

An investigation on factors influencing smart watch adoption: A partial least squares approach

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Abstract - Technologies are constantly being developed and commercialized in the current era of the digital world. Wearable device is one of the most rapid growing devices in information technology in developing countries. Drawing upon Unified Theory of Acceptance and Understanding of Technology² (UTAUT²), this paper examines the use behavior of wearable devices. Data was collected from 150 smart watch users from Bangladesh using survey questionnaire. Result indicates that the performance expectancy, hedonic motivation and habit playing a positive influential role in the terms of adaptation of wearable devices. Our study showed that three independent variables affect the behavior intention of wearable devices which is performance expectancy, hedonic motivation and habit. In other side, Behavioral Intention of using wearable device among the people of Bangladesh influenced by Habit. Our proposed model is empirically tested and contributed to an emerging body of technology acceptance and can be motivating the users of wearable devices. This research shades light to the industry by identifying factors that could affect consumers of wearable devices and could be a diagnostic tool for the industry to penetrate the market of wearable devices.

Keywords - UTAUT 2, Information technology, Wearable device, Technology acceptance, Behavioral intension, Use Behavior.

I. INTRODUCTION

The wearable device is a great invention of Information technology. People's interest in the use of technology called behavioral intention refers to the intensity users in using technology. According to Venkatesh et. al. (2012), there are seven important factors affecting behavioral intention on the use of technology include performance expectancy, effort expectancy, social influence, facilitating condition, hedonic motivation, value, and habit. The seven constructs are described in a research model which is known as Unified Theory of Acceptance and Use of Technology Model (UTAUT) developed by Venkatesh et. al. (2012). Those factors must be paid attention for service providers of technology device so that they can provide better services and improve the ability in satisfying the needs and desire of the users.

According to Rogers (1995) product attributes are key factors that influence users' adoption of a product. Now-a-

days adventurous consumers are more likely to adopt new innovative products like smart watch. Our Research question was: *What are the factors that are influencing customers of Bangladesh to purchase smart watch?* To answer this research question the objectives of our paper are as follows:

- To predict the variable those are collected from an existing model named UTAUT 2 model developed by Venkatesh et. al. (2012).
- To test the modified UTAUT2 model in the context of Bangladesh.
- To test the model with survey data to get a clear result to investigate factors those are affecting the purchase behavior of smart watch in Bangladesh.

II. SYSTEM AND MODEL DEVELOPMENT

The uses of wearable device are depending on consumer's acceptances and use of information technology. A technology acceptance model has been developed named Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et. al (2003). The development of technology is growing rapidly. So a new model of UTAUT has been developed because of the development of technology. The UTAUT model was developed to describe the acceptance and use of technology. Based on consumers technologies then it will be developed. There are many industries or companies that develop their service of technology and application based on their consumers need. The new model by developing existing model is called UTAUT 2. According to (Venkatesh et. Al., 2012), The purpose of the UTAUT model 2 are- 1) identifying three key constructs from prior research , 2) introducing new relationship, 3) altering some existing relationship. The UTAUT model 2 has seven constructs such as performance expectancy, effort expectancy, facilitating condition, hedonic motivation, price value and habit. These constructs affect behavioral intension.

III. RESEARCH METHOD

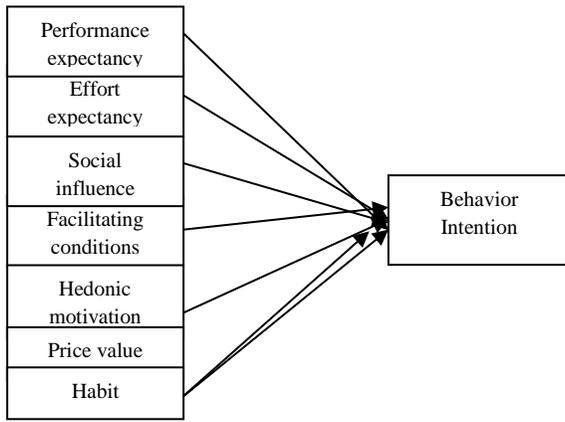


Figure 1: UTAUT2 Model

Performance Expectancy (H1): The performance expectancy has a positive effect on Behavioral Intention of using smart watch.

Effort Expectancy (H2): The effort expectancy has a positive effect on Behavioral Intention of using smart watch.

Social Influence (H3): The social influence has a positive effect on Behavioral Intention of using smart watch.

Facilitating Conditions (H4): The facilitating conditions have a positive effect on Behavioral Intention of using smart watch.

Hedonic Motivation (H5): Hedonic motivation has a positive effect on Behavioral Intention of using smart watch.

Price Value (H6): Price value has a positive effect on Behavioral Intention of using smart watch.

Habit (H7): Habit has a positive influence on Behavioral Intention of using smart watch.

Behavioral Intention (H8): Behavioral Intention has a positive effect on user's behavior of using smart watch.

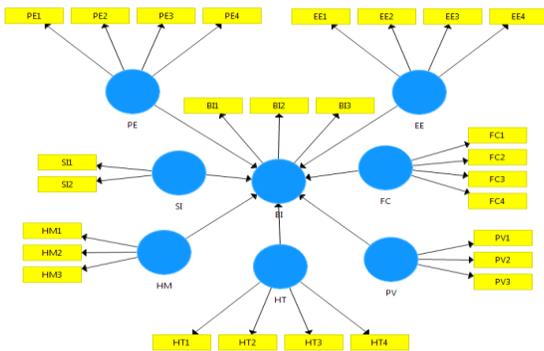


Figure 2: Proposed Model

A. Data collection procedure

A total of 150 questionnaires (printed) were distributed among targeted group. We used G-power 3.1 software to measure the sample questionnaires. Our targeted value is 160. Questionnaires were returned with a clear response. The questionnaire consists of two sections. The first section elicited the demographic data; the second section was focused on items to measure the constructs of our research model. Sample Questionnaires make the research model significant.

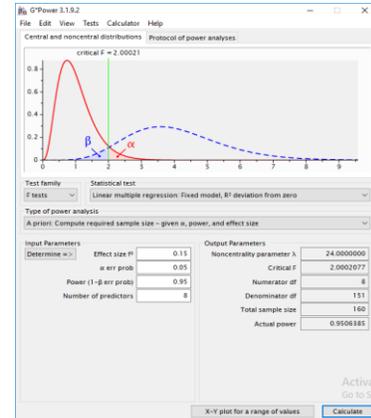


Figure 3: Targeted number of Questionnaire by G-power 3.1

B. Sample profile

The frequency of 50.7% respondents are doing exercises and 45.3% are not used to doing any exercise. 86% respondents have knowledge about smart watch and 14% have not. 76.7% know the feature about smart watch, 23.3% respondents don't know about its feature. 19.3% people purchase smart watch before and 80.7% do not purchase these devices. 82.7% respondents want to use it. 54% respondents think that the price of smart watch in Bangladesh is affordable for them and 46% think that the price is not affordable. If the price is belongs to them then 78% respondents are interested to buy smart watch.

C. Demographic information

Table 1: Statistics

N	Age	Gender	Exercise	Knowledge	Feature	Purchase	Use	Function	Price	Purchase 2
Valid	101	150	144	150	150	150	149	138	150	150
Missing	49	0	6	0	0	0	1	12	0	0

D. Data analysis strategy

We used the SmartPLS 3.0 software (Ringle et al. 2015) to analyze the research model. We tested the measurement model (validity and reliability of the measures) following

the recommended two-stage analytical procedures by Anderson and Gerbing (1988), followed by an examination of the structural model (testing the hypothesized relationship) (see Hair et al., 2014; Alzahrani et al. 2016). A bootstrapping method was used to test the significance of the path coefficients and the loadings (Hair et al., 2014).

IV. EXPERIMENTAL SETUP AND RESULT

A. Measurement Model

We need to examine two type of validity to assess the measurement model. The convergent validity and then the discriminant validity. The convergent validity of the measurement is usually ascertained by average variance extracted and also the composite reliability (Gholami et al., 2013). The composite reliabilities were all higher than 0.7 and the AVE were also higher than 0.5 as suggested. The discriminant validity of the measures (the degree to which items differentiate among constructs or measure distinct concepts) was examined by following the Fornell and Larcker (1981) criterion of comparing the correlations between constructs and the square root of the average variance extracted for that construct. All the values on the diagonals were greater than the corresponding row and column values indicating the measures were discriminant.

Table 1: Convergent Reliability

	Composite Reliability	Average Variance Extracted (AVE)
B		0.707
I	0.879	
E		0.610
E	0.862	
F		0.544
C	0.825	
H		0.662
M	0.850	
H		0.609
T	0.862	
P		0.654
E	0.883	
P		0.607
V	0.822	
SI		0.888
SI	0.941	

Table 2: Discriminate Validity

E	0.	0.						
E	0.324	0.781						
F	0.	0.	0.					
C	0.392	0.506	0.737					
H	0.	0.	0.	0.				
M	0.556	0.451	0.495	0.814				
H	0.	0.	0.	0.	0.			
T	0.652	0.173	0.277	0.427	0.780			
P	0.	0.	0.	0.	0.	0.		
E	0.533	0.216	0.375	0.435	0.493	0.809		
P	0.	0.	0.	0.	0.	0.	0.	
V	0.292	0.104	0.190	0.300	0.261	0.309	0.779	
S	0.	0.	0.	0.	0.	0.	0.	0.
I	0.413	0.181	0.419	0.352	0.466	0.372	0.179	0.943

Table 3: Structural model result

Relationship	Path coefficient	P-value	T-value	Result
EE-> BI	0.086	0.180	1.343	Not Supported
FC-> BI	0.035	0.748	0.321	Not Supported
HM-> BI	0.221	0.009	2.607	Supported
HT-> BI	0.421	0.000	4.801	Supported
PE-> BI	0.171	0.064	1.855	Supported
PV-> BI	0.040	0.550	0.598	Not Supported
SI-> BI	0.038	0.605	0.518	Not Supported

We used bootstrapping method for structural model. Hair et al. (2014) suggested looking at the R², beta and the corresponding t-values. The significance level of each path coefficient measures the significance of the hypothesis. From table 4, we can see the relationship between HM ($\beta=0.009$, $p < 0.05$), PE ($\beta=0.064$, $p < 0.05$) and HT ($\beta=0.000$, $p < 0.05$) on BI are significant which indicate H5, H1 and H7 are supported. Here, H7 are strongly significant on BI. Overall, our result indicates 55% of the variance associated with Behavioral Intension accounted for by seven variables.

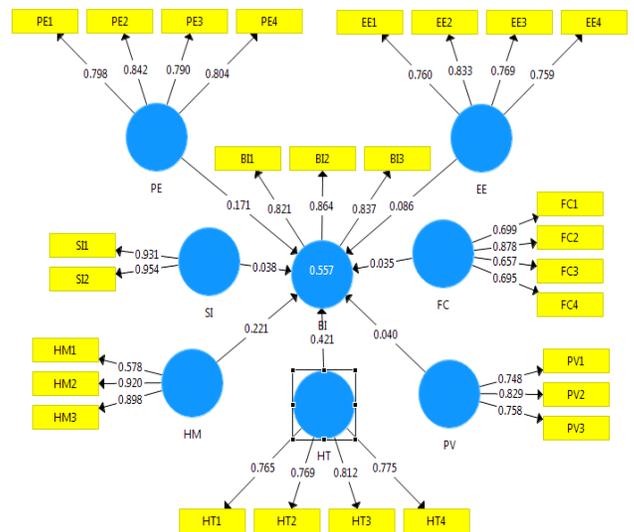


Figure 6: Our Proposed Structural model with result

V. DISCUSSION

These study investigated technology acceptance of wearable devices focused on smart watch. The paper's aim is influencing customer specially of Bangladesh to use smart watch. The result of the present study suggests that our hypothesis H1, H5, H7 are supported. H2, H3, H4, H6, H8 are not supported.

The significant impact of Performance Expectancy on Behavioral Intension indicates the degree to which an individual believes that using the system will help him or

her to gain proper information. Result of H7 reflects strong influence on Behavioral Intention .That means Habit has the strongest effect on Behavioral Intention. If people have the habit to use smart watch then they will be more influenced to use it. The Behavioral Intention will be increased if the performance expectancy, hedonic motivation and habit increase. Our research goal is identifying the problem why people of Bangladesh are not so much familiar to smart watch and our aim is to influence them to use technology device. We research about it and we found three important factor that has a clear relationship with Behavioral Intention.

VI. CONCLUSION

A. Limitation

Our targeted sample was limited and they are maximum undergraduate student from one university. In case of large sample size the result might be differed. Our data is collected from the student of software engineering which is a technological subject. The result could be different in case of business administration, social sciences cases. Consumer's perception might change over time, so the smart watch company concern is required. We like to work with more samples in future. Overcoming all these limitations of this study can produce more flawless research contribution.

B. Future Research

With the integrated model named UTAUT2, We propose a theory for consumer's use behavior of smart watch in Bangladesh. The result of our study showed that three independent variables affect the behavior intention of smart watch. It means Performance Expectancy, Hedonic Motivation and Habit are found strong predictors of Behavioral Intention. In other side, Behavioral Intention of using smart watch among the people of Bangladesh influenced by Habit. Our proposed model is empirically tested and contributed to a nascent body of technology acceptance and used people motivation of technology used. Further research is expected to expand research other country to examine the Behavioral Intention of Smart watch or other technology device.

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