

Consumer Behavior of eHealth Services

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論 文 内 容 の 要 旨

Consumer behavior of any product or service can be explained through five phases: (1) Knowledge and awareness behavior (2) Acceptance behavior (3) Compliance behavior (4) Predictive behavior, and (5) Retention behavior. The consumer behavior of conventional (physical) products or services has been studied since long, however, the consumer behavior of ICT-based healthcare services, where the core service itself is virtual by nature, has not been significantly studied.

Existing studies related to eHealth are mostly focused on ICT design and implementation, system architecture and infrastructural issues. However, the success of eHealth in terms of social adoption, doesn't only depend on its ICT design and infrastructure but more importantly on its consumer acceptance for whom the service is being designed and delivered. It is interesting to observe that consumer behavior of eHealth especially from the perspective of developing countries where most of the worlds' population resides, has hardly been focused.

Therefore, this research aims to analyze and understand the consumer behavior of eHealth focused on developing countries. To attain the overall goal, the study has identified the following specific objectives considering the above mentioned different phases of consumer behavior:

To explore the current level of knowledge and awareness of eHealth among rural consumers.

To identify the factors that affect consumers' acceptance of eHealth and to propose an eHealth acceptance model.

To measure the consumers' level of trust by assessing their compliance behavior toward ePrescription and to identify the factors with relative magnitudes that affect the consumers' compliance behavior.

To predict the consumer behavior through machine learning algorithms and to propose the best performing model in terms of predictive accuracy.

We have collected data from Bheramara Upazilla, North-Western sub-district of Bangladesh in June and July 2016 from 592 randomly selected rural respondents through a field survey with structured questionnaire. It is worth mentioning that our portable health clinic (PHC), a special type of eHealth service, has served to 4701 people in this area several times since 2012. To attain the research goal, information related to the consumers' demography, socio-economic status, perception

and behavioral response towards eHealth systems were collected. Various statistical tools including descriptive statistics, factor analysis, reliability test, correlation and logistic regression models and machine learning algorithms were used to analyze the data.

The major findings and contributions of this research are listed below:

First, the study explored the current level of knowledge and awareness of eHealth among rural consumers. Considering the rural low-resource setting, we findings were much higher than our expectation. We found approximately 40% of the rural respondents have knowledge about using ICT in obtaining healthcare services while 32% have their own experience of receiving eHealth care services from PHC. The study has also identified the major reasons for using and not using PHC services.

Second, we identified the factors with their relative magnitudes that affect consumer acceptance of eHealth and proposed a new eHealth acceptance model for rural end-users which performs slightly better (by 2%) than the existing TAM related models with an R^2 of 0.54 and adjusted R^2 of 0.51.

Third, we proposed a new mechanism of measuring patients' trust towards eHealth systems by assessing their ePrescription compliance behavior instead of asking simple binary or Likert scale questions. The study found 74.7% primary compliance among the users. We also found the prime factors with their relative magnitudes that affect the patients' compliance behavior.

Finally, we have developed a prediction model based on machine learning algorithms which can predict consumers' usage behavior with an accuracy of 85.9%, precision of 86.4%, recall of 90.5%, F-score of 88.1%, and AUC of 91.5% through 12 predictive variables.

The findings of this research are expected to be helpful for eHealth service providers to gain a comprehensive understanding of the factors that affect the end-users' or consumers' acceptance of remote healthcare service. As a consequence, large-scale social adoption and long-run sustainability of eHealth systems will be achieved. The findings will also help to increase the level of ePrescription compliance among rural patients, therefore the overall morbidity is expected to be reduced. Finally, the machine learning prediction model will assist the service providers to select more appropriate users and areas to be served with limited resources with a certain level of accuracy and precision.

The study was conducted on a particular geographical location; therefore, the findings has its limitation to draw a generalized conclusion. In order to obtain a generalized conclusion, further study covering a broader geography will be required. A few additional variables could be added to the proposed eHealth acceptance model such as compatibility, technology anxiety, and resistance to change to gain more comprehensive insights of eHealth acceptance. Consumer behavior has an ever-changing phenomenon and this is why their perceptions and attitude towards eHealth systems may change over times. It is, therefore, necessary to conduct a longitudinal or time-series study to measure the fluctuations in behavior.