated that continued usage is an extension of adoption and used TAM in explaining the continuance usage situations (Cheng, 2020; Kumar & Natarajan, 2019). Hayashi, Chen, Ryan, and Wu (2020) have stated that ECM and TAM are conceptually very similar, and integrating these models will enhance the predictive power.

1.2.2. Extended Post-Acceptance Model (EECM) with factors

Although the original PAM was extended and tested with PEOU, as it is an important factor in determining CUI (Thong, Hong, & Tam, 2006), however, scientific studies have emphasized the

importance of TAM constructs with other factors in continuance usage, since the factors were found to vary depending on context. For instance, ECM was extended with personal innovativeness in the context of mobile commerce (Hung, Hwang, & Hsieh, 2007), perceived enjoyment was included in digital learning (Joo, Park, & Shin, 2017), and habits, subjective norms and enjoyment were integrated in social networking sites (Mouakket, 2015). But, given the negative utilitarian sector, such as healthcare, studies demand to explore the unique factors influencing its continuance usage (Mettler, 2012). Susanto, Chang, and Ha (2016) underline security concerns as a major determinant of usage intention in banking and hospital sectors. Also, the result of meta-analysis conducted by Chauhan and Jaiswal (2017) in developed countries highlights service quality (Akter, D'Ambra, & Ray, 2013), individual belief and norms and security concerns (Susanto, Chang, & Ha, 2016) as the major factors that contribute to greater variance in continuance behavior of e-Health services. Therefore, based on the previous findings on continuance usage research, the current study extended the post acceptance model by identifying trust, security and privacy, perceived service quality, and social influence as the main influential factors in determining CUI of e-Health services.

1.3. Research framework and hypotheses development

The proposed research model (see Figure 1) is developed by integrating ECM and TAM models with four external constructs that reflect CUI of e-Health services.

1.3.1. Expectation Confirmation Model

The Expectation Confirmation Model (ECM) proposed by Bhattacherjee (2001) is used as a fundamental principle for this study. In market-

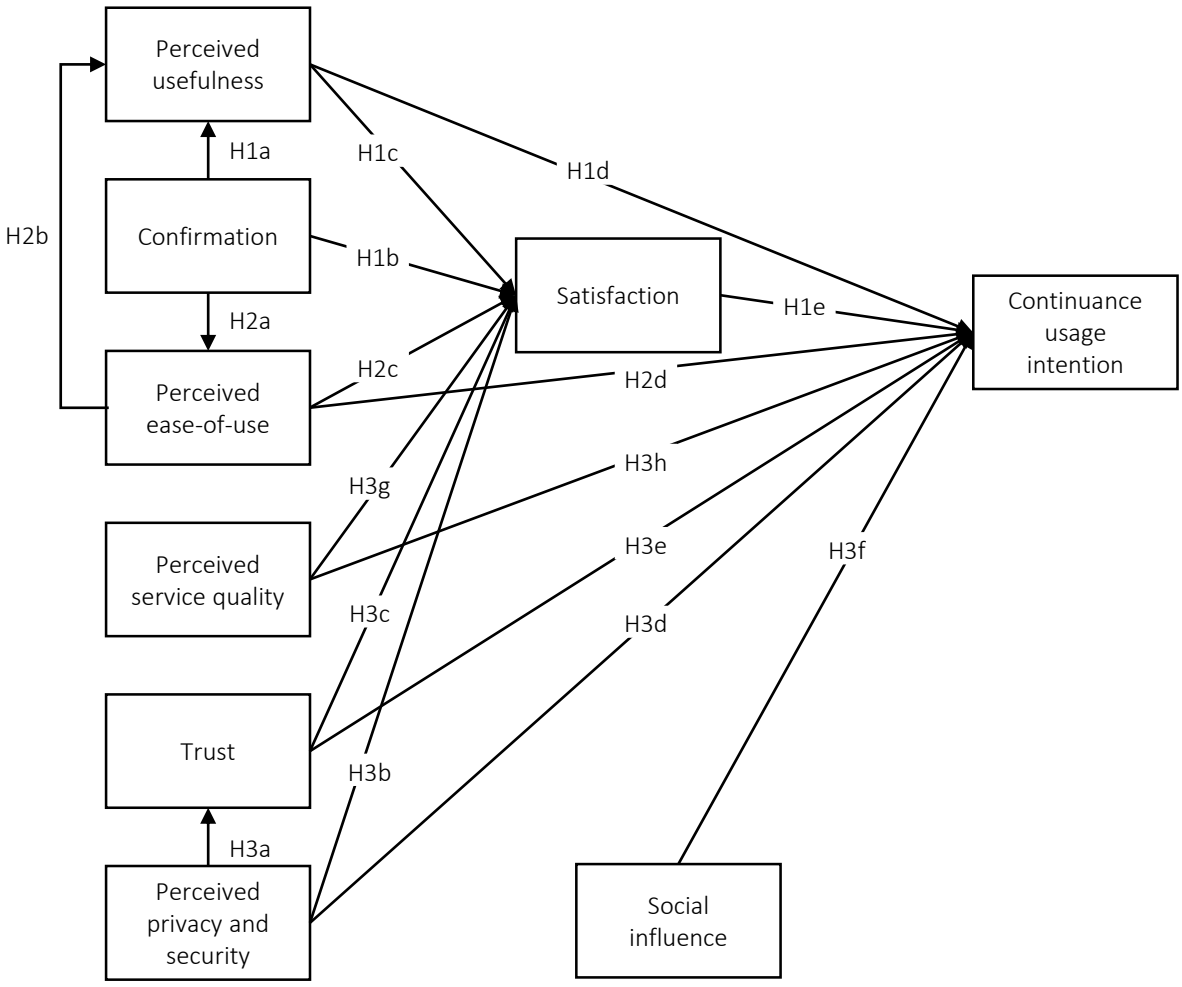


Figure 1. Research framework of the study

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ing, according to Oliver (1993), when users are satisfied with the ICT usage, they most likely intend to use ICT continuously. User satisfaction refers to the complete assessment of ICT that replicates the emotion-based response based on specified technologies (Kim, 2010). Prior studies have empirically proved that user satisfaction is the critical source for ICT CUI (Thong, Hong, & Tam, 2006; Kim, 2010). Earlier studies have claimed that post-adoption expectation is based on 'PU', which is an extrinsic motivation, and when users' expectations are more than or up to the level of expectations they pretend to be satisfied, this results in CUI (Zhang, Gupta, & Gao, 2015). Thus, based on theoretical and literature evidence, following hypotheses are put forward:

H1a: Confirmation will have a positive influence on PU of e-Health services.

H1b: Confirmation will have a positive influence on satisfaction with e-Health services.

H1c: PU will have a positive influence on satisfaction with e-Health services.

H1d: PU will have a positive influence on CUI for e-Health services.

H1e: Satisfaction will have a positive influence on CUI for e-Health services.

1.3.2. Technology Acceptance Model

A number of studies have endeavored to build and empirically test the models of continued information technology usage behavior (Premkumar & Bhattacherjee, 2008). This study attempts to augment the understanding of behavioral intention in continuous IT usage. Even though TAM and ECM emphasize various viewpoints on user perceptions, the integration of these theories will result in better understanding of adoption and continuance usage behavioral intention. Prior studies have also evidenced that the synthesized model will provide a comprehensive knowledge on the ICT phenomenon (Wang, 2016; Hou, 2015). Henceforth, the integration will help bridge the gap between acceptance and continued influx of research on behavioral intention system usage.

Cho (2016) extended the Bhattacherjee's (2001) model by integrating TAM and ECM. Provided with plenty of support for positive influence of PU based on existing TAM research, PEOU is counted in ECM. TAM supports that 'PEOU' is strongly correlated with 'PU'. The theory by itself provides an evidence that, individual behavioral intention is been significantly affected by 'PEOU' and 'PU' indirectly through the 'attitude' of an individual. In addition, the extended model of Cho (2016) has shown a positive relationship between 'confirmation' and 'PEOU'. TAM has been applied expansively to user acceptance research of several types of technologies comprising telemedicine, electronic personal health records, electronic medical records, mobile healthcare, and e-government (Kim & Park, 2012). Thus the following hypotheses are posited:

H2a: Confirmation will have a positive influence on PEOU for e-Health services.

H2b: PEOU will have a positive influence on PU of e-Health services.

H2c: PEOU will have a positive influence on satisfaction with e-Health services.

H2d: PEOU will have a positive influence on CUI for e-Health services.

1.3.3. Perceived privacy and security (PPS), trust, perceived service quality (PSQ), and social influence on continuance usage intention (CUI)

PPS reflects user concerns regarding information disclosure. IT development takes into account the need for information processing, and its complexity has led to the fact that privacy has become a critical issue. This fact undermines the consumer confidence in service providers, as consumers worry about shared personal information (Casaló, Flavián, & Guinalíu, 2007). Akter, D'Ambra, and Ray (2013) stated that information security and privacy include the collection, improper access, errors, and unauthorized use of secondary data. When service providers gain the trust of users, the usage of e-services becomes continued, which indicates the positive consumer attitudes towards service providers (Chang & Chen, 2009).

Trust empowers users to accept the fact that service providers have the potential, benevolence, integrity and ability to protect the provided information from potential misuse and risk. Trust acts as a subjective guarantee to the consumers to achieve the good experience in the present and in the future (Akter, D'Ambra, & Ray, 2013). According to Zhou and Li (2014), trust is a facilitator for CUI and indirectly results in continued usage through satisfaction. When the users' PPS and trust towards the usage of certain technology is greater, this directly leads to satisfaction and, therefore, to CUI (Mou & Cohen, 2017).

In the service industry, PSQ is one of the most significant predictors for services usage. According to Parasuraman, Zeithaml, and Berry (1985), PSQ captures the difference between actual performance and system expectations for quality dimensions. Earlier studies have proven that PSQ is a key component of the healthcare industry and a vital antecedent for satisfaction. Oghuma, Libaque-Saenz, Wong, and Chang (2016) have shown a positive impact of confirmation on PSQ, and that user satisfaction is affected by overall confirmation of their use experience.

Social influence, or subjective norm, plays a vital role in decision-making and human behavior. Earlier studies focused on the impact of subjective norms on technology acceptance, and their outcomes varied. Mathieson (1991) and Davis, Bagozzi, and Warshaw (1989) found a weak relationship between social influence and other variables, whereas Moore and Benbasat (1991) revealed a stronger association.

Nevertheless, subjective norm was found to have no direct effect on technology acceptance in the context of healthcare. But the theoretical notion of TPB highlights the significant association. In addition, Aggelidis and Chatzoglou (2009) have found a positive effect of social influence on CUI among physicians in HIS (Hospital Information System) usage. Thus the following hypotheses are proposed:

H3a: PPS will have a positive influence on trust in e-Health services.

H3b: PPS will have a positive influence on satisfaction with e-Health services.

H3c: Trust will have a positive influence on satisfaction with e-Health services.

H3d: PPS will have a positive influence on CUI for e-Health services.

H3e: Trust will have a positive influence on CUI for e-Health services.

H3f: Social influence will have a positive effect on CUI for e-Health services.

H3g: PSQ will have a positive influence on satisfaction with e-Health services.

H3h: PSQ will have a positive influence on CUI for e-Health services.

2. METHODS

2.1. Instruments

The items to measure the constructs have been adopted from the extant literature to ensure the content validity. To ensure face validity, the items were evaluated by experts in this field. To measure the main study variables, multiple scales have been used. The Likert-type five-point scale, ranging from 1 being 'strongly disagree' to 5 being 'strongly agree', is used to measure the variables. To evaluate 'PU' and 'PEOU,' the measures were adopted from Chang, Pang, Tarn, Liu, and Yen (2015) with four items respectively. To measure 'PPS', the items were adopted from Hoque (2016) with six items. 'Perceived trust' was measured using the items adopted from Chen, Liu, and Lin (2013) with four items. To determine 'confirmation,' 'satisfaction' and 'CUI,' the items were adopted from Paré, Trudel, and Forget (2014) and Chen, Liu, and Lin (2013) with four items, three items and four items, respectively. 'Social influence' was deliberated from Aggelidis and Chatzoglou (2009), with four items. 'PSQ' consists of four items adopted from Chang, Liu, and Chen (2014).

2.2. Data collection

Since the study focuses on the healthcare sector and the customer perspective, the sample units chosen for this study are hospital customers – out-patients and care-givers, who should have

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used e-Health services at least once, in particular, patients visiting multispecialty hospitals in the state of Tamil Nadu; that represents the diverse population of India. The geographical location chosen for the data collection is Chennai, as it is among the five top metropolitan areas in India, where the technology usage is larger in number according to the joint research report by Google and Forrester (2017). The *Hospitals in India, 2017* report states that South Indian hospitals are well equipped and managed by highly skilled professionals; among which Tamil Nadu has a lot of private and public hospitals authorized by the Indian government. For the purpose of the study, it is also ensured that the chosen four multispecialty hospitals in Chennai provide e-Health services to their customers.

This study used a purposive sampling method because it is difficult to estimate the precise population size of the patients procuring the treatment or the other users (care-givers) who use e-Health services in India. The data were personally collected when visiting hospitals from 453 valid samples using a well-structured closed ended questionnaire, resulting in 82.4 percent acceptance rate. The sample size of 453 satisfies the subject-to-item ratio as recommended by Hair, Hult, Ringle, and Sarstedt (2016). The sample size also satisfies the thumb rule of SEM (Structural Equation Model), where the minimum number of sample size must be greater than 200 samples (Kline, 2011), and a thumb rule of SmartPLS SEM, where the sample size should be 10 times greater than the highest number of measurement items for a specified construct in the instrument (Hair, Hult, Ringle, & Sarstedt, 2016).

Table 1 shows the demographic profile of the survey respondents. The gender distribution of the respondents has been balanced, with 53.2 percent of males and 46.8 percent of females. Besides, 37.7 percent of the respondents are between the ages 29 to 36, and 41.9 percent completed postgraduate education.

Among the respondents, 48.8 percent use e-Health services for the benefit of their family members, while 32.9 percent use for themselves and 18.3 percent access e-Health services for their friends. Table 2 shows the correlation coefficient "r" that lies between 0.3 and 0.8, which indicates a significant positive linear relationship among the variables. These results provided preliminary support for the proposed research hypotheses.

3. RESULTS

Before testing the model, the data were checked for normality using the Shapiro-Wilk test, which gave a significant result. Further, the sampling adequacy was entrenched using Kaiser-Meyer-Olkin (KMO) and Bartlett's test Sphericity tests that showed positive sampling adequacy (KMO: 0.898; Bartlett's test: significant at 0.00). To test the research model, Partial Least Squares (PLS) were used, as this technique has several advantages. First, SEM (Structural Equation Modeling) as a second-generation technique, can analyze indicator loadings (and weights) on constructs (hence, measuring construct validity) and estimate casual relationships with constructs in multistage models (Sarstedt, Ringle, & Hair, 2017). Second, PLS is the robust co-variance based modeling for theory

Table 1. Demographic profile of respondents

Demographic variables		Number of respondents	Percentage
Gender	Male	241	53.2
	Female	212	46.8
Age	20-28	145	32.0
	>28-36	171	37.7
	Above 36	137	30.2
Education	School level	19	04.1
	UG	165	36.4
	PG	190	41.9
	Others	79	17.4
For whom e-services are available	Myself	149	32.9
	Family member	221	48.8
	My friend	83	18.3

Table 2. Correlation among study variables

Constructs	PU	PEOU	TR	PPS	SI	PSQ	CNF	STF	CUI
PU	1	–	–	–	–	–	–	–	–
PEOU	.528*	1	–	–	–	–	–	–	–
TR	.518*	.430*	1	–	–	–	–	–	–
PPS	.527*	.520*	.585*	1	–	–	–	–	–
SI	.363*	.360*	.435*	.663*	1	–	–	–	–
PSQ	.716*	.394*	.511*	.639*	.550*	1	–	–	
CNF	.309*	.671*	.369*	.577*	.426*	.479*	1	–	–
STF	.382*	.357*	.825*	.636*	.523*	.508*	.466*	1	–
CUI	.484*	.486*	.549*	.709*	.630*	.630*	.559*	.614*	1

Note: ** Correlation is significant at the 0.01 level (2-tailed), *N* = 453.

testing, which is appropriate for this study Further, with regard to the final estimates, PLS provides better approximation (Hair, Hollingsworth, Randolph, & Chong, 2017).

Therefore, PLS was opted to test the research model of this study. The data were analyzed in two phases (a measurement model and a structural model). First, the establishment of reliability and validity confirms the measurement model. Consequently, with the structural model, the study hypotheses were tested.

3.1. Measurement model

To assess the instrument reliability and validity, a nine-factor measurement model was set-up under the CFA (confirmatory factor analysis) approach. To load the items on their pre-specified factors, each item was restricted, while the factors oneself were permitted to correlate freely. Tables 3 and 4 show CFA results.

Table 3. Confirmatory factor analysis results

Construct	Item	Standard loading*	AVE	CR	α
Perceived usefulness	PU1	.705	0.794	0.921	0.903
	PU2	.825	–	–	–
	PU3	.777	–	–	–
	PU4	.718	–	–	–
Confirmation	CON1	.884	0.760	0.884	0.917
	CON2	.900	–	–	–
	CON3	.904	–	–	–
	CON4	.856	–	–	–
Perceived ease-of-use	PEOU1	.788	0.748	0.922	0.887
	PEOU2	.754	–	–	–
	PEOU3	.777	–	–	–
	PEOU4	.799	–	–	–
Perceived service quality	PSQ1	.789	0.759	0.886	0.891
	PSQ2	.764	–	–	–
	PSQ3	.790	–	–	–
	PSQ4	.795	–	–	–
Perceived privacy and security	PPS1	.803	0.807	0.926	0.916
	PPS2	.844	–	–	–
	PPS3	.859	–	–	–
	PPS4	.829	–	–	–
	PPS5	.782	–	–	–
	PPS6	.793	–	–	–
Social influence	SI1	.785	0.731	0.916	0.915
	SI2	.776	–	–	–
	SI3	.810	–	–	–
	SI4	.806	–	–	–
Trust	TR1	.887	0.807	0.926	0.880
	TR2	.821	–	–	–
	TR3	.865	–	–	–
	TR4	.836	–	–	–
Satisfaction	STF1	.851	0.814	0.929	0.912
	STF2	.867	–	–	–
	STF3	.845	–	–	–
Continuance usage intention	CUI1	.816	0.781	0.914	0.883
	CUI2	.877	–	–	–
	CUI3	.833	–	–	–
	CUI4	.820	–	–	–

Note: * All standard loadings are significant at $p < 0.001$.

Table 3 shows that the value of composite reliability and Cronbach's alpha of each construct ranges from 0.880 to 0.929, which is greater than the suggested threshold of 0.7 (Hair, Hollingsworth, Randolph, & Chong, 2017), thus demonstrating the reliability satisfactory level. The discriminant validity and convergent validity were tested to ensure the construct validity. AVE (Average Variance Extracted) and indicator loadings were examined to test the convergent validity. All the resulted values of AVE were above the desired threshold of minimum 0.5 (Fornell & Larcker, 1981). To ensure the convergent validity, all the standard loadings were inspected, which led to exceeding the recommended value of 0.6 and significance at 0.001 (Fornell & Larcker, 1981).

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Table 4. Discriminant analysis

Constructs	CON	CUI	PEOU	PSQ	STF	PPS	SI	TR	PU
CON	0.855	–	–	–	–	–	–	–	–
CUI	0.153*	0.902	–	–	–	–	–	–	
PEOU	0.659*	0.307*	0.884	–	–	–	–	–	–
PSQ	0.400*	0.163*	0.382*	0.812	–	–	–	–	–
STF	0.362*	0.161*	0.368*	0.412*	0.812	–	–	–	–
PPS	0.571*	0.139*	0.542*	0.372*	0.309*	0.865	–	–	–
SI	0.348*	0.567*	0.457*	0.196*	0.205*	0.280*	0.821	–	–
TR	0.691*	0.199*	0.638*	0.295*	0.209*	0.573*	0.310*	0.898	–
PU	0.669*	0.214*	0.715*	0.339*	0.296*	0.594*	0.408*	0.604*	0.877

*Note: * p < 0.05; **p < 0.01; *** p < 0.001; CON- confirmation; CUI- continuance usage intention; PEOU- perceived ease-of-use; PSQ- perceived service quality; STF- satisfaction; PPS- perceived privacy and security; SI- social influence; TR- trust; PU- perceived usefulness*

To ascertain the discriminant validity, square roots of AVEs should be greater than the inter-construct correlations portrayed in the off-diagonal entries (Hair, Hollingsworth, Randolph, & Chong, 2017), signifying the acceptability of discriminant validity (as shown in Table 4).

3.2. Structural model

Table 5 shows the Smart PLS path coefficients. The value of t-statistics is found to be greater than 1.96 for all the paths. Confirmation has a significant effect on perceived usefulness, positively influencing satisfaction and CUI, while it is significant towards satisfaction, which in turn has a positive effect on CUI of e-Health services. Thus, *H1a*, *H1b*, *H1c*, *H1d* and *H1e* were supported.

In terms of PEOU, confirmation had a significant effect on ease-of-use, and PEOU had a positive effect on PU, satisfaction, and CUI, thus supporting *H2a*, *H2b*, *H2c* and *H2d*. The effect of PPS on trust, satisfaction and CUI, and the effect of trust on satisfaction and continuance intention are significant. Thus *H3a*, *H3b*, *H3c*, *H3d* and *H3e* were supported. The effect of social influence on the usage intention is positive, resulting in acceptance of hypothesis *H3f*. In addition, PSQ has a significant effect on satisfaction and CUI, thus hypotheses *H3g* and H3h are supported. The explanatory power (R^2) of CUI is 0.704, which is considered to have better explanatory power (Hair, Ringle, & Sarstedt, 2013).

Table 5. Structural path coefficients

Hypotheses	Original sample	Sample mean	Standard deviation	Beta	*T*-statistics	*P*-value	Sig.	Results
H1a	0.365	0.363	0.036	0.362	10.083	0.000	Yes	Accepted
H1b	0.576	0.586	0.043	0.658	15.303	0.001	Yes	Accepted
H1c	0.270	0.274	0.050	0.269	5.383	0.000	Yes	Accepted
H1d	0.458	0.455	0.062	0.459	7.414	0.000	Yes	Accepted
H1e	0.152	0.151	0.066	0.152	2.314	0.021	Yes	Accepted
H2a	0.436	0.444	0.045	0.440	9.799	0.000	Yes	Accepted
H2b	0.539	0.541	0.044	0.556	12.652	0.000	Yes	Accepted
H2c	0.134	0.135	0.038	0.132	3.474	0.001	Yes	Accepted
H2d	0.106	0.107	0.043	0.105	2.451	0.015	Yes	Accepted
H3a	0.387	0.385	0.040	0.391	9.777	0.034	Yes	Accepted
H3b	0.134	0.131	0.042	0.133	3.181	0.002	Yes	Accepted
H3c	0.224	0.222	0.029	0.220	7.618	0.000	Yes	Accepted
H3d	0.107	0.109	0.053	0.107	2.027	0.000	Yes	Accepted
H3e	0.145	0.145	0.041	0.144	3.517	0.001	Yes	Accepted
H3f	0.182	0.183	0.036	0.182	5.074	0.000	Yes	Accepted
H3g	0.236	0.235	0.043	0.238	5.557	0.000	Yes	Accepted
H3h	0.125	0.124	0.045	0.124	2.757	0.006	Yes	Accepted

Note: p-value < 0.000 – significant at 1% level; *p*-value < 0.05 – significant at 5% level.

4. DISCUSSION

The main objective of this study is to identify the factors that influence CUI of e-Health services among healthcare customers (patients and care-givers). Based theoretically on ECM and TAM, this study has tested multiple hypotheses related between the key components of these theories and some external variables. The main results of this study supported all the proposed hypotheses. In support of previous studies (Cho, 2016; Bhattacherjee, 2001), confirmation, as a post-consumption perception, both directly and indirectly influences satisfaction and CUI of consumers through their perceptions such as PEOU and PU in using the services in general and e-Health services in particular. The study results also revealed that PPS impacts trust and user satisfaction. Health literature and other sources have highlighted the irrefutable role of PPS in building trust (Susanto, Chang, & Ha, 2016; Casaló, Flavián, & Guinalíu, 2007). Since e-Health involves sharing of personal and sensitive information, it is captious to pledge users that the usage of e-Health services is secured. Only when hospitals achieve a high level of patient confidence in security and privacy do users trust hospitals and use e-Health services continuously.

The significant relationship between user satisfaction and PPS is in line with the expectation. All user categories, highly experienced or less experienced users, expect hospitals to provide privacy and security protection of the provided personal information (Susanto, Chang, & Ha, 2016). Since privacy is a must-have element in e-Health services, its presence will affect the user satisfaction. On the other hand, its absence will negatively impact the user satisfaction. The study found a positive relationship between trust and satisfaction. According to Singh and Sirdeshmukh (2000), the trust-satisfaction relationship can be easily wrecked when a trust defect is committed. The authors stated that "a trust defect is something that disturbs consumers trust on the organization, its people, and its product". When customer trust is broken, they feel they are betrayed and that leads to dissatisfaction with the product/service or organization.

Kim and Park (2012) highlighted this concept by building the proposition: "the negative effect (direct effect) of trust will surpass the positive effect of trust on satisfaction", that is distrust → disconfirmation → dissatisfaction. When the trust is gained, it not only satisfies consumers but also directly influences the repurchase intention, i.e., CUI. This finding reveals that trust will result in directly and indirectly affecting usage intention through satisfaction. The direct relationship among perceived service quality, satisfaction and usage intention is found to be significant. In the high-credence services such as electronic healthcare, providing the consistent quality of services will reduce the customers' uncertainty, which leads to satisfaction with the usage of services, which will directly affect CUI (Akter, D'Ambra, & Ray, 2013). Social influence has a positive effect on the e-Health service usage, which is in line with previous studies (Oghuma, Libaque-Saenz, Wong, S& Chang, 2015). This may be due to the fact that the higher the effects of social influence on users, the higher the likelihood of their CUI. According to De Veer, Peeters, Brabers et al. (2015), when the user expectations are satisfied, they influence their peers in using the services in mandatory context, such as e-Health, and later on they become more dependent on health services, which makes them more open to the influence of others.

5. THEORETICAL AND PRACTICAL IMPLICATIONS

In the concept of theory building, this study has made an attempt to integrate and extend the theories, which include the Expectation Confirmation Model (ECM) and the Technology Acceptance Model (TAM) by adding external constructs (privacy and security, trust, social influence and service quality), and implement them in the healthcare context. This method will create a reliable development theory that points to a significant addition to the up-coming literature on the continuous usage intention towards e-Health services.

The study findings have some important practical implications. For instance, they help service providers to understand the key factors of CUI of e-Health services. Besides, it is essential for a service provider to confirm that the provided services are a risk-free way to experiment and explore. Hospital customers tend to confirm their pre and post expectations of services. Therefore, it is es-

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sential for the hospitals to confirm patient expectations before delivering the service. If the delivered service does not meet patient expectations, they tend to discontinue the service. So, providers must confirm whether e-Health services satisfy the hospital customers or whether any changes are needed.

TAM and ECM key constructs, such as PEOU and PU, were significant in terms of usage intentions. Therefore, it is important for service providers, service designers and developers to be light and helpful in providing or designing services, regardless of age, gender, qualification, and knowledge of technology. If the service provided is easy to use, then the availability of technology is easily adopted by all categories of people. As a result, this leads to positive word-of-mouth that pave the way for patient satisfaction, which really results in customer retention (Akter, D'Ambra, & Ray, 2013). Also, service providers should focus more on enhancing social influence, as it is considered an important factor. According to Zhou (2014), this can be established by reinforcing "user's sense of membership and belonging and developing an influential, attractive and acceptable group norm to promote his or her post-adoption behavior".

In addition, to maintain and increase the patients' confidence and trust e-Health services, policy makers and service providers require to act by administering ethical information practices and guaranteeing health internet laws, legislations, and regulations. Health organization procedures and policies are required to promise the security, privacy and integrity of e-Health services; this would include data security and ethical issues related to e-health systems.

It is also necessary to mention the study limitations. First, the study findings have recognized social influence, trust, PSQ, and PPS as e-Health service characteristics with the background of extant literature. However, to portray a complete picture of e-Health services CUI, these four constructs are insufficient. Future study can include some other external variables to measure the usage intention. For example, Kim and Park (2012) have found that technological and individual characteristics are pertinent in accepting e-technologies. Similarly, Limayem, Hirt, and Cheung (2007) have recommended that 'habit' affects CUI in the e-service context. Second, for a short period of time, work was carried to identify user behavior, and conclusions were drawn based on cross-sectional data. As recommended by Bhattacherjee (2001), the respective significance of PU, satisfaction and confirmation in anticipating the CUI tend to vary, depending on specific situation and behavior. Therefore, the results may vary depending on cross-sectional data. To overcome this, it is necessary to conduct additional research with longitudinal studies in different time to make a comparison, which will provide a clear illustration of how associations between variables change over time. In addition, the integrated model does not take into account the moderating effect of demographics such as age and education level. Also, the current study was conducted in India, which has a collectivist culture, and applying to other culture requires further examination, and the culture does change the behavioral intentions of users (Oliveira, Thomas, Baptista, & Campos, 2016). Future research may include culture and demographics, such as age and education level as moderators.

CONCLUSION

This study focuses on understanding the basic e-Health services continuance usage intention among patients by integrating the Expectation Confirmation Model (ECM) and the Technology Acceptance Model (TAM). Some external variables, such as social influence, perceived privacy and security, perceived service quality and trust, were included in the integrated models. After developing and testing the extended models, the study has found that confirmation and perceived ease-of-use are the key factors that affect the continuance usage intention for basic e-Health services. Besides, the study concludes that other factors, such as perceived usefulness, satisfaction, trust, perceived service quality, perceived privacy and security and social influence, also affect the usage intention towards e-Health services.

AUTHOR CONTRIBUTIONS

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Investigation: K Anil Kumar.
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