

## Modeling the Behavioural Intention of Broadband Technology Usage among Teenagers: Application of Utaut Model

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**Abstract:** Teenagers in any society are fond of using the internet services on the mobile devices in lieu of personal computer, thus affect their behavioural intention in using broadband technology. Studies on the factors that affect the behavioural intention of teenagers towards the usage of broadband technology have been received less attention. This research proposes the model for behavioural intention of broadband technology usage among the teenagers by adapting unified theory of acceptance and use of technology model. A quantitative survey approach was employed by engaging 1,730 teenagers who are secondary school students in the Northern region of Malaysia. The result reveals that performance expectancy, effort expectancy, social influence and compatibility are the significant factors to achieve behavioural intention of usage of broadband technology among the teenagers. The use of presented model would help in determining the behaviour of teenagers towards the use of broadband technology which can affect their academic performance.

**Key words:** Broadband technology, user behavioural intention, technology among teenagers, UTAUT model, Malaysia

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### INTRODUCTION

It has been argued that a successful academic curriculum should embed internet access in order to ease and assist youth in their learning approach (Luan *et al.*, 2008; Ramayah and Jaafar, 2008). Internet accessibility in the classroom does not only affect the learning in youth, but also giving values to the tutors' proficient and skills. The study of Luan *et al.* (2008) stressed that among the successful factors that led to the impacted academic delivery by the teachers in Malaysia is the compulsory inclusion of minimum of one Information Technology (IT) course during teachers' training programmes. This implies that much have been put in place to ensure that benefits of incorporating internet usage in the education of teenagers are at optimise level. On the other hand, the use of internet in learning has gone beyond the use of low or narrowband internet due to the innovation in the learning techniques. Some of the academic activities in the classroom today, need to be solved through the use of innovative technology such as virtual reality and augmented reality applications. Thus, there is need to engage in the use of high speed internet known as broadband technology that is capable of downloading and uploading data at high speed and gives convenience to the users.

The researchers have stressed that there are variations in the definitions of broadband which is as a result of belief and philosophy of individual and organization (Wee, 1999). Thus, broadband is considered as the technology that provides consumers fast and always-on access to new applications, services and content with real lifestyle and productivity benefits (Sawyer *et al.*, 2003; Muraina *et al.*, 2013a). Studies have revealed that broadband technologies can be grouped into two different types which are wireline broadband and wireless broadband technologies. Wireline broadband technology is comprised of Digital Subscriber Line (DSL), cable modem, power line and fibre optics. On the other hand, wireless broadband technology is regarded as Worldwide Interoperability for Microwave access (WiMax), satellite and Wireless Fidelity (Wi-Fi) (Muraina *et al.*, 2013b). This is why the International Telecommunication Union (ITU) recommendation 1.113 of standardization sector described broadband as the transmission capacity that is faster than primary rate Integrated Services Digital Network (ISDN) at 1.5 or 2.0 megabits per second.

Now a days, many of broadband applications require the minimum speed rate of 50 Mbit sec<sup>-1</sup> towards their functionality which is most commonly found among the industrial workers or working class due to the cost of

acquiring the high speed internet (Yoshimoto, 2005; Vetter, 2006; Wathen and Harris, 2007). Madden *et al.* (2013) argued that one out of four teenagers in United State of America (USA) always connect to the internet through their cell phone in lieu of other devices, like desktop or laptop computer. This implies that teenagers found joy in using the internet connectivity to play games and chatting with their peer group which is an act of forming a lackadaisical behaviour towards the usage of broadband technology. Whereas, broadband technology is believed to be useful and benefited beyond the socio factors but also economic and manpower aided factors calling for strengthen the behavioural intention of teenagers towards the use of broadband technology (Mack and Faggian, 2013). Meanwhile, previous studies on the broadband technology usage have not been extended to the search of factors that affect the behavioural intention of teenagers. Hence, there is need to model the factors that influence the behavioural intention of broadband technology usage among teenagers which is the focus of this research. In order word, behavioural intention is seen as a measure of the strength of one's intention to perform a specified task and find its source from the theory of reasoned action (Ajzen, 1991).

In addition, this research adapts Unified Theory of Acceptance and Use of Technology (UTAUT) to empirically model the behavioural intention of broadband technology usage among teenagers due to its higher variance explanation while compare with other models in the Information Systems (IS) research (Venkatesh *et al.*, 2003, 2011, 2012). The UTAUT model is based on the eight models in the domain of Information Technology (IT) which were conceptually and empirically integrated and focus on the unification of users towards acceptance and usage of technology (Venkatesh *et al.*, 2003). The eight models under UTAUT are Technology Acceptance Model (TAM), Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), Motivational Model (MM), Combined TAM and TPB (C-TAM-TPB), Diffusion of Innovation (DOI), Model of PC Utilization (MPCU) and Social Cognitive Theory (SCT). Moreover, Partial Least Square (PLS) Structural Equation Model (SEM) is used to validate the proposed model for behavioural intention of broadband technology usage among teenagers as a result of its efficiency to simplify the multivariate complex model as well as handling non normal distributed data (Haenlein and Kaplan, 2004; Hair *et al.*, 2011). Besides, Hair *et al.* (2011) stresses that PLS-SEM is worth of using in the multivariate model because it bounds to bring additional value to the explained variance of dependent variable (broadband behavioural intention).

## MATERIALS AND METHODS

**Conceptual issue:** The increase in the use of ICT has led to the usage of broadband technology in many of public and private enterprises to a climax level. This is as a result of the infinite benefits that broadband technology provides such as connection to the outside world. On the contrary, researchers have stressed that the benefits of broadband technology is not limited to the government or private offices but also, the teenagers who are part of the constituents of the society (Kandasamy and Shah, 2013; Yusop and Sumari, 2013; Luan *et al.*, 2008). Luan *et al.* (2008) argued that integration of broadband usage to the activities of youth and teenagers in the context of education provides avenue to active learning and genuine environment. This shows that broadband technology is not self-dependent but a network that requires efficient utilization from the people.

However, studies have shown that the domain of secondary education which enjoys patronage of youth or teenagers have been affected by the broadband access (Christopher and Gorretti, 2012). Many of the youths that have computers do not have internet connectivity either dial-up or broadband. This serves as deterrent to the teenager's academic performance and their future ambitions. On the contrary, the present advancement in ICT and reduction in the price of computer make the sources of information to become affordable to the teenagers through the acquisition and use of broadband technology (Lee *et al.*, 2012; Wee, 1999).

In the context of Malaysia, the joint proposal of the Ministry of Education (MOE) and the Malaysian Institute of Microelectronics System (MIMOS) formulate policy called, Computer-In-Education (CIE) so as to introduce computer literacy into the teaching curriculum. Thus, computer has become a subordinate to the life of students in their daily activities. Despite the fact that there are great efforts to add ICT application into the activities of students, the level of usage of technology is considering low. This is as a result of lack of access to the broadband technology, cost of PC, low motivation of students and lack of availability of computer laboratory in the students' schools (Christopher and Gorretti, 2012; Raman, 2011; Ramayah and Jaafar, 2008; Wee, 1999).

On the contrary, researchers have stressed that prominent factor that should be considered for positively adjusted the behavioural intention of teenagers towards the usage of technology devices are perceived usefulness, perceived ease of use and subjective norm (Raman, 2011; Ramayah and Jaafar, 2008; Davis *et al.*, 1989). In other words, those factors have been referred to as performance expectancy, effort expectancy and

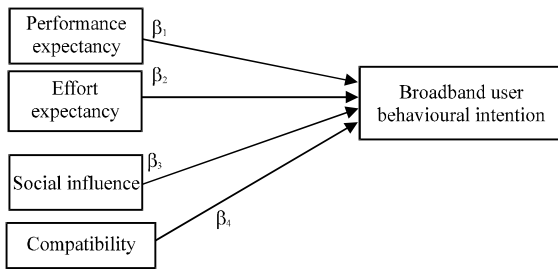


Fig. 1: Research model

social influence by Venkatesh *et al.* (2003). Though, factors that influence the use of broadband technology or ICT among the teenagers especially in their education career have been suggested by the previous researchers (Raman, 2011; Ramayah and Jaafar, 2008; Davis *et al.*, 1989; Ajzen, 1991). However, previous studies have stressed that accessibility and usage rate among the youth or teenagers are not equal due to the existence of digital divide in the level of education, income disparity, gender, race and geographical location (Luan *et al.*, 2008; Norris, 2001; Matheson and Zanna, 1990).

#### Proposed research model and hypotheses formulation:

The proposed research model in this research has its bases from the UTAUT model as a result of its ability to explain variation in the acceptance and usage of technology. Thus, this research adapts some of its constructs while compatibility is added based on the stands of some researchers in order to model the factors that influence the positive behavioural intention towards the use of broadband technology among the teenagers and shown in Fig. 1.

The performance expectancy is described as the degree to which an individual believes that using the system or device assist to achieve the job performance (Venkatesh *et al.*, 2003). Many researchers have agreed to the outcome derived from some studies conducted using UTAUT model and concluded that effort expectancy was found to be positively related to behavioural intention towards usage of ICT devices (Park *et al.*, 2007; Lm *et al.*, 2011). Moreover, effort expectancy as one of the exogenous constructs in UTAUT model can be described as the degree of ease of use of information system or devices felt by a user. Besides, Muraina *et al.* (2012), Taylor and Todd (1995) emphasised that effort expectancy influences the behavioural intention towards acceptance and usage of information system devices more than one time. In addition, the degree to which an individual user feels that other people believe that he or she should be using the information system is regarded as social influence (Venkatesh *et al.*, 2003). Thus, social

influence posted a significantly influence on the behavioural intention towards the ICT from time to time (AlAwadhi and and Morris, 2008).

Compatibility is the extent by which innovation is envisaged as being consistent with the values, needs and experiences of future adopters or users (Moore and Benbasat, 1991). The opinion of Rogers (1975) towards compatibility is the degree to which an innovation is perceived to be consistent with the current values, past experiences and needs of the future adopters. In other words, Rogers (2003) established that compatibility is the degree by which individual that involved in online transactions through the use of mobile commerce feels consistent with the future users of the existing values, beliefs, initial knowledge and current needs. Indeed, compatibility is considered as one of the important determinant's factors of the behavioural intention to towards the use of devices or technologies (Wu and Wang, 2005). Hence, the following hypotheses are formulated based on the previous studies in order to model the factors like performance expectancy, effort expectancy, social influence and compatibility towards behavioural intention of broadband technology usage among teenagers (Appendix 1):

- H<sub>1</sub>: Performance expectancy relates to the broadband technology user behavioural intention among teenagers
- H<sub>2</sub>: Effort expectancy relates to the broadband technology user behavioural intention among teenagers
- H<sub>3</sub>: Social influence relates to the broadband technology user behavioural intention among teenagers
- H<sub>4</sub>: Compatibility relates to the broadband technology user behavioural intention among teenagers

All the four constructs that were used in this research for modeling the behavioural intention of broadband technology usage among teenagers were measured by using 5 point likert scale survey questionnaire, ranging from strongly disagree (1) to strongly agree (5). These were built on UTAUT measurement items while some items that used to measure performance expectancy, effort expectancy and social influence were adapted from Venkatesh *et al.* (2003, 2011, 2012), Abdulwahab and Zulkhairi (2012). Besides, compatibility construct was measured by adapting items from Moore and Benbasat (1991) and Rogers (2003). Moreover, the research was conducted in the northern region of Malaysia with 1,820

samples who are mainly secondary school students. The samples were invited into the internet centres located at strategic places in their respective constituencies for the distribution and collation of questionnaires. Meanwhile, only 1,730 respondents were eventually selected for administering the survey questionnaires through fish-bowl style of simple random sampling. The data collection took exactly 9 weeks as there were early and late respondents. Prior to the selection of the 1,730 respondents in the data collection exercise, we explained the meaning of broadband technology to the selected respondents and found most of them have been using broadband technology at different degree at their school, home, cybercafé or internet centres. Moreover, 1,689 questionnaires were returned after administering of the questionnaires by the respondents, represented response rate of 97.63%. Hence, the non response bias test was conducted and revealed that there is no difference in demographics between respondents and non-respondents.

## RESULTS

This study produces the analysis and result of the collected data from the respondents who are teenage group in the society towards modelling of their behavioural intention on broadband technology usage. These were achieved through data preparation and PLS-SEM approach.

**Data preparation:** Prior to the data analysis using PLS-SEM for the collected data, we ensured that the data was properly screened for the missing values by using SPSS version 20. The analysis performed routine check on the outliers which can distort or turn the outcome of the research to unacceptable issue. Thus, the data passed both error and interesting outliers while 36 cases failed to certify influential outliers, leading to discarding of 36 cases from 1,689 returned questionnaires while 1,653 was used in the subsequent analysis. Influential outliers' cases are recommended to remove from the entire cases for the multivariate analysis due to its ability to affect model fitness (Aguinis *et al.*, 2013). Moreover, the test of normality was performed and found that dataset was not normal, calling for the use of PLS-SEM as suggested by Hair *et al.* (2011, 2013). The test of multicollinearity was conduct by observing values of tolerance and Variance Inflation Factor (VIF). The results showed that all the tolerance values are above 0.10 and VIF values are <10, showing the data's fulfilment of multicollinearity conditions.

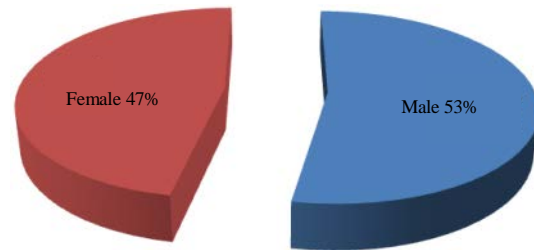


Fig. 2: Gender of respondents

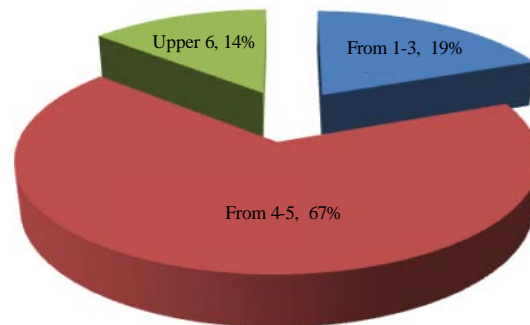


Fig. 3: Academic status of respondents

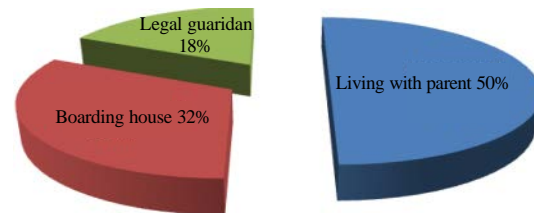


Fig. 4: Living location of respondents during academic session

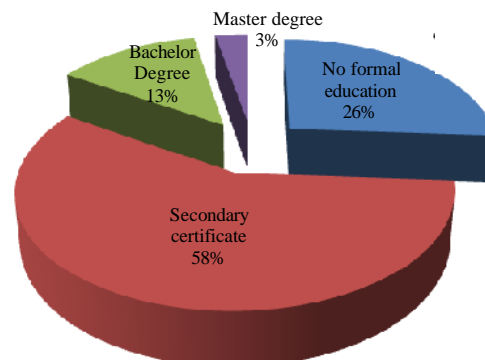


Fig. 5: Repondent's parent's education background

**Profile of the respondents:** As shown in Fig. 2, 52.6% of the valid respondents were male students while 47.4% were female students with the average age of 16 year.

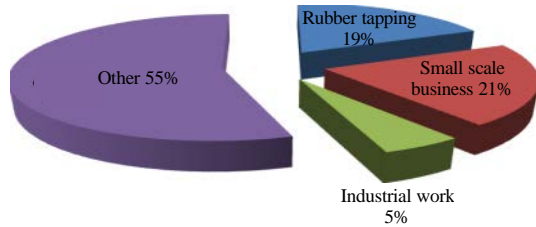


Fig. 6: Respondent's parent's occupation

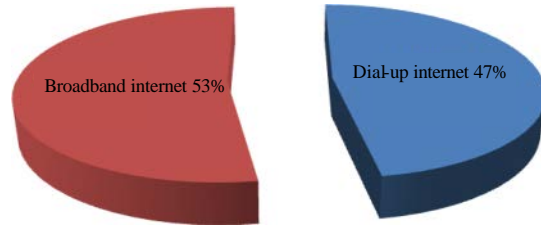


Fig. 7: Type of internet using by respondents

Therefore, the data gathered shows that 68.4% of the respondents were in form 4-5 during the research, 18.4% in form 1-3 and 13.2% in upper 6 of the secondary school education as represented in Fig. 3. This implies that the respondents were cut across the teenage groups and fits to be used as the unit of analysis in the research.

Moreover, Fig. 4 shows that 50% of the respondents confirmed that they are living with their parents during the academic session while 32% lived in the school's hostels and 18% live with the legal guardians. Figure 5 shows that 57.9% of the respondents claimed that their parents' educational status is secondary school education, 13.2% bachelor degree, 2.6% master degree while 26.3% of the respondents' parents do not have a formal educational background.

Besides, 18.4% of the respondents' parents engage in rubber tapping activity as a source of income, 21.1% engage in small scale businesses, 5.3% work in industry and 55.3% engage in other activities as revealed in Fig. 6. In addition, 52.6% who are majority of the respondents confirmed that they do not have computer at home, while 65.8% do not have internet connectivity at home due to the high starting cost, lack of equipment and limited coverage of internet in their respective living locations. Meanwhile, all the respondents were found familiar with the usage of broadband either at home, school, internet centres or cybercafé. On the other hands, 47.4% of the respondents are still using dial-up internet as revealed in Fig. 7 while 52.6% are using broadband internet. This is an indication of needs to model factors that could influential broadband user behavioural intention among teenagers.

**Partial Least Square approach:** Partial Least Square (PLS) is used to analyse the factors that can influence the

Table 1: Average variance extracted and composite reliability

Constructs	AVE	CR	R <sup>2</sup>	CA	Communality
<b>Broadband user</b>					
Behavioural intention	0.5422	0.8209	0.559	0.7265	0.5422
Compatibility	0.5821	0.8476	-	0.7696	0.5821
Effort expectancy	0.5553	0.8510	-	0.7946	0.5553
Performance expectancy	0.5636	0.8329	-	0.7310	0.5636
Social influence	0.7393	0.8500	-	0.7503	0.7393

Table 2: Outer loading

Constructs	BUBI	CP	EE	PE	SI
BUBI1	0.7832	-	-	-	-
BUBI2	0.7292	-	-	-	-
BUBI3	0.9249	-	-	-	-
BUBI4	0.7598	-	-	-	-
CP1	-	0.7668	-	-	-
CP2	-	0.7405	-	-	-
CP3	-	0.7316	-	-	-
CP4	-	0.8105	-	-	-
EE1	-	-	0.7988	-	-
EE2	-	-	0.8643	-	-
EE3	-	-	0.7955	-	-
EE4	-	-	0.8204	-	-
EE5	-	-	0.8851	-	-
PE1	-	-	-	0.7467	-
PE2	-	-	-	0.8879	-
PE3	-	-	-	0.8565	-
PE5	-	-	-	0.8585	-
SI2	-	-	-	-	0.8304
SI4	-	-	-	-	0.8883

model of behavioural intention of broadband technology usage among the teenagers as shown in Fig. 1. The use of PLS-SEM for the research objective ensures that measurement model phase in the PLS analysis assesses reliability and validity of the constructs to model the behavioural intention of broadband technology usage among the teenagers as recommended by Chin (2003). Consequently, the structural model examines relationship between the exogenous and endogenous variables and confirms the set hypotheses.

**Measurement model:** The results of measurement model are shown in Table 1-4, representing the reliability and validity of the constructs that used to model behavioural intention of usage of broadband technology among teenagers.

From Table 1, the internal consistency of all the constructs in the model shown in Fig. 1 ranges from 0.7265-0.7946 which is acceptable and revealed that the scales used in the instrument were reliable. The Average Variance Extracted (AVE) of all the construct are >0.50 threshold value, meaning that the constructs passed the convergent validity based on Fornell and Larcker (1981). This implies that constructs like compatibility, effort expectancy, performance expectancy and social influence are capable of modeling the behavioural intention of users of broadband technology among the teenager.

Table 3: Discriminant validity (Fomell-Larker criterion)

Constructs	BUBI	CP	EE	PE	SI
BUBI	0.7363	-	-	-	-
CP	0.6984	0.7630	-	-	-
EE	0.5917	0.5582	0.7452	-	-
PE	0.4831	0.5207	0.6913	0.7507	-
SI	0.3817	0.4528	0.1516	0.2183	0.8598

Table 4: Discriminant validity (cross loading)

Constructs	BUBI	CP	EE	PE	SI
BUBI1	0.5832	0.4829	-0.0267	-0.0664	0.3581
BUBI2	0.6292	0.3778	0.1544	0.0759	0.0780
BUBI3	0.9249	0.6995	0.7065	0.5787	0.2579
BUBI4	0.7598	0.4481	0.5784	0.5231	0.4207
CP1	0.4781	0.7668	0.3850	0.1625	0.3753
CP2	0.4577	0.7405	0.1872	0.2414	0.2022
CP3	0.3674	0.7316	0.3810	0.3826	0.2013
CP4	0.7160	0.8105	0.6397	0.6715	0.5001
EE1	0.0049	0.2661	0.2988	0.0387	-0.2105
EE2	0.5114	0.3757	0.8643	0.4978	0.1127
EE3	0.3330	0.3717	0.6955	0.5975	0.1066
EE4	0.4436	0.3932	0.8204	0.4632	0.0301
EE5	0.5997	0.6413	0.8851	0.7105	0.2210
PE1	0.2282	0.4723	0.2888	0.5467	0.0148
PE2	0.4786	0.5532	0.6503	0.8879	0.3227
PE3	0.4168	0.3161	0.6111	0.8565	0.1087
PE5	0.2512	0.2148	0.4353	0.6585	0.1232
SI2	0.2947	0.3626	0.1796	0.2121	0.8304
SI4	0.3574	0.4133	0.0904	0.1686	0.8883

Table 5: Significance of the path coefficients

Hypotheses	Path	Relationships	Original Sample	t-statistics	Remarks
H <sub>1</sub>	$\beta_1$	PE->BUBI	0.3216	2.323*	Supported
H <sub>2</sub>	$\beta_2$	EE->BUBI	0.3149	2.133*	Supported
H <sub>3</sub>	$\beta_3$	SI->BUBI	0.4223	2.6526*	Supported
H <sub>4</sub>	$\beta_4$	CP->BUBI	0.4705	2.841*	Supported

Degree of freedom: 5,000; \*significant at  $p < 0.05$  (2-tailed test)

Table 6: Effect size of the model

Correlation between Dimension	Path coefficients	Effect size ( $f^2$ )	Remarks
PE->BUBI	0.3216	0.352	Large
EE->BUBI	0.3149	0.415	Large
SI->BUBI	0.4223	0.295	Medium
CP->BUBI	0.4705	0.364	Large

Moreover, it shows in Table 2 that the indicator loading of all the items are above 0.70 benchmark value which indicate that the loading items supported internal consistency. Therefore, the proposed construct for modeling the behavioural intention of broadband technology usage among teenagers are reliable. Besides that, the square root of AVE of each construct in the model is higher than the corresponding constructs in the column of discriminant validity using Fornell-Larcker criterion as shown in Table 3.

Indeed, the discriminant validity through the cross-loading approach was conducted on the collected data and revealed in Table 4 that all the values of items in each construct are higher than their corresponding items. Hence, all the rules of measurement model are achieved and sufficient to proceed for the assessment of structural

model which further strengthen modeling of behavioural intention of broadband technology usage among teenagers.

**Structural model:** The structural model was assessed by using the bootstrapping technique. Hair *et al.* (2011) described bootstrapping technique as the use of repeated which obtain replacement from the main sample in order to achieve the standard error for hypothesis testing. Thus, this research used bootstrapping method through the Smart-PLS 2.0 with 5,000 iterations for 1,653 cases. The obtained results show that all the path coefficients in our model are significant and supported the set hypotheses as shown in Table 5. Indeed, the model for the behavioural intention of broadband technology usage is fit and relevant among the teenagers with the variance explanation ( $R^2$ ) of 0.559 (Table 1).

Furthermore, the role of each of the exogenous variables to model the behavioural intention of broadband technology usage among teenagers was investigated as shown in Table 6. This is achieved by examined the effect size ( $f^2$ ) that estimates the impact of the exogenous variables on the endogenous variable. The argument of Hair *et al.* (2013) and Chin (2010) buttress that the effect size of exogenous variable expresses their impacts or roles played in establishing the endogenous variable. Therefore, it becomes necessary to examine the effect size of construct to model behavioural intention of broadband technology usage among teenagers. Precisely, the  $f^2$  for the research model was assessed by removing and replacing a particular exogenous variable, so as to investigate the roles play by the exogenous variables towards achieving model for broadband technology user behavioural intention among youths and mathematically shown in Eq. 1:

$$f^2 = \frac{R^2_{\text{included}} - R^2_{\text{excluded}}}{1 - R^2_{\text{included}}} \quad (1)$$

Where:

$f^2$  = The effect size of  $R^2$  when a particular exogenous variable is present and omitted in the model

$R^2_{\text{included}}$  = The value of  $R^2$  when all the exogenous variables are existed

$R^2_{\text{excluded}}$  = The value of  $R^2$  when a particular exogenous variable is omitted from the model

Hence, the effect sizes of PE->BUBI, EE->BUBI, SI->UBI and CP->BUBI are shown in Table 6. Meanwhile, the effect sizes are categorised based on the recommended benchmark values of Chin (2010) as 0.02 (small), 0.15 (medium) and 0.35 (large). The results in

Table 6 reveal that effect of PE->BUBI, EE->BUBI and CP->BUBI are large while SI->BUBI is medium.

## DISCUSSION

This research adapts the use of UTAUT model in modeling the behavioural intention of broadband technology usage among the teenagers as a result of reviewing of previous studies. The research identifies the Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI) and Compatibility (CP) as the factors that could be used to model the behavioural intention of broadband technology usage among teenagers. The results in Table 5 and Fig. 8 reveal that there is relationship between Performance Expectancy (PE) and the Broadband User Behavioural Intention (BUBI) among teenagers. The result implies that believe of individual teenager that using broadband technology can assist in solving their academic activities will affect their behaviour towards using the technology. Besides, teenagers are found to be soft-minded fellows and the moment they are convinced that broadband technology can help them in solving their academic issues, especially when they would have to be online in solving the academic problems their minds become stronger in using the broadband technology. Indeed, the result of the effect of PE in modeling BUBI is large as shown in Table 6 which indicates that PE should be considered as modeling unit of behavioural intention of broadband technology usage among the teenager.

Furthermore, the Effort Expectancy (EE) which is the degree of ease attached to the usage of broadband technology was hypothesised and supported from the result in Table 5. The implication of this is that the more the ease of use of broadband technology among the teenagers, the more their positive intention towards the use of broadband. As shown in Table 6, effort expectancy is one of the factors to model the behavioural intention of broadband technology among the teenagers since it has large effect size. Moreover, the research further shows that the relationship between Social Influence (SI) and Broadband User Behavioural Intention (BUBI) of broadband technology among the teenagers is supported the Hypothesis ( $H_3$ ) with medium effect size. This indicates that achieving the model to show directions of using the broadband technology among the teenagers could be fluctuated as the social influence bounds to determine its achievement. The peer group are delicate elements of the society in terms of decision making. They are flexible and can be affected by whatever their colleagues are practising other than the directives of their

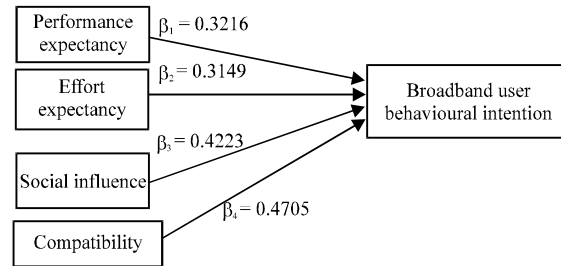


Fig. 8: Final model

parents. Hence, the social influence should be handled as a contributing factor to model the behavioural intention of broadband technology usage among teenager. Besides, Compatibility (CP) is related to Broadband User Behavioural Intention (BUBI) of broadband technology among the teenagers. It means that compatibility of the broadband technology with the activities of teenagers will prosper their behavioural intention in using the technology. Indeed, the effect of relationship between Compatibility (CP) and broadband user behavioural intention is large meaning that it constitutes to the model that determines the behavioural intention of usage of broadband technology among the teenagers.

## CONCLUSION

This research establishes the factors for modeling the behavioural intention of usage of broadband technology among the teenagers by adapting UTAUT model as shown in Fig. 8 of the final model. The results were obtained by using the SmartPLS 2.0 and SPSS version 20 leading to the fact that the identified significant factors; performance expectancy, effort expectancy, social influence and compatibility. Besides, the research showed that performance expectancy, effort expectancy and compatibility had large effect size as the exogenous variables for establishing nature of broadband user behavioural intention among teenagers while social influence possesses medium effect. This implies that all the four identified significant factors are necessary to model the behavioural intention of usage of broadband technology among the teenagers since their effect sizes are large and medium. Moreover, taking the suggested factors for continuous usage of broadband technology among teenagers into consideration would assist the individual schools in achieving their objectives, thus impact the societies in transforming to the informational type. Hence, the research would be further studied in future by focusing on the implication of broadband user behavioural intention on the continuous usage of broadband technology among the teenagers.

## ACKNOWLEDGEMENT

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## APPENDIX 1

### Items used during survey

#### Performance expectancy

PE 1: Using broadband enhances my academic performance.

PE 2: Using broadband internet services helps achieving academic activities more quickly.

PE 3: Using broadband facilitates academic efficiency

PE 4: Usage of broadband would make it easier to do my work

PE 5: My frequent use of broadband would earn me competency in my work

#### Effort expectancy

EE 1: My interaction with the broadband device would be clear and understandable.

EE 2: I found that broadband devices are easy to operate.

EE 3: I found broadband internet services easy to use.

EE 4: I found using facilities in broadband to be flexible.

EE 5: It would be easier for me to become skilful at using broadband internet services.

#### Social influence

SI 1: Important people in my village think I should use broadband.

SI 2: People who are important to me would want me to use broadband.

SI 3: People that use broadband in my village are more prestige.

SI 4: I would use the broadband internet if my friends use it.

SI 5: My village has supported the use of broadband.

#### Compatibility

CP 1: Using broadband is compatible with my work and life.

CP 2: Using broadband fits with the way I like to work.

CP 3: Using the broadband fits into my work style.

CP 4: Using a broadband is completely compatible with my current situation.

## REFERENCES

- Abdulwahab, L. and M.D. Zulkhairi, 2012. Modeling the determinants and gender, age and ethnicity difference in telecommunication centre acceptance. *Res. J. Inf. Technol.*, 4: 85-105.
- Aguinis, H., R.K. Gottfredson and H. Joo, 2013. Best-practice recommendations for defining, identifying and handling outliers. *Organiz. Res. Methods*, 16: 270-301.
- Ajzen, I., 1991. The theory of planned behavior. *Organiz. Behav. Hum. Decis. Process.*, 50: 179-211.
- AlAwadhi, S. and A. Morris, 2008. The use of the UTAUT model in the adoption of e-government services in Kuwait. *Proceedings of the 41st Annual Hawaii International Conference on System Sciences*, January 7-10, 2008, Waikoloa, Hawaii, pp: 219.
- Chin, W.W., 2010. How to Write Up and Report PLS Analyses. In: *Handbook of Partial Least Squares: Concepts, Methods and Application*, Vinzi, V.E., W.W. Chin, J. Henseler and H. Wang (Eds.). Springer, New York, USA., ISBN-13: 9783540328254, pp: 655-690.
- Chin, W.W., B.L. Marcolin and P.R. Newsted, 2003. A partial least squares latent variable modeling approach for measuring interaction effects: Results from a Monte Carlo simulation study and an electronic-mail emotion/adoption study. *Inform. Syst. Res.*, 14: 189-217.
- Christopher, U.O. and E.M. Gorretti, 2012. Availability and the use of computer and internet by secondary school students in Benin City, Nigeria. *Intl. J. Lib. Inf. Sci.*, 4: 16-23.
- Davis, F.D., R.P. Bagozzi and P.R. Warshaw, 1989. User acceptance of computer technology: A comparison of two theoretical models. *Manage. Sci.*, 35: 982-1003.
- Fornell, C. and D.F. Larcker, 1981. Structural equation models with unobservable variables and measurement error: Algebra and statistics. *J. Market. Res.*, 18: 382-388.
- Haenlein, M. and A.M. Kaplan, 2004. A beginner's guide to partial least squares analysis. *Understanding Stat.*, 3: 283-297.
- Hair, J.F., C.M. Ringle and M. Sarstedt, 2011. PLS-SEM: Indeed a silver bullet. *J. Market. Theor. Pract.*, 19: 139-152.
- Hair, J.F., G.T.M. Hult, C.M. Ringle and M. Sarstedt, 2013. *A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM)*. SAGE Publication, Thousand Oaks, CA., USA., ISBN-13: 978-1452217444, Pages: 328.
- Kandasamy, M. and P.M. Shah, 2013. Knowledge, attitude and use of ICT among ESL students. *GSE. J. Educ.*, 1: 185-199.
- Lee, H.S., T.G. Kim and J.Y. Choi, 2012. A study on the factors affecting smart phone application acceptance. *Proceedings of the 3rd International Conference on e-Education, e-Business, e-Management and e-Learning*, January 5-7, 2012, IACSIT Press, Singapore, pp: 27-34.
- Lim, I., S. Hong and M.S. Kang, 2011. An international comparison of technology adoption: Testing the UTAUT model. *Inform. Manage.*, 48: 1-8.
- Luan, W.S., N.S. Fung and H. Atan, 2008. Gender differences in the usage and attitudes toward the internet among student teachers in a public Malaysian university. *Am. J. Applied Sci.*, 5: 689-697.



- Mack, E. and A. Faggian, 2013. Productivity and broadband the human factor. *Intl. Reg. Sci. Rev.*, 36: 392-423.
- Madden, M., A. Lenhart, M. Duggan, S. Cortesi and U. Gasser, 2013. Teens and technology 2013. Pew Internet and American Life Project, Washington, DC.
- Matheson, K. and M.P. Zanna, 1990. Computer-mediated communications: The focus is on me. *Soc. Sci. Comput. Rev.*, 8: 1-12.
- Moore, G.C. and I. Benbasat, 1991. Development of an instrument to measure the perceptions of adopting an information technology innovation. *Inform. Syst. Res.*, 2: 192-222.
- Muraina, I.D., R.S.O. Wan and A. Azizah, 2013a. Efficacy of UTAUT model in continuation of usage of broadband in the rural areas of northern region of Malaysia. *Proceedings of International Conference on Rural ICT Development*, June 25-27, 2013, pp: 25-27.
- Muraina, I.D., S.A.W. Rozaini and A. Azizah, 2012. Conceptualising service quality and technology factor as drivers for continuous usage of broadband among rural dwellers in Malaysia. *Proceedings of 3rd International Conference on Network Applications, Protocols and Services*, September 1, 2012, Universiti Utara Malaysia, Malaysia, pp: 19-21.
- Muraina, I.D., W.R.B.S. Osman and A. Ahmad, 2013b. Investigating the readiness of broadband continuous usage among rural dwellers in the northern region of Malaysia. *Intl. J. Comput. Commun. Eng.*, 2: 679-683.
- Norris, P., 2001. *Digital Divide: Civic Engagement, Information Poverty and the Internet Worldwide*. Cambridge University Press, Cambridge, United Kingdom, Pages: 183.
- Park, J.K., S.J. Yang and X. Lehto, 2007. Adoption of mobile technology for Chinese consumers. *J. Electron. Commerce Res.*, 8: 196-206.
- Raman, A., 2011. The usage of technology among education students in university Utara Malaysia: An application of extended technology acceptance model. *Int. J. Edu. Dev. Inform. Comm. Tech.*, 7: 4-17.
- Ramayah, T. and M. Jaafar, 2008. Technology usage amongst construction students: The mediating role of gender. *J. Constr. Developing Countries*, 13: 63-77.
- Rogers, E.M., 1975. *The Diffusion of Innovations*. 3rd Edn., Free Press, New York.
- Rogers, E.M., 2003. *Diffusion of Innovations*. 5th Edn., Simon and Schuster, New York, USA., ISBN-13: 9780743258234, Pages: 576.
- Sawyer S., J.P. Allen and H. Lee, 2003. Broadband and mobile opportunities: A socio-technical perspective. *J. Inf. Technol.*, 18: 121-136.
- Taylor, S. and P.A. Todd, 1995. Understanding information technology usage: A test of competing models. *Inform. Syst. Res.*, 6: 144-176.
- Venkatesh, V., J.Y. Thong and X. Xu, 2012. Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Q.*, 36: 157-178.
- Venkatesh, V., M.G. Morris, G.B. Davis and F.D. Davis, 2003. User acceptance of information technology: Toward a unified view. *MIS Q.*, 27: 425-478.
- Venkatesh, V., T. Sykes and X. Zhang, 2011. Just what the doctor ordered: A revised UTAUT for EMR system adoption and use by doctors. *Proceedings of the 44th Hawaii International Conference on System Sciences*, January 4-7, 2011, Kauai, HI., USA., pp: 1-10.
- Vetter, P., 2006. The role of wireline access technology to bridge the digital divide. *MUSE IST Workshop*, Brussels, Belgium.
- Wathen, C.N. and R.M. Harris, 2007. I try to take care of it myself: How rural women search for health information. *Qual. Health Res.*, 17: 639-651.
- Wee, S.H., 1999. Internet use amongst secondary school students in Kuala Lumpur, Malaysia. *Malaysian J. Lib. Inf. Sci.*, 4: 1-20.
- Wu, J.H. and S.C. Wang, 2005. What drives mobile commerce? An empirical evaluation of the revised technology acceptance model. *Inform. Manage.*, 42: 719-729.
- Yoshimoto, N., 2005. NTT's deployment of FTTH services and future developments. *FTTH Council Conference*, Las Vegas., USA.
- Yusop, F.D. and M. Sumari, 2013. The use of social media technologies among Malaysian Youth. *Proc. Soc. Behav. Sci.*, 103: 1204-1209.