Exploring Barriers Affecting e-Health Service Continuance Intention in India: From the Innovation Resistance Theory Stance

Arghya Ray[a,*], Pradip Kumar Bala[b], Yogesh K. Dwivedi[c,d]

[a] Assistant Professor, Area of MIS and Analytics, International Management Institute Kolkata, India.
[b] Professor, Area of Information Systems & Business Analytics, Indian Institute of Management Ranchi, India.
[c] Professor, Digital Marketing and Innovation, Digital Futures for Sustainable Business & Society Research Group, School of Management, Swansea University, Bay Campus, Swansea, UK.
[d] Department of Management, Symbiosis Institute of Business Management, Pune & Symbiosis International (Deemed University), Pune, Maharashtra, India.

A B S T R A C T

Although existing studies on e-health have usually focused on e-health services adoption intention, there is a dearth of studies on the barriers that affect e-health services retention intention especially in India. Additionally, although studies have mostly focused on utilizing expectation-confirmation model to understand innovation related barriers, innovation resistance theory (IRT) has been overlooked. As Indian e-health service providers face stiff challenges due to customer's unwillingness to continue using the service, there is a need to bridge the research gap that exists in this context. This mixed-method study, based on responses received from 289 participants and 1154 online negative reviews from e-Health providers in India, examines the barriers from the IRT stance. Results of this study reveal a notable negative association between tradition, value and financial barrier and intention to continue using e-health services. Additionally, continuance intention affects recommendation. The study concludes with various implications and scope for future research.

Keywords: Barriers, Digital Healthcare, e-Health Services, Innovation Resistance Theory, Natural Language Processing, Structural Equation Modeling (SEM)

Ⅰ. Introduction

Online healthcare services better known as e-Health services refer to the internet-based health-care services, like, electronic medical records (EMR), booking physician appointments, electronic prescriptions, providing online consultation, etc. Like other eServices, e-health services also act "as means

*Corresponding Author. E-mail: mailarghyaray@gmail.com

of driving revenue streams and creating efficiencies" (Featherman and Pavlou, 2003). Additionally, these services are expected to improve medical accuracy, staff productivity, reduce costs and patient satisfaction (Bhattacherjee et al., 2006; Freudenheim, 2004). However, as compared to other information technology based services in different sectors, like, online travel agency services (Ray and Bala, 2021; Ray et al., 2021), and e-Learning services (Ray et al., 2020), information technology adoption in the healthcare sector had been lagging (Chin, 2004; Landi, 2018). Additionally, among the few users that adopt a service, in most cases the users are not willing to use it again which leads to service discontinuance (Venkatesh and Goyal, 2010) because of various barriers or hindrances (Lam, 2005; Mani and Chouk, 2018; Ram and Sheth, 1989). While adoption intention deals with the extent an individual is willing to use a service (Javed et al., 2020), retention or continuance intention deals with an individual's reuse intention (Al-Debei et al., 2013; Maqableh et al., 2021). This discontinuance behaviour from customers can impact businesses. When a customer keeps on using a product for a long period of time, productivity benefits and maximum customer lifetime value (CLV) are achieved by the company (Venkatesh et al., 2003). Studies have shown that a small increase (5 percent) in customer retention can increase the profits to almost 95 percent. Hence, it is important for e-health providers to worry about retention strategies.

To improve online health consultations, online medicine supply, online appointments and enable participation of citizens, the government of India has emphasized the need of e-health services and apps like "Mera Aspataal", "Sugam", etc. were launched (TheHansIndia, 2018). The healthcare sector in India is expected to earn around US$372 billion

by 2022 (IBEF, 2018). Experts also feel that e-Health is one of the important segments for development in India (Tandon, 2015). The Covid-19 pandemic has also shown the importance for e-Health applications. Some of the popular e-health providers in India are Practo, SastaSundar, Thyrocare, Pharmeasy, Tata 1mg, etc. Despite the various e-health initiatives in India, like, the telemedicine initiatives, virtual kiosk, etc. (Srivastava et al., 2014), there are several issues that the online healthcare sector face, like, technological concerns (app. design, connectivity issues), cross-network effect (maintain demand and supply of backend operators, consultants and patients), finances, etc. (Jarosławski and Saberwal, 2014). Other notable barriers affecting e-Health services usage intention in India, are privacy and security, usability, quality, and brand credibility, etc. In the context of India, only Kumar and Natarajan (2020) have utilized expectation-confirmation model (ECM) and technology acceptance model (TAM) to examine barriers affecting users' eHealth continuance intention and found that trust, societal influence, service quality, privacy and security are notable barriers. There is a clear dearth of studies on retention of e-health services especially in India. Hence, there is a need for research to investigate individual aspects of users for better retention of e-Health-service users. Other studies identified in the management domain which tries to explore eHealth retention intention have mostly used ECM, investment model (Chiu et al., 2021) and the elaboration likelihood model (ELM) (Zhang et al., 2018) and have mostly captured data from China. Although ECM is commonly used, ECM fails to capture system characteristics which can also affect satisfaction (Gyamfi et al., 2020). A better framework that helps to capture barriers affecting usage intention of technological innovations is the innovation resistance

theory (Ram, 1987; Ram and Sheth, 1989). The main business problem that drives this research is the need for understanding the innovation related barriers that affect the usage of e-Health services in a developing country like India. In this study, the measures of negative utility (innovation technology barriers) have been explored to capture consumers' reactions and perceptions of e-Health services in India. Additionally, there is a dearth of research on understanding factors that affect recommendation intention (Kaur et al., 2020). Hence, the main research question that guides the methodology is:

RQ1: What is the impact of various technology related barriers on the continuance intention and recommendation intention of e-health services?

Thus, to answer the problem statement "to bridge the gap of limited studies that examine the innovation related barriers that affect e-Health services continuance intention in India", the study has utilized a mixed-method approach. A quantitative-based study was conducted through the innovation resistance theory (IRT) lens using 289 responses received from an online questionnaire-based survey. Results of the analysis show that value, tradition and financial barriers are the most important barriers that affect user's continuance intention and also recommendation intention. These findings are also confirmed in the Natural Language Processing (NLP) based qualitative study. The major contributions of this study for both academicians and practitioners are: (a) to examine barriers affecting e-health services continuance intention in India from the IRT stance; (b) to explore how the innovation related barriers affect intention to recommend eHealth services in the Indian context.

In Section 2 following the Introduction, we have reviewed the extant literature on the various barriers in the e-Health segment and the IRT. In Section 3, we have discussed the conceptual model and hypotheses formulation. In Section 4, we have discussed the methodology, followed by the findings, discussion, implications, limitations and scope for further research in the remaining sections.

Ⅱ. Review of Literature

Researchers in the healthcare context have mostly concentrated on the adoption of healthcare information systems (HIT) in various studies like, understanding the perspectives of healthcare professions (Jensen and Aanestad, 2006), assessing the impact of HIT adoption (Bhattacherjee et al., 2006), etc. But users may not be willing to continue using the HITs after using the services. This is because of various barriers like privacy (Esmaeilzadeh, 2019), technical and social challenges (Davidson and Heslinga, 2006), etc. In the next sub-section we look at the barriers that researchers have focused in various healthcare information systems related studies.

2.1. Barriers in e-Health Services

Retention of an innovation refers to the user's willingness to continue using a particular service. Retention of customers' is more significant than acquiring new customers since satisfied customers are more likely to make more frequent purchases and in more volume (Reichheld and Sasser, 1990). However, several barriers exist which triggers an individual's discontinuance intention. Griebel et al. (2017) stated that there are different barriers that affect consumers intention to use e-health services, like, individual barriers (cognition, motivation, accessibility, trust), environmental and organisational barriers (finance, political barriers, missing fit), and tech-

nical barriers (unsuited services, security, system language, customer support, missing standards, lack of system feedback, unclear benefits). The authors also stated that the most important thing e-health services need to take into account is the "customer needs".

Anderson (2004) found barriers like privacy, inaccurate information, information quality, etc. affect continuance intention of e-health services. Cashen et al. (2004) found that for accessing healthcare information among the vulnerable population the barriers that exist are literacy, background, cultural diversity, access to technology, and education. Davidson and Heslinga (2006) revealed an assimilation gap due to social and technological challenges that prevents adoption of HITs. Mazurek and Stroinski (2010) have found that technical and social barriers affect e-health services. Gregorio et al. (2013) found that barriers like support from organizations, reluctance to share personal information, etc. affect e-Health services integration. Chan et al. (2015) found that knowledge and skill barriers affect e-Health usage. Additionally, user competencies and literacy level also play a part. Zibrik et al. (2015) in their study on Chinese and Punjabi health events of British Columbia found that along with age, gender, income and education, the other barriers that exist are literacy, accessibility, attitude, health literacy and culture. Landis-Lewis et al. (2015) found that barriers like performance indicator lifespan, and disruptions affect use of electronic medical report (EMR) data. Nijeweme-d'Hollosy et al. (2015) found barriers like legal aspects, speed of technical development, consumer attitude, authenticity, user's technical literacy levels, standardizations, etc. affect interoperable e-health services. Kautsch et al. (2016) found that government policies act as barriers in development of e-health services in Poland. Eden et al. (2016) and Saleem et al. (2015) performed a systematic review

on the barriers and facilitators that affect exchange of healthcare information and Clinical information systems respectively. Ariens et al. (2017) found that barriers like availability of resources, allocation of resources, financial aspects, reliability, security and confidentiality affect use of e-health services. Chauhan and Jaiswal (2017) have voiced the need to examine the e-health application type while trying to understand e-health adoption. Natsiavas et al. (2017) stated that security measures affects usability. The other issues stated by the authors are management decisions and budget. Treskes et al. (2018) also found lack of data integration and reimbursement as major barriers to e-health implementation. Esmaeilzadeh (2019) in her study found that perceived risks has a negative effect on net equity related to healthcare information exchanges (HIEs).

Although retention of e-Health services is an important topic, using the keywords TITLE-ABS-KEY (("retention" or "continuance") and ("e-health" or "online health" or "healthcare information systems" or "online healthcare")) and (limit-to (subjarea, "busi") or limit-to (subjarea, "medi") or limit-to (subjarea, "comp") or limit-to (subjarea, "heal") or limit-to (subjarea, "deci") or limit-to (subjarea, "econ") or limit-to (subjarea, "neur")) and (limit-to (subjarea, "soci") or limit-to (subjarea, "psyc")) we found only 30 documents related to management domain from Scopus database. Among these we found just two articles (Chiu et al., 2021; Zhang et al., 2018) relevant to our study (refer <Table 1> Serial Numbers 1 and 2). While both the studies have focused on China, the studies have mainly used expectation-confirmation model, investment model and elaboration likelihood model to explore barriers towards eHealth services continuance intention. However, relaxing the constraints related to management domain but focusing on Indian context eHealth

<Table 1> Studies Related to e-Health Services Retention/Continuance Intention

Sr. No.	Authors	Context of Study	Country of Study	Theories Used	Variables Used	Major Findings	Limitations Mentioned
1	Chiu et al. (2021)	Fitness and Health Apps.	China	Expectation Confirmation Model, Investment Model	confirmation, perceived usefulness, satisfaction, investment size, quality of alternative, commitment, continuance intention	Satisfaction and investment size affected commitment and intent to continue.	Cross-sectional sampling (limiting trend understanding), Generalizability (study held in China), Insignificant confirmation of expectation
2	Zhang et al. (2018)	eHealth Application	China	Elaboration Likelihood Model	Information quality, system quality, perceived e-health literacy, satisfaction, trust, continuance intention	Perceived eHealth literacy affects satisfaction which affects intention to continue.	Generalizability (data from students using WeChat in China), convenience sampling
3	Kumar and Natarajan (2020)	e-Health Services	India	Extended Expectation Confirmation Model (ECM), Technology Acceptance Model (TAM)	perceived (usefulness, ease-of-use, service quality, privacy and security) confirmation, trust, satisfaction, societal influence, continuance intention	Trust, societal influence, perceived service quality, privacy and security affects intent to retain eHealth services.	The contructs used from ECM and TAM might limit overall exploration, cross-sectional data limits generalizability, cultural context is not captured

services only, we found one study by searching in Scopus using keywords TITLE-ABS-KEY ("retention" or "continuance") and ("e-health" or "online health" or "healthcare information systems" or "online healthcare") and "INDIA*") (refer <Table 1> Serial No. 3). In the Indian context, Kumar and Natarajan, (2020) found that trust, societal influence, perceived service quality, privacy and security affects intention to retain eHealth services. This shows the need for studies conducted in the e-Health services retention segment in India.

2.2. Innovation Resistance Theory (IRT)

Although adoption intention and resistance intention are explanations of customer behaviour, while adoption intention studies focus on factors affecting individuals willingness to use a service (Javed et al., 2020), retention or continuance intention studies explores factors affecting individuals' reuse intention (Al-Debei et al., 2013; Maqableh et al., 2021). Thus, while adoption based studies deal with facilitators of innovation use, resistance based studies identifies the issues or barriers. The resistance behaviour is mainly observed due to perceived threat to the status quo (Ram and Sheth, 1989). Examining resistance is important to understand non-adoption behaviour of customers (Jiang et al., 2000) and to explore the barriers that hinder usage intention (Walsh et al., 2021). Although few researchers (Chiu et al., 2021; Kumar and Natarajan, 2020) have utilized expectation-confirmation model to examine resistance ori-
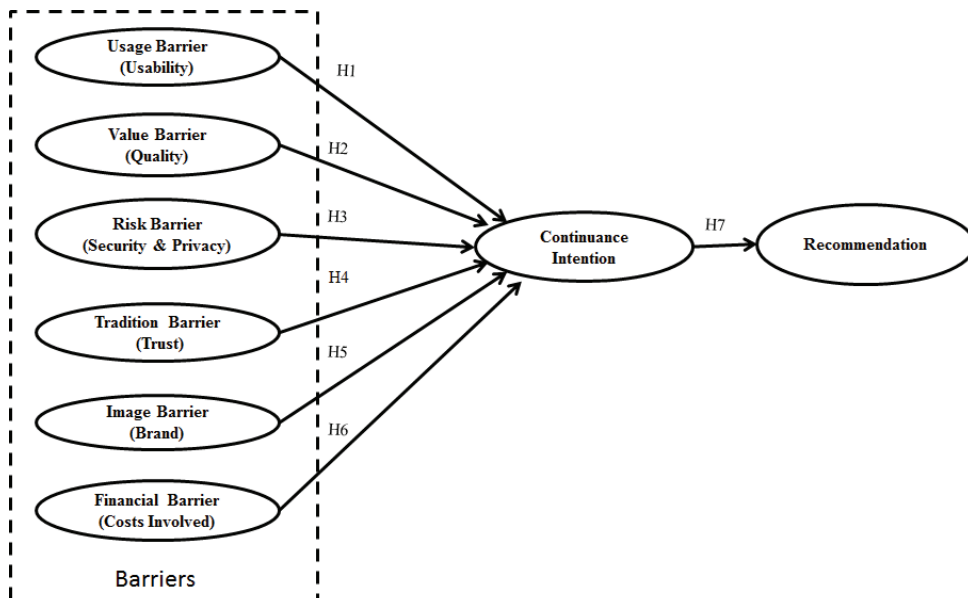
ented behaviour, the innovation resistance theory is mostly used to examine resistance towards new innovation (Ram and Sheth, 1989; Walsh et al., 2021). Innovation resistance theory (IRT) was introduced in 1987 (by Ram, 1987) and later updated by Ram and Sheth (1989). IRT helps to assess the resistance-oriented behaviour of consumers towards various innovations. Earlier researchers have used IRT for exploring the barriers affecting usage of technology based services, like, online banking (Laukkanen, 2016), adoption of MOOCs (Ma and Lee, 2018), online purchase (Lian and Yen, 2013), and mobile commerce (Hew et al., 2017). Looking at the usage of IRT in various contexts, IRT is an appropriate framework for exploring the consumer's resistance towards new innovations (Ma and Lee, 2018).

According to IRT, resistive-oriented behaviour can be active or passive (Heidenreich and Handrich, 2015). While active resistance is directly associated with the features of the innovation and is linked to mainly functional barriers like usage, value, risk and social barriers (Yu and Chantatub, 2016), passive resistance is generally linked to psychological barriers like traditional and image barriers that mainly causes a conflict with user's existing beliefs (Yu and Chantatub, 2016). The increasing amount of research on psychological theories in the retention of technologies has made us combine the information system, and psychological concepts to form a conceptual model based on IRT to understand and explore factors impacting the retention of e-health services in India.

Ⅲ. Conceptual Model and Hypotheses Formulation

This study has utilized the constructs based on the studies by various researchers. The study used six barriers, namely, usage (usability issues), value (quality issues), risk (perceived risks), tradition

<Figure 1> The Proposed Model [adapted from IRT (Ram and Sheth, 1989)]

(trust), image (e-health service identity) and financial (costs involved) that affect continuance intention and in turn recommendation. <Figure 1> show the conceptual model based on innovation resistance theory.

3.1. Usage Barriers

Usage barriers refer to the resistance due to usability issues (Laukkanen, 2016). It is also strongly linked with an innovation's ease of use and the complexity (Davis, 1989; Laukkanen et al., 2008). Lian and Yen (2013) stated that if the innovation is not consistent with users' past experiences, and values system, then it will be difficult for the consumer to use the innovative service. Earlier scholars have also found a relation between usage barrier and intention in different contexts like, online shopping (Lian and Yen, 2014), online banking (Laukkanen, 2016), massive online open courses (MOOCs) (Ma and Lee, 2018), etc. While Lian and Yen (2014) had noted a non-significant relation between usage barrier and intentions, Laukkanen (2016) and Ma and Lee (2018) had noted a negative association. In case of e-health services, the technical issues related to apps also restrict users from using e-health services (Griebel et al., 2017; Nijeweme-d'Hollosy et al., 2015). After an individual has used the e-Health service and after use if an user feels that he/she is not able to understand the functionalities of the e-health portal/application properly, the user will face difficulties in using the e-health service and hence will refrain from using it. In India, since the literacy level is very low and majority is late adopters of new innovations, usage barrier can affect their continuance intentions. On the other hand, since there are many providers in India, users can easily switch to a different app. which is easy-to-use. Thus we propose:

H1: Usage barriers (usability issues) negatively influence continuance intention.

3.2. Value Barriers

Value barrier depicts the resistance to use a particular service that fails to provide a user value for the price or time spent on the service (Ram and Sheth, 1989). Earlier researchers have stated that if the innovative service is not able to provide quality service and value, users will be reluctant to use the service (Cruz et al., 2010). Other researchers have also found a negative relation between value barrier and usage-intention in case of different eServices, like, online shopping (Lian and Yen, 2014), usage of MOOCs (Ma and Lee, 2018), and in case of digital payments (Sivathanu, 2018). After using the eHealth service, if the user feels that he/she is not able to gain much value from the service and the service fails to provide quality services, users will refuse to use the service. We feel that when an e-health service cannot provide services of good experienced doctors or does not keep the promises it makes, people will stop using that e-health service. Thus this study proposes:

H2: Value barriers (quality) negatively influence continuance intention.

3.3. Risk barriers

Risk barriers refer to the risks, uncertainties associated with an innovative service (Lian and Yen, 2013). When a user fears the associated risks with an eService, he/she will have refrain from using the service. Perceived fear makes users reluctant to use e-services. In case of e-health services, users fear security issues related to disclosing of personal data and privacy issues (Ariens et al., 2017; Gregorio et

al., 2013). Additionally, if users see that the e-health service provides fake information, they will refrain from using it. Earlier researchers have found that risk barriers and intention to use a service are negatively related in contexts like, MOOCs (Ma and Lee, 2018), digital payment services (Sivathanu, 2018), and smart devices (Chouk and Mani, 2019). In a country like India, where the literacy level is high and the majority of the people belong to middle or lower income groups, uncertainties related to security and privacy can affect their decisions. After using a particular eHealth service, if the user feels that their private information is getting leaked and there is not much security enhancing features, the user might stop using the app. Hence we propose:

H3: Risk barriers (security and privacy) negatively influence continuance intention.

3.4. Tradition Barriers

Tradition barriers depict the reluctance of a user to use a service that conflicts with the user's usual culture (Lian and Yen, 2013). This happens when a user is reluctant to trust a new innovation. Researchers have stated that more the conflict, the more powerful the barrier will be (Lian and Yen, 2013; Ram and Sheth, 1989). Griebel et al. (2017) concluded that individual barriers like, motivation, trust, etc. affect user's usage intention in context of e-health services. Though it has been pointed out by many researchers that the association between trust and satisfaction is an important determinant of customer continuance intention (Chen and Hitt, 2002; Gerpott et al., 2001; Gustafsson et al., 2005; Rust and Zahorik, 1993), some researchers believe that customer satisfaction and trust is a superior strategy for satisfaction alone (Ranaweera and

Prabhu, 2003). Ariens et al. (2017) found that barriers like reliability affect e-health usage. Lian and Yen (2014) stated a negative association of tradition barrier with intention to use online shopping among older adults. Chen et al. (2018) in their study saw a positive association between tradition barriers and intention to use hydro-electric motorcycles. In India, where people are closely bound by tradition and word-of-mouth recommendations, if a user feels that the e-health service is fake and not trustworthy, they will stop using the service. Unless the e-health services can provide the trust and reliability regarding the services provided like, consultation, booking time, etc., users will refrain from using the services in future. Hence, we propose:

H4: Tradition barriers (trust) has a negative influence on continuance intention.

3.5. Image Barriers

Image barrier depicts the users' belief of the brand or other side-effects of the innovative service (Lian and Yen, 2014). Ma and Lee (2018) found that image barrier and intention are negatively related in case of MOOCs. Lian and Yen (2013) found an insignificant relationship between image barriers and online purchase intention. Sivathanu (2018) found that image barriers have a positive impact on resistance to use digital payments. Joachim et al. (2018) found a strong negative influence of image barrier on usage intention in case of an innovative service. In case of e-health services in India, if a particular e-health service does not provide the expected service, or the e-health service has some faulty practices which get revealed through posts in social-media platforms, the users will be reluctant to use the e-health service. Hence this study supposes:

H5: Image barriers (brand) negatively influence continuance intention.

3.6. Financial Barriers

Financial barriers deal with the user's background, wealth and financial literacy (Agnew and Szykman, 2005; Banks et al., 2015; Ihli et al., 2018; Kim et al., 2016). In has been noted that financial barrier affects intention in case of using photovoltaic systems (Nakada et al., 2016), and taking up undergraduate studies (Hung, 2010). In context of eHealth services, although the services provide advantages like lowering costs and providing better services (Wood, 2020), some e-health services display high costs and hence customers will be reluctant to use those services. In India since most of the people belong to lower or middle income group, people worry about their hard-earned money. After using the e-Health service, if the user feels that the e-Health service is charging a lot of money on consultation or appointments, not providing refund on time, charging high cancellation charges, etc., users will stop using the service. Thus we propose:

H6: Financial barriers (Prices) negatively influence continuance intention.
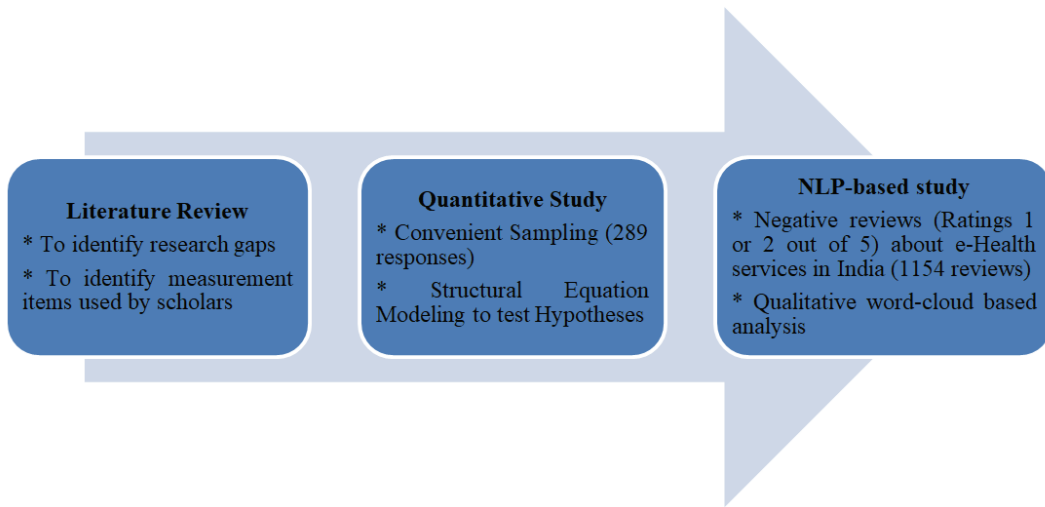
3.7. Continuance Intention and Recommendation

Continuance intention refers to the use of a specific service after using it for the first time (Bhattacherjee, 2001; Zhou, 2018). Chea and Luo (2008) in their study have stated that like continuance intention, there are other post-usage variables which are important. One of them is recommendation. A recommendation from other users who have used the service earlier can encourage other potential users to use that service (Li and Liu, 2011). Additionally, Chea and Luo (2008) stated that the decision to provide a recommendation is determined by the positive impact of the service on the user. Li and Liu (2011) have stated that continuance intention is seen as a loyalty dimension. Users having continuance intention must have got some benefits from using the service, and will recommend the service to others (Choi, 2009; Li and Liu, 2011). Thus, we propose:

H7: Continuance intention has a positive influence on recommendation.

Ⅳ. Methodology

This study intends to assess the various barriers customers face while using eHealth services in India. For examining the variables a mixed method approach is utilized. The steps involved are shown in <Figure 2>. First, a quantitative-based approach has been used since this study is exploratory in nature (Ray et al., 2019; Ray et al., 2020). An online questionnaire was floated and the data was collected from respondents through online (Facebook, WhatsApp) and offline media (shareable printed questionnaire forms). Sharing the questionnaire on Facebook and WhatsApp helped to get data from people from different cities in India. The items were measured on a five-point Likert-scale (5 = 'strongly agree', 1 = 'strongly disagree'). Data was captured using convenient sampling from respondents who had a prior experience of an e-Health service. <Table 2> describes the sample statistics. As used by earlier information system researchers, the minimum sample size required for the study was determined by the "10 times" rule (Goodhue et al., 2012). We have received 289

<Figure 2> Flow-diagram Showing the Steps Followed in this Study

responses for this study which is much beyond the minimum required sample size. Out of 289 responses received, 189 participants (65.40%) were male and the participants were mainly aged between 24 - 30 years (71.97%). 51.21% participants in this study have been using e-health services for less than six months while 48.79% of the participants have been using e-health services for over six months.

Previous studies have shown that prior-usage of a technology forms the base that generates the user's evaluative power during the subsequent stages (Bajaj and Nidumolu, 1998). Since, consumer behavior is a 'self-repetitive routine', the measures to capture past behavior was utilized to predict future behaviors. The measurement items in the survey are all perceived measures. This approach helps the subjects to view themselves in a hypothetical situation and rate the measures accordingly. In future, collecting data sepa-rately for independent and dependent variables will help in reducing the common method bias (Barkhi and Wallace, 2007).

For analyzing the data collected, we have used the structural equation modeling (SEM) technique

<Table 2> Sample Profile

Sample Characteristics (n = 289)	Responses	Percentage
Gender:		
Male	189	65.40%
Female	100	34.60%
Age (in years):		
17 - 23	41	14.19%
24 - 30	208	71.97%
31 - 40	25	8.65%
> 40	15	5.19%
Duration of usage:		
Less than 6 months	148	51.21%
6 months - 1 year	72	24.91%
More than 1 year	69	23.88%

since SEM has the capability to provide accurate calculation of probability distribution of observed data (Baabdullah et al., 2019). SMART PLS (3.2.7) is used to perform the SEM based analysis (Ringle et al., 2015). Since the research is exploratory, PLS-SEM is preferred (Hair et al., 2013). Additionally, the advantages of using PLS-SEM are as follows:

(a) it helps in providing the approximated values of the unobserved latent variables; (b) it helps in inspecting different paths based on the latent variables (Cassel et al., 1999); (c) it does not assume the normality of data; and (d) it does not need large sample sizes unlike other causal-modelling methods (Arnett et al., 2003).

In order to cross-check the findings of the quantitative based study, we have utlized a Natural Language Processing (NLP) based approach (Ray and Bala, 2019) to extract negative reviews (1154) from an eHealth service provider and perform a word-cloud based analysis to understand the barriers that customers usually face. The reviews having ratings below 3 (out of 5, where 5 mean excellent services) were considered for the analysis purpose. The online data extraction tool ParseHub (free version) was used for extracting the negative reviews from Indian eHealth service providers in India (namely, SastaSundar, Thyrocare, Pharmeasy). Once the data was extracted, data cleansing was done by removing unwanted symbols, punctuations, and stopwords. Stemming was not done because we intended to perform word-cloud analysis and hence reducing the words to its root form will affect the overall analysis. Once the data was cleansed, we have performed word-cloud to analyse the data qualitatively. Word-cloud based analysis has been used by researchers as a qualitative study (Gao et al., 2020) and helps to understand the important words (Dharaiya et al., 2020). Additionally, a qualitative study after a quantitative study helps to ascertain the findings of the quantitative study (Gopstein et al., 2020; Leckenby and Hesse-Biber, 2007). In this study, we have used R v3.6.3 and packages "tm", "SnowballC" and "wordcloud" for forming the word-cloud after proper cleansing of unwanted textual data.

The NLP-based mixed method approach has been used by earlier researchers (Ray and Bala, 2021; Ray et al., 2022) and this method helps to arrive at conclusive evidence (or in other words, provide better triangulation) by capturing data from different sources in contexts like online travel agency services, online food delivery services and e-Learning services. In this study, the results of the quantitative based study related to the barriers faced by consumers using e-Health services has been further confirmed using reviews written by consumers who have used e-Health services in India.

Ⅴ. Results

5.1. Quantitative Study

For a good model, the expected cut-offs are as follows: standardized root mean square residual (SRMR) (< 0.08), (non) normed fit index ($\geq$ 0.90), and Chi-square ratio degrees of freedom (X^2/df) < 3.0 (Hair et al., 2013; Parry, 2010). The proposed model had a good SRMR score (0.067), and satisfactory NFI (0.701) and X^2/df (4.03) scores. The model also demonstrated good factor loadings and variation inflation factor (VIF) scores (factor loadings > 0.5 and VIF < 3)(refer <Table 3>)(Hair et al., 2013).

<Table 4> provide details of the measures regarding the various items in measurement model: the average variance extracted (AVE), the construct reliability (CR), and the chronbach's alpha (CA). The generally used criteria for AVE, CR, and CA are: AVE > 0.5, CR > 0.70 and CA > 0.70 (Hair et al., 1998). Here, it was found that AVE, CR, and CA scores for all the items are above 0.7. This confirmed that the constructs are reliable (Fornell and Larcker, 1981). Convergent validity was examined by checking

\<Table 3\> Study Measures, Variation Inflation Factor (VIF), and Factor Loadings for the Measurement Items

Study Measures	Measurement Items	Factor Loadings	VIF
Continuance Intention	INT1: I am willing to use the e-health service in future.	0.953	2.735
	INT2: Overall most of my expectations from using the e-health are fulfilled.	0.942	2.735
Image Barrier	IB1: The service executives of the e-health service do not answer user queries properly.	0.946	3.344
	IB2: Customer feedbacks are not taken seriously by the e-Health provider.	0.969	3.344
Risk Barrier	RB1: There is a privacy concern while using the e-health service.	0.856	2.221
	RB2: I feel that the e-health service is not secure and reliable.	0.982	2.221
Recommendation	RE1: I will recommend the e-Health service to others.	0.938	2.586
	RE2: I am willing to share my views about the e-Health service to others.	0.950	2.586
Financial Barrier	FB1: The services provided by the e-Health provider are too costly for me to use.	0.767	2.059
	FB2: The e-Health service charges extra amount for the services provides.	0.773	2.105
	FB3: Using a service through traditional means is better than using it through the e-Health platform.	0.919	1.437
Tradition Barrier	TB1: I feel that the information provided in the e-health service is not reliable.	0.940	2.221
	TB2: Overall, I do not trust the e-health service.	0.926	2.221
Usage Barrier	UB1: The e-health service is complicated to use.	0.928	1.947
	UB2: The search and book options in the e-health service are confusing.	0.914	1.947
Value Barrier	VB1: The e-Health services do not provide quality service.	0.934	1.850
	VB2: The e-Health service does not provide much value.	0.895	1.850

\<Table 4\> Mean, Standard Deviation (SD), Convergent and Discriminant Validity

Measures	CA	CR	AVE	FB	IB	RE	RB	TB	UB	VB	INT
FB	0.800	0.862	0.677	**0.823**	*0.978*	*0.153*	*0.813*	*0.919*	*0.696*	*0.904*	*0.267*
IB	0.911	0.957	0.917	0.764	**0.958**	*0.042*	*0.724*	*0.654*	*0.549*	*0.722*	*0.123*
RE	0.878	0.943	0.891	-0.157	-0.025	**0.944**	*0.051*	*0.248*	*0.139*	*0.070*	*0.824*
RB	0.852	0.918	0.848	0.634	0.619	-0.057	**0.921**	*0.648*	*0.428*	*0.727*	*0.103*
TB	0.852	0.931	0.870	0.830	0.574	-0.216	0.554	**0.933**	*0.750*	*0.853*	*0.363*
UB	0.822	0.918	0.848	0.614	0.475	-0.120	0.359	0.629	**0.921**	*0.699*	*0.255*
VB	0.808	0.911	0.837	0.729	0.620	-0.062	0.581	0.706	0.570	**0.915**	*0.310*
INT	0.887	0.946	0.898	-0.273	-0.110	0.731	-0.106	-0.317	-0.218	-0.263	**0.948**

Note: Average Variance Extracted = AVE; Cronbach's Alpha = CA; Composite Reliability = CR; Financial Barrier = FB; Continuance Intention = INT; Image Barrier = IB; Recommendation = RE; Risk Barrier = RB; Traditional Barrier = TB; Value Barrier = VB. HTMT Criteria values are presented in italics.
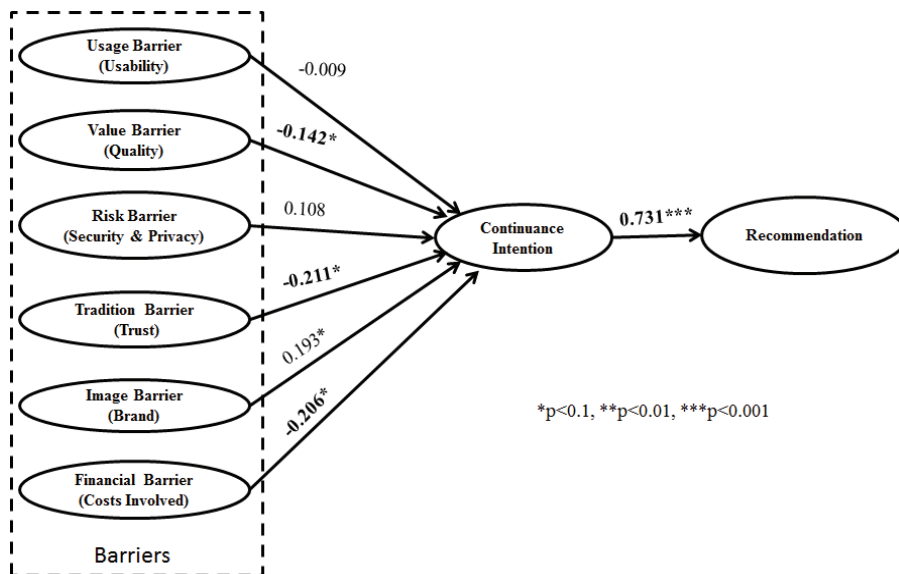
<Table 5> Hypotheses Results

Hypotheses:Path	β-value	t-statistic	Supported?
H1: Usage Barrier → Continuance Intention	-0.009	0.116	No
H2: Value Barrier → Continuance Intention	-0.142*	1.651	**Yes**
H3: Risk Barrier → Continuance Intention	0.108	1.151	No
H4: Tradition Barrier → Continuance Intention	-0.211*	2.135	**Yes**
H5: Image Barrier → Continuance Intention	0.193*	2.284	No
H6: Financial Barrier → Continuance Intention	-0.206*	1.769	**Yes**
H7: Continuance Intention → Recommendations	0.731***	17.442	**Yes**

Note: *p < 0.1, **p < 0.01, ***p < 0.001

<Table 6> Indirect Path effect

Path	β-value	t-statistic	Supported?
Usage Barrier → Recommendation	-0.006	0.116	No
Value Barrier → Recommendation	-0.104*	1.665	**Yes**
Risk Barrier → Recommendation	0.079	1.167	No
Tradition Barrier → Recommendation	-0154*	2.061	**Yes**
Image Barrier → Recommendation	0.141*	2.206	No
Financial Barrier → Recommendation	-0.150*	1.764	**Yes**

Note: *p < 0.1, **p < 0.01, ***p < 0.001

<Figure 3> The Path Coefficients of the Proposed Model

whether AVE scores of the measurement items are at least 0.5 (Gefen et al., 2000) (refer <Table 4>). Discriminant validity is validated by checking if the values of the diagonal for each item are greater than the non-diagonal scores (Chin, 1998) (see <Table 4>). Results indicate good discriminant validity (Yang and Yoo, 2004). We have also checked discriminant validity using heterotrait－monotrait ratio (HTMT) of correlations (Henseler et al., 2015) (refer <Table 4>). Most of the values fall within the defined threshold of 0.90 (Henseler et al., 2015; She et al., 2021a; She et al., 2021b). However, three values are exceeding 0.90 which depnds on the context and hence can be accepted (Franke and Sarstedt, 2019).

The standardized regression coefficients (or beta values) and significance level (p-value) estimated by the structural model are used to examine the validity of the different hypotheses (see <Table 5>). The different barriers, namely, usage barrier (β = -0.009), and risk barrier (β = 0.108) had an insignificant influence on continuance intention (p > 0.1). Tradition barrier (β = -0.211, p < 0.1), value barrier (β = -0.142, p < 0.1) and financial barrier (β = -0.206, p < 0.1) have a notable negative relationship with continuance intention. Interestingly, image Barrier (β = 0.193) has a significant (p < 0.1) positive influence on continuance intention. Additionally, continuance intention has a significant positive influence on recommendation (β = 0.731, p < 0.001). Thus, hypotheses H2, H4, H6, and H7 are supported by this study data. The path-coefficients suggest the strength of influence of the items on one another (see <Figure 3>). We also note that when we consider the indirect path effects, financial, value and tradition barriers have a significant negative impact on recommendation intentions (refer <Table 6>). In this study we have used two control variables, age and gender. Age has a negative significant influence (-0.153) on intention (p < 0.1) and insignificant impact on recommendation (0.037, p > 0.1). Gender also has a negative significant influence (-0.15) on intention (p < 0.1) and insignificant impact on recommendation (-0.012, p > 0.1).

5.2. NLP-based study

In this study, we have also performed an NLP based study to confirm the results of the quantitative study through analysis of textual content. As evident from the word-cloud (refer <Figure 4>) we found that the themes emerging are "fake", "fraud", "experience", "negative", "wrong", "cancelled", "fees", "poor", "terrible", "bad", "money", etc. In most of the reviews written by the users, the grief of the users is evident.

"Today I had requested for a blood test where the assigned came without a storage box where the required items are kept in hygienic and sterilized condition instead he picked it randomly from his bag including the cotton piece which is visibly dirty and was kept with rest of his stuff."(Female user)

"Guys stay away from ABC, their doctor doesn't understand your concern and when I ask for money refund, Customer service(which is a complete waste) said they provide me the best service. Please don't use their service and save your hard earn money" (Male user)

"Do NOT TRUST THEM on health check up or anything else. The lab they are using is not accurately checking the samples. I have been given wrong reports on TSH and HDL. When I did it outside, there is a large large difference in the values. ⋯. They took about 3000 rs for these fake reports. Also the doctors I talked to is also very rude and did not know a thing."(Female user)

<Figure 4> Word-cloud Depicting Some Barriers that Users Face while Using eHealth Services

"Yesterday out of desperation I thought of seeking consultation over ABC hoping to get immediate answers to the medical questions I had but to my utter disappointment I simply lost 300 bucks. the chat window opened but was unable to type anything. I immediately raised a ticket asking them to resolve the issue but neither the ticket was resolved nor I could get any consultation. it's a new technical way of begging. please do not fall into their trap better spend the same money in any good clinic/hospital around you." (Male user)

The sample reviews highlight the barriers and issues faced by customers which the providers do not often cater to. There are repeated cases of financial, trust, image and usability issues being highlighted by the customers (refer <Table 7>).

<Table 7> Relevant Potential Word(s) Identified from the Word-cloud and Reviews Related to the Barriers

Barriers	Relevant potential word/s identified from word-cloud and reviews
Usage Barrier (Usability)	app, issue, appointment cancelled, online consultation experience
Value Barrier (Quality)	doesn't respond, waited, terrible, doesn't care
Risk Barrier (Security and Privacy)	fake, fraud, charge, cancelled, hide
Tradition Barrier (Trust)	trust, fake
Image Barrier (Brand)	worst, fraud, bad experience
Financial Barrier (Costs Involved)	money, refund, fee, amount

Ⅵ. Discussion

Earlier studies have not examined the impact of various barriers that affect user's behavioural intentions and recommendations in context of e-Health services in India from the IRT lens. Initially, a quantitative based approach was undertaken involving 289 respondents. Findings reveal that among the resistance variables, value, tradition and financial barriers impact continuance intention (refer <Table 4>).

The study results show a negative relationship between usage barriers and continuance intention (H1 supported) as suggested by earlier researchers Ma and Lee (2018) in case of MOOCs. However, similar to the study by Lian and Yen (2014), this study shows an insignificant relationship between usage barriers and confirmation intention. Researchers Chen et al. (2018), Letchumanan and Muniandy (2013) have also noted an insignificant relationships between ease of use or usefulness and intention. Findings imply that users are indifferent to usability issues related to e-health applications. As long as an application is able to serve their needs, they don't care about the usability issues. The other implication of this finding can be the fact that with the penetration of internet, the modern day apps are user friendly and are easy to use. Hence users do not feel usability as a barrier now.

H2 examines the negative relation between value barrier and continuance intention. Findings show that there is a significant negative relation. This means that if consumers do not find much value in the e-Health service, they will refrain from using the service (Cruz et al., 2010; Lian and Yen, 2014). Additionally, if customer feel that the quality of the service provided is poor, and the service does not fulfill the needs of the customers, customers will refrain from using the services (Ma and Lee, 2018; Sivathanu, 2018). If a service adds more value to

the customer, the customer will continue using the service (Ray et al., 2020). Another indirect implication is that since the switching costs is low, consumers who are dissatisfied with a particular e-service will tend to switch to another competitor app, rather than continuing with the particular service.

H3 examined the negative relationship between risk barrier and continuance intention. Findings show an insignificant positive relationship. This is contrary to what researchers Gregorio et al. (2013) and Ariens et al. (2017) have found. This is however is in line with what researchers Zafiropoulos et al. (2012) have found in case of e-government services. The possible reason can be that such issues are relevant in all types of technological innovations. Hence, people try to ignore it as long as they are not affected. It means that although there can be a risk of faulty information or data privacy, when an e-health service is able to make proper bookings or doctor consultations online which can save some time for the users, the users will not be much affected by the risks associated with the e-health services.

H4 tested the association between tradition barriers and intention to continue using e-Health services. Like previous studies (Ariens et al., 2017; Griebel et al., 2017; Lian and Yen, 2014), findings suggested a notable negative association between tradition barrier and confirmation intention. This shows that as long as there is no conflict of the e-health service with the ideologies of an individual, and as long as there is trust, the user will continue using the e-health service. However, if there is a conflict, the more the conflict the lesser will be the intention to reuse.

H5 examined the negative relationship between image barrier and continuance intention. Results suggest a positive non-significant relationship. The findings are not consistent with previous studies (Lian

and Yen, 2014; Ma and Lee, 2018). However researchers have also noted no significant relationship between image barrier and intention in contexts like, adoption of e-government services (Zafiropoulos et al., 2012), and in the case of WeChat user's usage intention (Zhou et al., 2018). This can be due the fact that: a) customers do not value the brand names because in recent times almost all brands can perform similar activities. b) as long as the eHealth service is able to serve the requirements, consumers are loyal to the provider. If the customers perceive some problems with a brand, they will switch to a different provider.

Findings suggest a significant negative influence of financial barriers on continuance intention (H6 supported). This is in line with what earlier researchers (Agnew and Szykman, 2005; Banks et al., 2015; Kim et al., 2016) have noted. Results suggest that if the services listed in the e-health platform are costly, customers will refrain from using it. Additionally, if a particular provider asks for money prior to providing the service, customers fear that they may not get good quality service even after paying the amount and hence will refrain from using the service.

H7 examined the positive impact of continuance intention on recommendation. Results show a notable positive association. When a user is satisfied with an e-health service, he/she will be willing to encourage other potential customers to use the service (Li and Liu, 2011). The user will spread positive word of mouth in his/her circle and recommend others to share the service related feedback with others as well (Chea and Luo, 2008; Yang et al., 2012).

The results of the empirical analysis are confirmed by the results of the NLP-based qualitative study (word-cloud analysis) on negative reviews posted by consumers on Indian e-health service portals. The repeated use of words like, "fake", "trust", "fraud", "bad experience", "wrong", terrible", "payment",

"cancellation", etc. shows the different barriers that users have faced. The NLP-based study also shows that users mostly speak about value, tradition, and financial barriers. This is because of several service gaps that exist, like, addressing consumer concerns by customer service team is slow or lacking, cancellation of appointments due to unavailability of doctor without prior notice, lack of proper tracking of refund status, etc. Although the words like "fraud", "fake", etc. can also be related to brand image, the empirical analysis found an insignificant influence of image barriers on continuance intention. This can be due to the fact that due to the low switching costs in India because of the availability of so many providers, consumers hardly care about using a service once they feel that they have been cheated. They are mostly worried about the value and financial aspects. Although usually consumers face risk barrier when they face financial and value barriers, interestingly, the study findings show an insignificant influence of risk barrier on continuance intention. In the Indian context, although Kumar and Natarajan (2020) have examined the impact of usage, value, risk, and tradition barriers, our study have also helped to assess the impact of image and financial barriers. The use of IRT in this study helps to capture the innovation related barriers that affect Indian customers' perspective. The study results have also shown that indirectly value, tradition and financial barriers have a negative impact on recommendation intention. Earlier studies in this domain have not captured barriers affecting intention to recommend. Thus this study provides a new future research avenue.

6.1. Managerial Implications

The study yields several managerial implications. First, companies must focus on the barriers affecting

users' continuance intention. Factors like tradition, financial and value barriers can have strong impact on the usage intention and hence taking care of the issues that a customer faces at an early stage will be useful. This needs be considered at the product development stage. There should be ways to provide a seamless experience to customers. Bridging the IT-adoption/retention gaps as well as the service gaps will help service-providers to provide better services to their customers. Results show that positive confirmation leads to satisfaction and this can be made possible through better services and reduced service gaps (Parasuraman et al., 1988).

Second, it is important for companies to investigate better privacy schemes to ensure consumers' perceived risk is low. In healthcare segment, customers are more sensitive to privacy issues like, medical records, family information, etc. So service providers should have proper security checks so that the customer information is not leaked. Trust in modern era plays a significant role. Once a customer loses trust on a particular service, the customer will discontinue using the particular service. Additionally, his/her colleagues may also discontinue the service.

Third, this work will help managers to prioritize the barriers and look into ways of better advertising their services. For e.g., since traditional barrier is important, companies can project trust in their advertisements. Additionally, since value is important companies can look to diversify their offerings like online consultation, online medicine delivery, online booking, etc. The companies will also have to make sure that the services provided are of good quality and are not so costly (Wood, 2020). So understanding the barriers affecting the continuance intention helps service providers to not only rectify the service gaps that exist but also in reducing advertising and promotional costs. Finally, based on the study findings where

we find a strong positive impact of continuance intention on recommendations, companies that provide good service will have a loyal customer base. Additionally, these loyal customers will also help to bring in potential customers through word-of-mouth and recommendations. Hence, keeping the customers satisfied is an important task for the providers.

6.2. Theoretical Implications

This study has few theoretical implications. First, this study will motivate researchers to explore the barriers based on various situations in the e-health context. This current study has not considered the app. use during emergency situations. Since healthcare is a critical segment and hence a slow service can lead to several other problems like, death of a critically ill patient. So when a patient books an appointment and comes for a visit, the booking should be confirmed and not cancelled due to some issues in the app. Researchers in future can explore these factors. Health-care is a very important sector and hence understanding the different barriers will help academicians to explore more in different critical health-care domains and the possibilities of adopting these segments in the online platforms. Future scholars can conduct in-depth qualitative based analysis for understanding customer perspectives from different sectors (urban or rural) and income groups (poor, middle class, and rich). Finally, this work extends the e-health services literature. This study opens avenues for further research on various other barriers like cultural, educational, etc. Since in this study its noted that financial and trust issues play a major role in affecting customers continuance intention as well as recommendation intentions, scholars can work on an experimental based study to explore if reducing the financial, value and tradition barriers

will improve customer's continuance intention.

6.3. Limitations and Future Scope

In this study we have mostly collected data using convenient sampling. In future, researchers can work on capturing longitudinal data and not cross-sectional data to capture changing trends (if any) in the eHealth services segment. In this work, social influence is not captured. Future work can explore the level of interactivity in a social environment (Dickinger et al., 2008). This means that an in-depth analysis of the perspectives of all the stakeholders involved, namely, the patients, the healthcare centers, the hospitals, the service providers, etc. will help to get a much deeper insight and also help to bridge the gaps that exist. This will also throw light on the impact of micro-level and macro-level interactions on various decisions (Granovetter, 1973; Weimann, 1983). The other limitation of this study is that we have not captured the cases where people have used the e-Health services during emergency situations. So a future study can try to capture how consumers will use the services during emergencies and how fast the e-service will respond because healthcare is a critical segment. So far more functional features such as usability have been explored (Davis, 1989; Venkatesh et al., 2003) and hence non-func-

tional features like, recoverability, maintainability, capacity, etc. can be explored in future studies.

Ⅶ. Conclusion

e-Health services is an emerging segment in India. The successful diffusion of innovation depends not only on the rate of adoption but also on the rate of retention. This work contributes to the e-health literature by exploring the various barriers that can affect continuance intention and recommendation intention from the IRT stance. A quantitative based approach revealed that value, tradition and financial barriers have a significant direct negative influence on continuance intention and a significant indirect negative influence on recommendation intention. This is further confirmed by the NLP-based qualitative study. This study has several implications for both managers and academicians, like, providing a new avenue for academicians to explore the barriers affecting usage of e-Health services, and will pave a path for providers to look into the different issues. This study mainly contributes to the e-health literature by capturing the barriers that affect continuance and recommendation intention of e-Health services in India.

<References>

[1] Agnew, J. R., and Szykman, L. (2005). Asset allocation and information overload: The influence of information display, asset choice and investor experience. *Journal of Behavioral Finance*, *6*(2), 57-70.

[2] Anderson, J. G. (2004). Consumers of e-Health. *Social Science Computer Review*, *22*(2), 242-248.

[3] Al-Debei, M. M., Al-Lozi, E., and Papazafeiropoulou, A. (2013). Why people keep coming back to Facebook: Explaining and predicting continuance participation from an extended theory of planned behaviour perspective. *Decision Support Systems*, *55*(1), 43-54.

[4] Ariens, L. F., Schussler-Raymakers, F. M., Frima,

C., Flinterman, A., Hamminga, E., Arents, B. W., Bruijnzeel-Koomen, C. A., de Bruin-Weller, M. S., and van Os-Medendorp, H. (2017). Barriers and facilitators to eHealth use in daily practice: Perspectives of patients and professionals in dermatology. *Journal of Medical Internet Research*, *19*(9), e.300. https://doi.org/10.2196/jmir.7512

[5] Arnett, D. B., Laverie, D. A. and Meiers, A. (2003). Developing parsimonious retailer equity indexes using partial least squares analysis: a method and applications. *Journal of Retailing*, *79*(3), 161-70.

[6] Baabdullah, A. M., Alalwan, A. A., Rana, N. P., Kizgin, H., and Patil, P. (2019). Consumer use of mobile banking (M-Banking) in Saudi Arabia: Towards an integrated model. *International Journal of Information Management*, *44*, 38-52.

[7] Bajaj, A., and Nidumolu, S. R. (1998). A feedback model to understand information system usage. *Information and Management*, *33*, 213-224.

[8] Banks, J., Crawford, R., and Tetlow, G. (2015). Annuity choices and income drawdown: evidence from the decummulation phase of defined contribution pensions in England. *Journal of Pension Economics and Finance*, *14*(4), 412-438.

[9] Barkhi, R., and Wallace, L. (2007). The impact of personality type on purchasing decisions in virtual stores. *Information Technology and Management*, *8*, 313-330.

[10] Bhattacherjee, A. (2001). Understanding information systems continuance: An expectation-confirmation model. *MIS Quarterly*, *25*, 351-370.

[11] Bhattacherjee, A., Hikmet, N., Menachemi, N., Kayhan, V. O., and Brooks, R. G. (2006). The differential performance effects of healthcare information technology adoption. *Information Systems Management*, *24*(1), 5-14.

[12] Cashen, M. S., Dykes, P., and Gerber, B. (2004). eHealth technology and internet resources: Barriers for vulnerable populations. *The Journal of Cardiovascular Nursing, 19*(3), 209-214.

[13] Cassel, C., Hackl, P. and Westlund, A. H. (1999). Robustness of partial least-squares method for

estimating latent variable quality structures. *Journal of Applied Statistics*, *26*(4), 435-46.

[14] Chan, C. V., Mirkovic, J, Furniss, S., and Kaufman, D. R. (2015). eHealth literacy demands and cognitive processes underlying barriers in consumer health information seeking. *Knowledge Management and E-Learning*, *7*(4), 550-575.

[15] Chauhan, S., and Jaiswal, M. (2017). A meta-analysis of e-health applications acceptance: Moderating impact of user types and e-health application types. *Journal of Enterprise Information Management*, *30*(2), 295-319.

[16] Chea, S., and Luo, M. M. (2008). Post-adoption behaviors of e-service customers: The interplay of cognition and emotion. *International Journal of Electronic Commerce*, *12*(3), 29-56.

[17] Chen, P. Y., and Hitt, L. M. (2002). Measuring switching costs and the determinants of customer retention in internet-enabled businesses: A study of the online brokerage industry. *Information Systems Research*, *13*(3), 255-274.

[18] Chen, X. F., Slau, K., and Nah, F. F. H. (2008). *Adoption of 3-D Virtual Worlds for Education*. ICIS 2008 Proceedings. Association for Information Systems AIS Electronic Library (AISeL).

[19] Chen, H. S., Tsai, B. K., and Hsieh, C. M. (2018). The effects of perceived barriers on innovation resistance of hydrogen-electric motorcycles. *Sustainability*, *10*(6), e.1933. https://doi.org/10.3390/su10061933

[20] Chin, W.W. (1998). Issues and opinions on structural equation modeling. *MIS Quarterly*, *22*(1), 7-16.

[21] Chin, T. (2004). Technology valued, but implementing it into practice is slow. American Medical News, Retrieved from http://www.amednews.com

[22] Chiu, W., Cho, H., and Chi, C. G. (2021). Consumers' continuance intention to use fitness and health apps: An integration of the expectation－confirmation model and investment model. *Information Technology & People*, *34*(3), 978-998.

[23] Choi, N. (2009). *How loyal are you? Continuance intention and word of mouth in free/libre open source*

software. Paper presented at the AMCIS 2009 Doctoral Consortium.

[24] Chouk, I., and Mani, Z. (2019). Factors for and against resistance to smart services: role of consumer lifestyle and ecosystem related variables. *Journal of Services Marketing, 33*(4), 449-462.

[25] Cruz, P., Barretto, F.N.L., Muñoz Gallego, P., and Laukkanen, T. (2010). Mobile banking rollout in emerging markets: Evidence from Brazil. *International Journal of Bank Marketing, 28*(5), 342-371.

[26] Davidson, E., and Heslinga, D. (2006). Bridging the IT adoption gap for small physician practices: An action research study on electronic health records. *Information Systems Management, 24*(1), 15-28.

[27] Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*, 319-340.

[28] Dharaiya, S., Soneji, B., Kakkad, D., and Tada, N. (2020). Generating positive and negative sentiment word clouds from e-commerce product reviews. *2020 International Conference on Computational Performance Evaluation (ComPE)*, 2020, 459-463. https://doi.org/10.1109/ComPE49325.2020.9200056.

[29] Dickinger, A., Arami, M., and Meyer, D. (2008). The role of perceived enjoyment and social norm in the adoption of technology with network externalities. *European Journal of Information Systems, 17*, 4-11.

[30] Eden, K. B, Totten, A. M, Kassakian, S. Z, Gorman, P. N., McDonagh, M. S., Devine, B., Pappas, M., Daeges, M., Woods, S., and Hersh, W. R. (2016). Barriers and facilitators to exchanging health information: A systematic review. *International Journal of Medical Informatics, 88*, 44-51.

[31] Esmaeilzadeh, P. (2019). Consumers' perceptions of using health information exchanges (HIEs) for research purposes. *Information Systems Management, 36*(1), 57-77.

[32] Featherman, M. S., and Pavlou, P. A. (2003). Predicting e-services adoption: A perceived risk

facets perspective. *International Journal of Human-Computer Studies, 59*, 451-474.

[33] Fornell, C., and Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*, 39-50.

[34] Franke, G., and Sarstedt, M. (2019). Heuristics versus statistics in discriminant validity testing: A comparison of four procedures. *Internet Research, 29*(3), 430-447.

[35] Freudenheim, M. (2004). *Many hospitals resist computerized patient care*. New York Times, Retrieved from http://www.nytimes.com/2004/04/06/technology/06errors.html

[36] Gao, Z., Yada, S., Wakamiya, S., and Aramaki, E. (2020). NAIST COVID: Multilingual COVID-19 Twitter and Weibo Dataset, Retrieved from https://arxiv.org/abs/2004.08145

[37] Gefen, D., Straub, D., and Boudreau, M. (2000). Structural equation modeling and regression guidelines for research practice. *Communications of the Association of Information Systems, 4*, 1-79.

[38] Gerpott, J. T., Rams, W., and Schindler, A. (2001). Customer retention, loyalty, and satisfaction in the German mobile cellular telecommunications market. *Telecommunications Policy, 25*, 249-269.

[39] Goodhue, D. L., Lewis, W., and Thompson, R. (2012). Does PLS have advantages for small sample size or non-normal data? *MIS Quarterly, 36*(3), 981-1001.

[40] Gopstein, D., Fayard, A. L., Apel, S., and Cappos, J. (2020). Thinking aloud about confusing code: a qualitative investigation of program comprehension and atoms of confusion. *ESEC/FSE 2020: Proceedings of the 28th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering*, 605-616. https://doi.org/10.1145/3368089.3409714

[41] Granovetter, M. (1973). The strength of weak ties. *American Journal of Sociology, 78*, 1360-1380.

[42] Gregorio, J., Ferreira, T. L., Cavaco, A., da Silva, M. M, Lovis, C., and Lapao, L. V. (2013). Community pharmacies and eHealth services: Barriers and

opportunities for real Primary Healthcare integration. *Proceedings of the 26th IEEE International Symposium on Computer-Based Medical Systems.*

[43] Griebel, L., Pobiruchin, M., and Wiesner, M. (2017). *Report on the MIE workshop: Consumer health informatics - barriers and facilitators of eHealth usage among consumers.* MIE 2015 Workshop.

[44] Gustafsson, A., Johnson, M. D., and Roos, I. (2005). The effects of customer satisfaction, relationship commitment dimensions, and triggers on customer retention. *Journal of Marketing, 69,* 210-218.

[45] Gyamfi, S. A., Koranteng, F. N., Apau, R., and Ansong-Gyimah, K. (2020). Predicting engagement on collaborative learning systems: Perceptions of postgraduate students. *Proceedings of the 2020 9th International Conference on Educational and Information Technology,* 102-107.

[46] Hair, Jr., Anderson, R. E., Tatham, R. L., and Black, W. C. (1998). *Multivariate data analysis with readings* (5th ed.). Prentice Hall, Enlgewood Cliffs, NJ.

[47] Hair, J. F., Ringle, C. M. and Sarstedt, M. (2013). Partial least squares structural equation modeling: rigorous applications, better results and higher acceptance. *Long Range Planning, 46,* 1-12.

[48] Heidenreich, S., and Handrich, M. (2015). What about passive innovation resistance? Investigating adoption-related behavior from a resistance perspective. *Journal of Product Innovation Management, 32*(6), 878-903.

[49] Henseler, J., Ringle, C. M., and Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science, 43*(1), 115-135.

[50] Hew, J. T., Tan, G. W. H., Lin, B., and Ooi, K. B. (2017). Generating travel-related contents through mobile social tourism: Does privacy paradox persist? *Telematics and Informatics, 34*(7), 914-935.

[51] Hung, F. (2010). Intention of students in less developed cities in China to opt for undergraduate education abroad: Does this vary as their perceptions

of the attractions of overseas study change? *International Journal of Educational Development, 30*(2), 213-223.

[52] IBEF (2018). *Healthcare Industry in India.* India, Retrieved from https://www.ibef.org/industry/healthcare-india.aspx/

[53] Ihli, H. J., Gassner, A., and Musshoff, O. (2018). Experimental insights on the investment behaviour of small-scale coffee farmers in central Uganda under risk and uncertainty. *Journal of Behavioral and Experimental Economics, 75,* 31-44.

[54] Jarosławski, S., and Saberwal, G. (2014). In eHealth in India today, the nature of work, the challenges and the finances: An interview-based study. *BMC Medical Informatics and Decision Making, 14*(1), 1-12.

[55] Javed, M., Tuckova, Z., and Jibril, A. B. (2020). The role of social media on tourists' behavior: An empirical analysis of millennials from the Czech Republic. *Sustainability, 12*(18), e.7735.

[56] Jensen, T. B., and Aanestad, M. (2006). How healthcare professionals "make sense" of an electronic patient record adoption. *Information Systems Management, 24*(1), 29-42.

[57] Jiang, J. J., Muhanna, W. A., and Klein, G. (2000). User resistance and strategies for promoting acceptance across system types. *Information & Management, 37*(1), 25-36.

[58] Joachim, V., Spieth, P., and Heidenreich, S. (2018). Active innovation resistance: An empirical study on functional and psychological barriers to innovation adoption in different contexts. *Industrial Marketing Management, 71,* 95-107.

[59] Kaur, P., Dhir, A., Bodhi, R, Singh, T., and Almotairi, M. (2020). Why do people use and recommend m-wallets?. *Journal of Retailing and Consumer Services, 56,* 102091. https://doi.org/10.1016/j.jretconser.2020.102091

[60] Kautsch, M., Lichoń, M., and Matuszak, N. (2016). Development of publicly funded eHealth in Poland: Barriers and opportunities. *Economics and Sociology, 9*(3), 28-40.

[61] Kim, H. H., Maurer, R., and Mitchell, O. S. (2016). Time is money: Rational life cycle inertia and the delegation of investment management. *Journal of Financial Economics, 121*(2), 427-447.

[62] Kumar, K. A., and Natarajan, S. (2020). An extension of the expectation confirmation model (ECM) to study continuance behavior in using e-Health services. *Innovative Marketing, 16*(2), 15-28.

[63] Lam, W. (2005), Barriers to e government integration. *Journal of Enterprise Information Management, 18*(5), 511-530.

[64] Landi, H. (2018). Study: Healthcare Lags Other Industries in Digital Transformation, Customer Engagement Tech. Healthcare Innovation, Retrieved from https://www.hcinnovationgroup.com/population-health-management/news/13030021/study-healthcare-lags-other-industries-in-digital-transformation-customer-engagement-tech

[65] Landis-Lewis, Z., Manjomo, R., Gadabu, O. J., Kam, M., Simwaka, B. N., Zickmund, S. L., Chimbwandira, F., Douglas, G. P., and Jacobson, R. S. (2015). Barriers to using eHealth data for clinical performance feedback in Malawi: A case study. *International Journal of Medical Informatics, 84*(10), 868-875.

[66] Laukkanen, P., Sinkkonen, S., and Laukkanen, T. (2008). Consumer resistance to Internet banking: Postponers, opponents and rejecters. *The International Journal of Bank Marketing, 26*(6), 440-455.

[67] Laukkanen, T. (2016). Consumer adoption versus rejection decisions in seemingly similar service innovations: The case of the internet and mobile banking. *Journal of Business Research, 69*(7), 2432-2439.

[68] Leckenby, D., and Hesse-Biber, S. N. (2007). Feminist Approaches to Mixed-Methods Research. In S. N. Hesse-Biber and P. Lina (Eds.), *Feminist research practice: A Primer*. Chapter 9. pp.249. Sage Publications Inc.

[69] Letchumanan, M., and Muniandy, B. (2013). Migrating to e-book: A study on perceived usefulness and ease of use. *Library Hi Tech News., 30*(7), 10-16.

[70] Lian, J. W., and Yen, D. C. (2013). To buy or not to buy experience goods online: Perspective of innovation adoption barriers. *Computers in Human Behavior, 29*(3), 665-672.

[71] Lian, J. W., and Yen, D. C. (2014). Online shopping drivers and barriers for older adults: Age and gender differences. *Computers in Human Behavior, 37*, 133-143.

[72] Li, H., and Liu, Y. (2011). Post-adoption behaviour of e-service users: An empirical study on Chinese. In *Proceedings of the ECIS, 2011*.

[73] Ma, L., and Lee, C. S. (2018). Understanding the barriers to the use of MOOCs in a developing country: An innovation resistance perspective. *Journal of Educational Computing Research, 57*(3), 571-590.

[74] Mani, Z., and Chouk, I. (2018). Consumer resistance to innovation in services: Challenges and barriers in the internet of things era. *Journal of Product Innovation Management, 35*(5), 780-807.

[75] Maqableh, M., Jaradat, M., and Azzam, A. (2021). Exploring the determinants of students' academic performance at university level: The mediating role of internet usage continuance intention. *Education and Information Technologies, 26*, 4003-4025.

[76] Mazurek, C., and Stroinski, M. (2010). *Innovative ICT Platform for Emerging eHealth Services: Towards Overcoming Technical and Social Barriers and Solving Grand Challenges in Medicine*. 2010 Second International Conference on eHealth, Telemedicine, and Social Medicine.

[77] Nakada, T., Shin, K., and Managi, S. (2016). The effect of demand response on purchase intention of distributed generation: Evidence from Japan. *Energy Policy, 94*, 307-316.

[78] Natsiavas, P., Kakalou, C., Votis, K., Tzovaras, D., Maglaveras, N., Komnios, I., and Koutkias, V. (2017). Identification of Barriers and Facilitators for eHealth Acceptance: The KONFIDO Study. *IFMBE Proceedings*, 81-85.

[79] Nijeweme-d'Hollosy, W. O., van Velsen, L., Huygens, M., and Hermens, H. (2015). Requirements for and barriers towards interoperable

eHealth technology in primary care. *IEEE Internet Computing, 19*(4), 10-19.

[80] Parasuraman, A., Zeithaml, V. A., and Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions. *Journal of Retailing, 64*(1), 12-40.

[81] Parry, S. (2010). *Fit Statistics commonly reported for CFA and SEM.* Cornell Statistical Consulting Unit, Retrieved from https://www.cscu.cornell.edu/news/Handouts/SEM_fit.pdf

[82] Ram, S. (1987). *A Model of Innovation Resistance.* In NA - Advances in Consumer Research Volume 14, eds. Melanie Wallendorf and Paul Anderson, Provo, UT: Association for Consumer Research, 208-212.

[83] Ram, S., and Sheth, J. N. (1989). Consumer resistance to innovations: The marketing problem and its solutions. *Journal of Consumer Marketing, 6*(2), 5-14.

[84] Ranaweera, C., and Prabhu, J. (2003). On the relative importance of customer satisfaction and trust as determinants of customer retention and positive word of mouth. *Journal of Targeting, Measurement and Analysis for Marketing, 12*, 82-90.

[85] Ray, A., and Bala, P. K. (2021). User generated content for exploring factors affecting intention to use travel and food delivery services. *International Journal of Hospitality Management, 92*, 102730. https://doi.org/ 10.1016/j.ijhm.2020.102730

[86] Ray, A., Bala, P. K., and Rana, N. P. (2021). Exploring the drivers of customers' brand attitudes of online travel agency services: A text-mining based approach. *Journal of Business Research, 128*, 391-404.

[87] Ray, A., and Bala, P. K. (2019). Use of NLP and SEM in determining factors for e-service adoption. In Y. Akgül (Eds), *Structural equation modeling approaches to e-service adoption* (pp. 38-47).

[88] Ray, A., Bala, P. K., and Dasgupta, S. A. (2019). Role of authenticity and perceived benefits of online courses on technology based career choice in India: A modified technology adoption model based on career theory. *International Journal of Information Management, 47*, 140-151.

[89] Ray, A., Bala, P. K., and Dwivedi, Y. K. (2020). Exploring values affecting e-Learning adoption from the user-generated-content: A consumption-value-theory perspective. *Journal of Strategic Marketing*, 1-23. https://doi.org/10.1080/0965254x.2020.1749875

[90] Ray, A., Bala, P. K., Dasgupta, S. A. (2020). Psychological analytics based technology adoption model for effective educational marketing. In Rana et al. (Eds.), *Digital and Social Media Marketing. Advances in Theory and Practice of Emerging Markets.* Springer, Cham. https://doi.org/10.1007/978-3-030-24374-6_12

[91] Ray, A., Bala, P. K., Chakraborty, S., and Dasgupta, S. A. (2021). Exploring the impact of different factors on brand equity and intention to take up online courses from e-Learning platforms. *Journal of Retailing and Consumer Services, 59*, 102351. https://doi.org/10.1016/j.jretconser.2020.102351

[92] Ray, A., Bala, P. K., and Jain, R. (2022). How can topic-modelling of user-reviews reshape market surveys? Exploring factors influencing usage intention of e-learning services through a novel multi-method approach. *International Journal of Business Information Systems, 40*(2), 259-284.

[93] Reichheld, F. F., and Sasser, W. E. (1990). Zero defections: Quality comes to services. *Harvard Business Review, 68*, e.105.

[94] Ringle, C. M., Wende, S., and Becker, J. M. (2015). SmartPLS 3. Boenningstedt: SmartPLS GmbH, http://www.smartpls.com.

[95] Rust, R. T., and Zahorik, A. J. (1993). Customer satisfaction, customer retention, and market share. *Journal of Retailing, 69*, 193-215.

[96] Saleem, J. J., Plew, W. R., Speir, R. C., Herout, J., Wilck, N. R., Ryan, D. M., Cullen, T. A., Scott, J. M., Benne, M. S., and Phillips, T. (2015). Understanding barriers and facilitators to the use of Clinical Information Systems for intensive care units and Anesthesia Record Keeping: A rapid ethnography. *International Journal of Medical Informatics, 84*(7), 500-511.

[97] She, L., Ma, L., Jan, A., Sharif Nia, H., and

Rahmatpour, P. (2021). Online learning satisfaction during COVID-19 pandemic among Chinese university students: The serial mediation model. *Frontiers in Psychology*, *12*, 743936. https://doi.org/10.3389/fpsyg.2021.743936

[98] She, L., Rasiah, R., Turner, J. J., Guptan, V., and Nia, H. S. (2021). Psychological beliefs and financial well-being among working adults: The mediating role of financial behaviour. *International Journal of Social Economics, 49*(2), 190-209.

[99] Sivathanu, B. (2018). Adoption of digital payment systems in the era of demonetization in India. *Journal of Science and Technology Policy Management, 10*(1), 143-171. https://doi.org/10.1108/jstpm-07-2017-0033

[100] Srivastava, S., Pant, M., and Agarwal, N. (2014). Indian eHealth services: A study. *Proceedings of the Third International Conference on Soft Computing for Problem Solving*, 801-813. https://doi.org/10.1007/978-81-322-1768-8_69

[101] Tandon, P. (2015). eHealth is a key pillar of Digital India, Retrieved from https://economictimes.indiatimes.com/industry/healthcare/biotech/pharmaceuticals/why-ehealth-is-a-key-pillar-of-digital-india/articleshow/48069561.cms?from=mdr

[102] TheHansIndia. (2018). India's e-health initiatives, Retrieved from https://www.thehansindia.com/posts/index/Hans/2018-05-30/Indias-e-health-initiatives/385197

[103] Treskes, R. W., Wildbergh, T. X., Schalij, M. J., and Scherptong, R. W. C. (2018). Expectations and perceived barriers to widespread implementation of e-Health in cardiology practice: Results from a national survey in the Netherlands. *Netherlands Heart Journal*, *27*(1), 18-23.

[104] Venkatesh, V., and Goyal, S. (2010). Expectation disconfirmation and technology adoption: Polynomial modeling and response surface analysis. *MIS Quarterly*, *34*, 281-303.

[105] Venkatesh, V., Morris, M. G., Davis, G. B., and Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*, 425-478.

[106] Walsh, C., O'Reilly, P., Gleasure, R., McAvoy, J., and O'Leary, K. (2021). Understanding manager resistance to blockchain systems. *European Management Journal*, *39*(3), 353-365.

[107] Weimann, G. (1983). The strength of weak conversational ties in the flow of information and influence. *Social Networks*, *5*(3), 245-267.

[108] Wood, L. (2020). India eHealth Market Report 2020: A $16 Billion Opportunity by FY 2025, Retrieved from https://www.globenewswire.com/news-release/2020/10/05/2103408/0/en/India-eHealth-Market-Report-2020-A-16-Billion-Opportunity-by-FY-2025.html

[109] Yang, H. D., and Yoo, Y. (2004). It's all about attitude: Revisiting the technology acceptance model. *Decision Support Systems*, *38*, 19-31.

[110] Zafiropoulos, K., Karavasilis, I., and Vrana, V. (2012). Assessing the adoption of e-Government services by teachers in Greece. *Future Internet*, *4*(2), 528-544.

[111] Zhang, X., Yan, X., Cao, X., Sun, Y., Chen, H., and She, J. (2018). The role of perceived e-health literacy in users' continuance intention to use mobile healthcare applications: An exploratory empirical study in China. *Information Technology for Development*, *24*(2), 198-223.

[112] Zhou, S., Yu, X., and Luo, C. (2018). *Understanding WeChat User's Intention to Use Various Functions: from Social Cognitive Perspective*. WHICEB 2018 Proceedings. Association for Information Systems AIS Electronic Library (AISeL).

[113] Zhou, T. (2018). Understanding online knowledge community user continuance: A social cognitive theory perspective. *Data Technologies and Applications, 52*(3), 445-458.

[114] Zibrik, L., Khan, S., Bangar, N., Stacy, E.,, Novak Lauscher, H., and Ho, K. (2015). Patient and community centered eHealth: Exploring eHealth barriers and facilitators for chronic disease self-management within British Columbia's immigrant Chinese and Punjabi seniors. *Health Policy and Technology*, *4*(4), 348-356.

◆ About the Authors ◆

Arghya Ray

Dr. Arghya Ray has received his PhD from Indian Institute of Management Ranchi. Prior to joining IMI Kolkata, he was an Assistant Professor at FORE School of Management (FSM), Adamas University, and a Visiting Faculty at Birla Global University, IIM Ranchi and IIM Jammu. He also has an industrial experience of two years at TCS Limited. With B.Tech. (Silver Medalist) from SRM University, he has to his credit many publications in top level ABDC and ABS listed journals. He has also attended around ten national and international conferences. His research mainly focuses on understanding customer perspectives from social-media feeds in different domains like food delivery, e-learning and travel agency services.

Pradip Kumar Bala

Pradip Kumar Bala is a professor in the area of Information Systems & Business Analytics at Indian Institute of Management (IIM) Ranchi. He received his B.Tech., M.Tech. and Ph.D. from Indian Institute of Technology (IIT) Kharagpur in 1993, 1999 and 2009 respectively. He worked in Tata Steel before joining academics. He also worked as associate professor at Xavier Institute of Management Bhubaneswar and as assistant professor at IIT Roorkee before joining IIM Ranchi in 2012. His teaching and research areas include text mining & NLP, recommender systems, data mining applications, data mining and NLP algorithms, social media analytics and marketing analytics. He has conducted many training programmes in business analytics & business intelligence. He has published more than 100 research papers in reputed international journals, conference proceedings and book chapters. He is also a member of the International Association of Engineers (IAENG). He has served as Director In-charge, Dean (Academics), Chairperson, Post-Graduate Programmes, Chairperson, Doctoral Programme & Research, and Member of Board of Governors of IIM Ranchi.

Yogesh K. Dwivedi

Yogesh K. Dwivedi is a Professor of Digital Marketing and Innovation, Founding Director of the Emerging Markets Research Centre (EMaRC) and Co-Director of Research at the School of Management, Swansea University, Wales, UK. Professor Dwivedi is also currently leading the International Journal of Information Management as its Editor-in-Chief.

Professor Dwivedi completed his Ph.D. and M.Sc. in Information Systems at Brunel University London (UK), an M.Sc. in Plant Genetic Resources at the Indian Agricultural Research Institute (New Delhi, India) and his B.Sc. (with Botany, Zoology and Chemistry) at the University of Allahabad (Prayagraj, India).

Professor Dwivedi has successfully supervised more than 20 doctoral students to completion and has examined more than 70 doctoral theses at various institutions from Australia, India, Malaysia, Mauritius, Pakistan, the Netherlands and the UK. In recognition of his efforts to provide supportive, stimulating and inspirational supervision, Professor Dwivedi was selected as one of the five finalists for the "2017 Outstanding Research Supervisor of the Year" Award as part of the prestigious annual Times Higher Education Awards. This nomination was a tremendous achievement and deservedly apt, given Professor Dwivedi's commitment to support scholars at all stages of their careers.