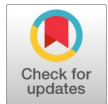


E-Healthcare Services – Actual Usage and Intention to Use among Indian Consumers

Aishwarya A, Kavitha T C, Smitha Nayak



Abstract: *The boom in the information technology (IT) has drastically changed the life style of people today. The electronic commerce plays a vital role in digital revolution by transforming the Indian consumer's buying behaviour, and the usage of smart phones, internet, etc., have radically increased among the Indian consumers. The IT revolution has brought a profound renovation in healthcare services too. The huge health information on internet and various healthcare apps available in market have led to the emergence of Electronic Healthcare Services (e-healthcare services). In most of the developed countries people use e-healthcare services to retrieve any kind of information regarding health. This mainly saves the time and energy of the people. The information with regards to health can be obtained from open sources, healthcare apps such as diet apps, fitness apps etc. Moreover, the mobile health apps such as Practo, Docsapp etc., do provide anytime assistance to the users. Today, due to rapid increase in IT usage for healthcare services by the consumers, it is quite essential to measure the impact of health information provided by websites and apps to their users. The e-healthcare can be viewed as the future of healthcare which is focused on providing quick, better and affordable services to the customers. Therefore, this study attempts to examine the behavioural intention to use and actual usage of the e-healthcare services. A self-administered questionnaire was distributed among the student community in Manipal, Karnataka, and at most 267 students participated in the survey. This study provides an understanding to the researchers aiming at identifying the factors determining the behavioural intention to use e-healthcare services and actual usage. Further, the study brings out the first order dimensions to measure the second order dimension of perceived value of e-healthcare services.*

Keywords: *Actual Usage, Behavioural Intention, E-healthcare services, Information Technology*

I. INTRODUCTION

In today's world the use of Information Technology [IT] to retrieve any kind of information has been increasing. People around the world are using IT to access data at any moment and from anywhere. This advancement in IT has led to the emergence of e-healthcare services. Earlier, individuals relied on doctors and practitioners for any advices related to health. However, with the development in technology, internet has become a hub for accessing all health-related information. E-healthcare services are described as a health service platform whose primary goal is to provide universal access to medical advice and data to any customers using information technology such as mobile phones, laptops, and internet.

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Information on health is obtained from either open source, healthcare apps such as fitness apps, diet Apps or even m-healthcare services such as Practo, Docsapp etc. This shift from seeking opinion from doctors about health-related information to seeking e-health information has been increasing among the people. The concept of e-Health came into light in the early 1960's when Dr. Kenneth Bird used telemedicine to treat a patient who are residing approximately 5kms away from the Massachusetts General Hospital. However, this topic became an area of research only after 2000. Some of the advantages of e-Health Services are:

1. Just the mere use of Internet can facilitate a large population to have easy access to health-related information at their own convenience.
2. Mobile health services, which is a part of e-healthcare services, used especially by doctors such as Practo, Docsapp, help them in recording patient information.
3. E-Healthcare Services also does not create much burden on the doctors as it involves less paperwork. The doctors can retrieve the patients' past medical records just by feeding in few information.
4. Also, the health apps such as fitness app, diet app etc., helps all the health-conscious people by providing the right information to stay and lead a healthy lifestyle.

Presently, it is the healthcare sector that is growing tremendously, which contributes approximately 10% to the overall global GDP. As technology is improving, the presence of e-healthcare services is also expected to become a prominent part of everyone's life. Also, consumers have started adopting DIY (Do It Yourself) approach when it comes to managing their fitness and wellness.

It has been noted, from the information gathered from Flurry Analytics, that the use of health and fitness app has greatly improved. The use of such applications has increased by 330% over the past three years. About 60% of India's population is said to have been using e-healthcare services. According to a study conducted, India ranks 2nd among all the developing countries to adopt e-healthcare Services. As per a survey conducted by PwC, one of the downsides of the adoption of e-healthcare services is that if the adoption rate increases then it might alter the traditional relationship with the healthcare industry.

E-healthcare can be viewed as the future of healthcare which is focused on providing quick, better and affordable services to the customers. One of the known facts is that e-Health services, no matter how informative it is, can never replace a doctor. As this sector is growing rapidly, it is also very important to know the intention of the users to continue the e-healthcare services in the future. This research therefore tries to determine the factors that influence the intention of customers to use e-healthcare services and their actual use of such services.



II. LITERATURE REVIEW

Hossain (2016) has described that off late the development in Information Technology and Communication (ICT) has increased the data availability for healthcare services. Thus, individuals seek information related to health from the internet. Through this research, the researcher (Hossain, 2016) has aimed to develop and substantiate e-healthcare model from the user's perspective. This research in addition to developing a framework for e-healthcare adoption, it also focusses on second order dimension of perceive value in context of e-healthcare services. To comprehend the users' behavioural intention and actual usage of e-healthcare service, the researchers endeavored to know the behavioural theories and technology acceptance theories. These theories provided background knowledge towards factors influencing the behavioural intention and factors effecting the actual usage.

A. Theory of Reasoned Action

Fishbein and Ajzen (1975) described the Theory of Reasoned Action (TRA) which explains how an individual behaves when influenced by certain factors. According to this theory, the Behavioural Intention (BI) typically has two antecedents, that is, Attitude and Subjective Norm. This theory was developed with an intention to describe a user's behaviour towards any product or service. There are two theories underlying the TRA. The first one is in order to predict a certain buying behaviour, it is mandatory to evaluate a consumer's attitude towards performing that behaviour. The second deals with the subjective norm, which deals with how their family, friends, peer groups etc influenced a person's behaviour. This theory also explains that attitude and subjective norms being the major determinants in understanding the BI and the BI ultimately influences the actual behaviour. Attitude (ATTD) is defined as, "an individual's past experience that will help the researcher determine their future behaviour" (Fishbein and Ajzen, 1975). In other words, it refers to an individual's set of beliefs towards something. Subjective Norms (SN) is nothing but the social influence (SI). It is defined as, "the person's perception that most people who are important to him think he should or should not perform the behaviour in question" (Fishbein and Ajzen, 1975). In other word, it refers to a person's peer groups, family members, relatives or friends who influence their behaviour. BI is influenced by attitude and social influence. "It refers to an individual's willingness to behave a certain way" (Fishbein and Ajzen, 1975). The ATTD and SN are antecedents to BI, and BI in turn determines the Actual Behaviour (AB). The researchers are of the opinion that there are exogenous variables that affect ATTD and SN indirectly. According to this study the higher the intentions to behave a certain way, higher will be the chances that the behaviour is actually performed. The researchers also suggest that ATTD and SN are subjected to vary according to individual's situation, their behaviour and differences.

B. Theory of Planned Behaviour

Ajzen (1985) has described the Theory of Planned behavior (TPB) as an extension of the TRA. According to this theory, apart from ATTD and SN, one more factor, which is the perceived behavioural control (PBC) has direct impact on the BI as well as AB. This theory helps to comprehend how individuals can change a particular behaviour (e.g.: reduce smoking addiction). This theory indicates that BI eventually

controls the AB. However, these BI are influenced by three other factors, that is, ATTD, SN, and PBC. This theory recommends that, to actually change an individual's behaviour they must change their ATTD (e.g.: to create a negative attitude towards smoking), among these three variables, such as, ATTD, SN, and PBC, ATTD has higher significant effect on BI. PBC is defined as, "the ability of a person to identify how simple or how complicated it is for the individual to pursue a particular behaviour" (Ajzen, 1985) This results in a person having varying perceptions towards a particular situation.

The PBC is also said to have direct and an indirect impact towards an individual's behaviour. This is based on the assumption that behavioural control which is been perceived has a positive implication on the BI of an individual. If a person feels that due to lack of resource availability he cannot act in a certain manner, then the willingness of the individual to execute that behavior will be lower even if there is a favourable attitude.

Furthermore, it is stated that PBC is a result of self-efficacy theory. According to the study, it is said that more favourable an individual's attitude is towards behavioural and social influence, the higher will be the PBC, and stronger will be the individual's intention to perform the behaviour.

C. Technology Acceptance Model

The Technology Acceptance Model (TAM) theory defines how individuals adopt and use modern technology (Davis, 1989). The TAM theory suggests that when an individual is provided with a technology, their usage is influenced by certain factors. These factors are:

Perceived Usefulness (PU) is defined as, "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). In other words, it refers to how much an individual believes that the given technology will prove to be useful to them and improve their efficiency.

Perceived Ease of Use (PEOU) is defined as, "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989). It can also be explained as the extent to which an individual is congenial with the use of technology and its features.

The model states that PU and PEOU predicts the attitude of the individual towards the use of technology. This model also suggests that PU will influence the BI to use the technology. Further, PEOU influences the PU and ATTD. Moreover, ATTD determines the BI, which in turn leads to the actual usage (AU) of the technology.

This is one of the widely accepted models and is used by many researchers in their technology adoption studies. Thus, PU and PEOU have direct impact on ATTD, which in turn the ATTD impacts BI, which ultimately impacts the Actual Usage (AU).

D. Unified Theory of Acceptance and Use of Technology

Venkatesh, Morris, Davis, and Davis (2003) deliberated the Unified Theory of Acceptance and Use of Technology (UTAUT) model. This model depicts individual's intention to embrace technology and their behaviour towards it. This model stresses of four major determinants in understanding the technology adoption behaviour.

Performance Expectancy (PE), Effort Expectancy (EE), and Social Influence (SI) are three independent variables influencing the BI. The Facilitating Conditions (FC), and BI determines the AU. Gender, age, experience and voluntariness through independent variables, have a moderating impact on the BI. BI is used as the primary predictor of the actual use of technology in this model.

PE is defined as, "The degree to which an individual believes that using the system will help him or her to attain gains in job performance" (Venkatesh, 2003). It is hypothesized to moderate the influence on behavioural intention by gender and age. EE is defined as, "The degree of ease associated with the use of the system" (Venkatesh et al., 2003). It is hypothesized that gender and age, and experience will moderate the impact on behavioural intention. SI is defined as, "The degree to which an individual perceives that important others believe he or she should use the new system" (Venkatesh et al., 2003). Gender and age, experience, and system volunteers are hypothesized to moderate the impact on behavioural intention. FC is defined as, "The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system" (Venkatesh et al., 2003). It is hypothesized age, and experience will moderate the impact on behavioural intention. The above four are independent variable which has an impact on the dependent variables BI and AU. Since the introduction of this model, it has widely been used by many researchers to explain and encourage the adoption of modern technology. Based on these above reviewed literatures, this study brings out the relationships between exogenous and endogenous variables.

E. Trust and Behavioural Intention

According to the conceptual framework of this research the two factors trust (TRUST) and response efficacy (RE) has a direct impact on BI. This in turn has a direct impact on the Actual Usage (AU).

Trust refers to, "the willingness to be vulnerable based on the positive expectation towards another party's future behaviour" (Mayer et al., 1995). Trust comprises of three beliefs, which are ability, integrity and benevolence (McKnight and Chervany, 2001). Higher an individual trust the information provided by the e-healthcare service provider, the higher will be their intention to use such e-health services.

F. Response Efficacy and Behavioural Intention

Response Efficacy is referred as performance expectancy by Venkatesh et al. (2003). Response Efficacy refers to, "an individual's belief on the effective use of the technology" (Venkatesh et al., 2003). The performance expectancy has significant effect on BI in the study conducted by many researchers (Davis, 1989, Venkatesh et al., 2003, Venkatesh et al., 2012). As this variable has significant effect on BI, this research considers RE, in understanding the relationship between RE and BI.

G. Perceived Value and BI

Perceived value is defined as "the overall evaluation by the consumer of the usefulness of a product (or service) based on perceptions of what is received and what is provided" (Zeithaml, 1988). The perceived value is the trade-off between the perceived benefit and cost. Many researchers (Chen, 2008, and Chen and Chen 2010) in service sector has proved the perceived value (PV) as a predictor of BI. And, the PV has a significant effect on BI. In the context of e-healthcare services, this research made an effort in

understanding the first order dimensions of PV. As a result, PV being the second order higher level dimension and the constructs, such as, information quality (IQ), monetary value (MV), epistemic value (EV), usefulness value (UV) and convenience value (CV) are captured as first order lower level dimensions.

H. Perceived Value - Second Order Dimension

In this study, the researcher has used second order higher level dimension in understanding the PV. The first order dimensions IQ, MV, EV, UV, and CV. In this research, the second order dimension with repeated indicators of reflective-formative (R-F) method has been used to capture the perceived value.

Information Quality can be defined, "as the reliability to use information which involves the correctness and relevance of the data" (DeLone and McLean, 1992). The model developed for information system by DeLone and McLean (1992), has shown that a higher level of IQ leads to higher access to Information System. Epistemic Value refers to "the novelty aspect of consumer behaviour, and conditional value is related to the situation in which consumers made decisions" (Goetzinger et al., 2007). Usefulness Value is defined as, "how beneficial is the information provided to the users of the services. This has been a congruous predictor of adoption of technology" (Davis, 1989). It is considered as one of the means for individuals to achieve their goals by enhancing their efficiency (Hung and Jen, 2012). Convenience Value refers to, "how effortless the users find in using a particular technology given to them" (Akter et al., 2013). It is considered as one of the key determinants. High end technology is considered to be convenient as they can be available anywhere and at any time thereby saving the time of the users (Farquhar and Rowley, 2009). Monetary Value refers to, "whether services involve reasonable prices and a worth it when compared to other option available" (Sweeney and Soutar, 2001). Usually IT services are considered cost effective when compared to alternatives.

I. Research Objectives

E-Healthcare Services is a health service platform whose primary objective is to provide any individual with universal access to medical advice and information through the use of IT such as mobile, laptop, internet, etc. Through this research, the researcher seeks to determine the factors leading to behavioural intention to use e-Healthcare services, as well as its actual usage of such e-Healthcare Services. The objectives of this research are listed below:

1. To analyze the factors influencing Behavioural Intention towards e-Healthcare Services
2. To know the factors that influences the Actual Usage of e-Healthcare Services
3. To examine the second order dimension of the perceived value

J. Conceptual Framework

The below Fig .1 illustrates the conceptual framework of this research. The researcher has developed the conceptual framework based on the theories mentioned above. The below framework is tested to examine the relationships between BI and AU, TRUST and BI, RE and BI, PV and BI, and PBC and AU.



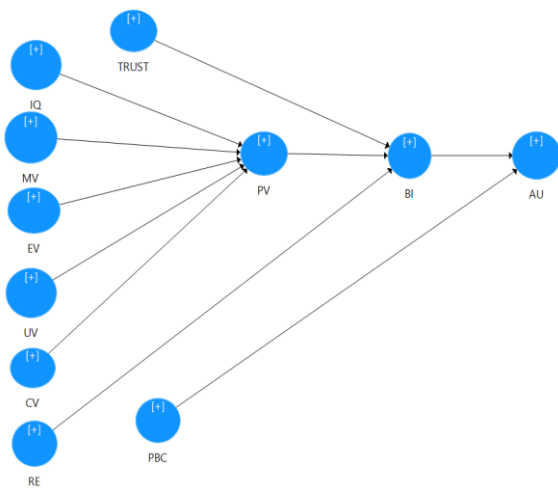


Fig. 1. The Conceptual Framework

The following hypotheses are developed to examine the framework:

- H1: Perceived Value has a significant impact on Behavioural Intention
- H2: Response Efficacy has a significant impact on Behavioural Intention
- H3: Trust has a significant impact on Behavioural Intention
- H4: Perceived Behavioural Control has a significant impact on Actual Usage
- H5: Behavioural Intention has a significant impact on Actual Usage

III. RESEARCH METHODOLOGY

In this study, the approach adopted is deductive research. This study is a combination of exploratory and descriptive study, where quantitative data has been used. The results obtained from this research describes the BI and the AU of e-healthcare services among the student community. To represent the quantitative research analysis, self-administered questionnaires were circulated among the students through Google forms, using five-point Likert scale.

The targeted respondents for the study were the students from Manipal who had an idea about e-healthcare services. Since the survey was conducted in entire Manipal, the size of the population is not known. Thus, the formula adopted for the calculation of infinite population is:

$$n = \frac{z^2 \times p(1-p)}{e^2}$$

- Where, z = z score value
- e = margin of error
- n = population size
- p = population proportion

For the purpose of this study, the confidence level is 95%, the z score value for 95% is 1.96, the margin of error is 6%. As the population is infinite, the population proportion is assumed to be 50%. Therefore, the sample size determined is 267. However, 302 respondents participated in survey. To design structural equation, Partial Least Square –Structural Equation Modelling approach was used by adopting SMART-PLS 3.0 software for the data analysis. The total 47 items were used for the survey. The questionnaire was of reflective indicators. Therefore, Reflective-Reflective method was adopted for data analysis. And, Refeective –Formative repeated indicators approach was used for the second order dimension of PV.

IV. DATA ANALYSIS

A. Demographic Analysis

There were 302 respondents in total for this study, out of which 159 (52.6%) respondents consisted of the female population and 143 (47.4%) respondents consisted of the male population. Majority of the respondents were between the age group of 22 years-25 years (57.3%). The demographic analysis also includes the education qualification of the respondents. Major portion of the respondents have done their post-graduation (PG) (59.9%). Also, the respondents’ discipline was captured. It was found that 36.8% of the respondents were medical students while the remaining 63.2% of the respondents were non-medical students.

B. Reliability and Validity

To adopt PLS-SEM for the structural equation modelling, the basic reliability and validity tests need to be completed. The first criteria of outer loading of all 47 items were tested and the 47 items resulted into values greater than 0.7 value. As the outer loadings of all 47 items are greater than 0.7, all items were retained for the further analysis. From the below Table 1, it is quite evident that all the variables have a good composite reliability as it meets the required threshold value of > = 0.7 (Hair, Hult, Ringle, & Sarstedt, 2011). Thus, all the variables are retained for further analysis. The Average Variance Extracted (AVE) has a threshold value of > = 0.5 (Chin,1998, and Hock and Ringle, 2006). The constructs mentioned in table 2 meet the necessary threshold value and it can therefore be concluded that all the constructs have a good reliability and validity.

Table – I: Reliability Values of the Constructs

Constructs	Composite Reliability	AVE
AU	0.818	0.604
BI	0.935	0.828
CV	0.893	0.807
EV	0.933	0.735
IQ	0.896	0.684
MV	0.942	0.889
PBC	0.902	0.754
PV	0.957	0.585
RE	0.919	0.790
TRUST	0.885	0.720
UV	0.936	0.829

C. Structural Model

The results of the second order dimensions are displayed in below Table II. Among the first order dimensions of PV, all the dimensions path coefficients values have significant results, as the t-values are greater than 1.964. As the method used for second order dimension is Reflective-Formative repeated indicators, the R² value of PV resulted as 1.00 (Fig.2). As the second order dimension resulted into significant result, the full conceptual framework is tested using PLS-Algorithm and Bootstrapping technique in Fig.2.



.Table - II : Results of Second Order Dimensions

First Order Dimensions	Path Coefficients	t-values	p-values
IQ	0.256	28.344	0.000
MV	0.148	24.793	0.000
EV	0.356	42.924	0.000
UV	0.237	29.340	0.000
CV	0.147	23.814	0.000

*** p < 0.001; **p<0.01; p < 0.05

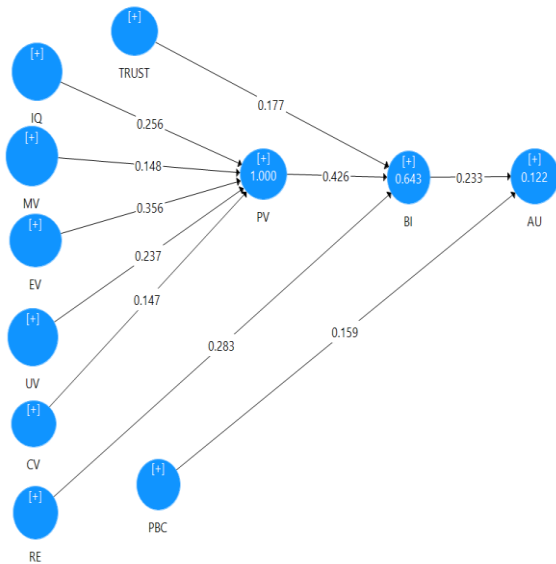


Fig. 2. Results of Structural Model

The complete conceptual framework is tested using Bootstrapping Technique after testing the individual relationships between independent and dependent variables significance level. The coefficient of determination of R² value for the full model that measures BI is 0.643 and the R² value for the full model that measures AU is 0.122. Thus, this model gives an insight that 64.3% of variance is for BI which is moderate and only 12.2% of variance is for AU which is low.

Table – III: Summary of the Hypotheses Results

Relationships	Path Coefficients	t-values	p-values	Decisions
PV -> BI	0.426	4.870	0.000	Supported
RE -> BI	0.283	3.708	0.000	Supported
TRUST-> BI	0.177	2.465	0.014	Supported
PBC -> AU	0.159	2.331	0.020	Supported
BI -> AU	0.233	3.354	0.001	Supported

*** p < 0.001; **p<0.01; p < 0.05

Table III gives a summary of the results of the full structural model. From the above Table it is seen that all the variables are significant as the t- values are above 1.964. Thus, conclusion can be drawn that BI to AU, PV to BI, PBC to AU, TRUST to AU and RE to BI have a strong and significant relationship. The study highlights that the SRMR value as 0.077 for saturated model. The SRMR value lesser than 0.08 indicates good fit.

V. FINDINGS AND DISCUSSIONS

The aim of this study was to understand the factors that influence the BI and the AU of e-healthcare services among the student community across Manipal. Inferential analysis was used to test five of the hypotheses. The findings propose

that the individual constructs of the model have high significance with pertinent values of the path coefficient and T-values which were retrieved from PLS Algorithm and Bootstrapping. While carrying out analysis for the entire structural model, it was deduced that all the variables supported the required path coefficient and T-values. Thus, the hypothesis H1, H2, H3, H4 and H5 were tested positive and accepted. This suggests that all constructs are important for e-healthcare services. However, more importance is given to PV as it has a higher T-value when compared to the other constructs.

Further, in order to understand the perceived value, second-order dimensions were used. This gives a clarity on which construct has a major impact on the perceived value. From the study it can be inferred that all constructs, such as, IQ, MV, UV, EV, and CV have a significant impact on the perceived value, but the construct which is of utmost importance is that of IQ as it has the highest T-value among the first order dimension.

VI. MANAGERIAL IMPLICATIONS

This research emphasizes the weightage given by the users towards using the e-healthcare services. Based on these results the various online service providers of e-healthcare services can focus by working on those critical factors to increase the usage level among the users. This study emphasizes the importance of PV, RE, and TRUST in understanding the BI. The BI explains the variance by 64.3 % as the R² value of BI being 0.643. Moreover, the t-value of PV and BI being 4.870, the PV has a larger impact on BI than PV, RE, TRUST. This gives a clear-cut understanding that the e-healthcare service providers need to concentrate heavily on the perceived value. Th e-healthcare service users’ intention to use these types of services in highly influenced by the perceive value. However, all the first order dimensions of PV have a significant effect.

Further, EV has a great level of impact on PV, as the t-value between EV and PV is 42.924. Therefore, the e-healthcare service providers need to focus highly on the epistemic value of the information provided to the users. By which, the perceived value could be increased among the users, and in turn, the PV impacts the BI significantly. The research highlights the importance of PV and EV directly and indirectly on BI. The researchers (Davis, 1989, Venkatesh et al., 2002, and Venkatesh et al., 2012) of technology adoption theories continuously emphasis on the impact of perceived benefits on BI. In this study perceived benefits are termed as RE. The RE also has a significant effect on BI, and this t-value of 3.708 in Table 5 is the second highest value.

The e-healthcare service providers are recommended to work on information accuracy and reliability to ensure the increased benefits attained by the end users from the e-healthcare services. Further, the effect of PV and RE, will indirectly improve the TRUST among the end users towards the e-healthcare service providers. If the service providers work on PV and RE, by default the TRUST level among the users towards the service provider will significantly improve. Thus, to increase the number of users and usage level, the e-healthcare service providers should continuously update the information.



The actual usage of the e-healthcare services is influenced by both PBC and BI. The PBC captures the facilitating condition available for the users to use e-healthcare services, and their self-efficacy in using the e-healthcare services. However, both the factors have a significant effect on AU. The variance explained in AU is 12.2 percent, as the R² value of AU being 0.122. This study recommends the e-healthcare service providers to ensure their webpage or app to be simple and easy for the access by the end users'. The higher the complexity in accessing the webpage of app, lower will be the actual usage. As, the PBC defines self-efficacy and facilitating condition, the online services should be easy for usage and it should be available any time for the users' accessibility. Thus, the research highlights on BI and PBC to improve the actual usage of the e-healthcare services. And, to highlight the uniqueness of the research, this conceptual framework is an empirical tested theory, for e-healthcare services, among the student's community of both medicine and non-medicine category in higher education has been explored by the researcher.

VII. LIMITATIONS AND DIRECTIONS FOR FUTURE RESEARCH

Though the research has examined the proposed theory in measuring the BI and AU, the factors like social influence, attitude, hedonic, price, and habit were not considered for this study. The technology adoption theories like UTAUT2 and TAM, had measured the effect of attitude social influence, attitude, hedonic, and habit on BI. The future study can be extended by including the above said variables in explaining the BI. And, this extension would increase the variance explained in BI.

However, this theory was tested among only the student's community. It can also be tested among other demographic profile too, which could have actually resulted in understanding the BI and AU of different users' segment.

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