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# An Empirical Study of Facebook Adoption among Young Adults in a Northeastern State of India: Validation of Extended Technology Acceptance Model (TAM)

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**Abstract.** The purpose of this paper is to explore the adoption of a social networking site called Facebook in context of a landlocked and one of the least populous states in India. The adoption of Facebook is examined by considering technology acceptance model (TAM) as a basic model along with additional constructs such as subjective norm and perceived trust in it. The data were collected from 202 young adults from couple of degree level colleges from one of the least populous and landlocked states called Sikkim in India. The empirical outcomes provided the positive significant connections between nine hypothesised relationships among seven constructs. The article also discusses the resulting theoretical contributions for Facebook adoption and discusses practical implications of Facebook adoption for Facebook providers and users.

**Keywords:** Facebook, Adoption, Usage, Young Adults, India, TAM

## 1 Introduction

People's interest in social networking sites has considerably increased in recent years [1]. Social networking sites such as Facebook are virtual communities, which allow people to connect and interact with each other on a specific subject or to just hang out "together" online [2]. The prior research has shown that social network site usage is not randomly distributed among Internet users, and that user's demographic background and socio-economic status can play a significant role in the specific social network site adoption [3].

Social media sites, such as Facebook and Twitter, can expedite direct, one-to-many communication with a large audience at a little to no cost [4]. The research indicates that more than 500 million people spend about 700 billion minutes on Facebook every month and half of them log into their account in a given day with an average user has about 130 contacts [1]. As far as India is concerned, it is the second biggest market

for Facebook after the US. Facebook has 125 million average users with the number of mobile users stands at 114 million. On a daily basis, 59 million users in India access Facebook and 53 million are accessing it through mobile phones [5].

The adoption of Facebook across the young adults constitutes a natural experiment providing insight into how technological innovations spread across to the young population [4] particularly in the relatively trailing states in India as such social media sites allow the young generations to get connected to the world and to get updated to what is happening in the world without putting in much effort to know them. The adoption of Facebook by young adults also allows us to understand the degree to which the people want and intend to get connected to all those they are acquainted with and are available online. It also gives the idea about the people's interest toward following certain other public figures, brands, organisations for which they are interested in and want to follow their updates by liking them.

Realising that such a large number of people use Facebook in India and only a few research studies (e.g., [6,7]) have attempted to analyse the adoption of this social networking site in Indian context, it is timely and relevant to explore the adoption of Facebook among young adults in one of the least populous and landlocked states in India called Sikkim located in the Himalayan mountains.

## 2 Theory Development and Research Hypotheses

This section will provide overview of the proposed research model and the statements for hypotheses based on the relationships between seven constructs.

### 2.1 Overview of the Proposed Research Model

Our theoretical development will follow up and emerge from the TAM. The TAM carries on being the most extensively and commonly used dominant theoretical model for examining the individual's acceptance of information systems [8]. Adapted from the theory of reasoned action (TRA) [9] and firstly proposed by Davis [10], it presumes that acceptance of information system/information technology (IS/IT) at the individual level is established by two key variables; namely, *perceived ease of use* and *perceived usefulness*. The IS/IT community has also considered TAM as a prudent and powerful theory for more than two decades [11].

Perceived ease of use is defined as, the degree to which an individual believes that using a particular system would be free of effort [12]. Perceived usefulness is defined as, the degree to which an individual believes that using a particular system would enhance his or her job performance [12]. These two constructs are found to determine individual's attitude to adopt Facebook. *Attitude* can be defined as individual's positive or negative feelings about accomplishing the target behaviour [9]. Perceived usefulness and perceived ease of use influence the individual's attitudes toward using the technology (intention). According to TAM, intentions to use technology will determine whether a person will use the technology or not (behavior) [12].

TAM has been revised in various studies (e.g., [13]) to fit a specific context of technology being examined. One important and well-received revision of TAM has

been the inclusion of *subjective norm* in predicting the usage behavior of a technology by its users [14]. *Subjective norm* is defined as an individual's perception that most people who are important to him think he should or should not perform the behavior in question [9]. Legris et al. [15] performed a qualitative meta-analysis and concluded that TAM was a useful model but had to include the human and social change process variable such as subjective norm.

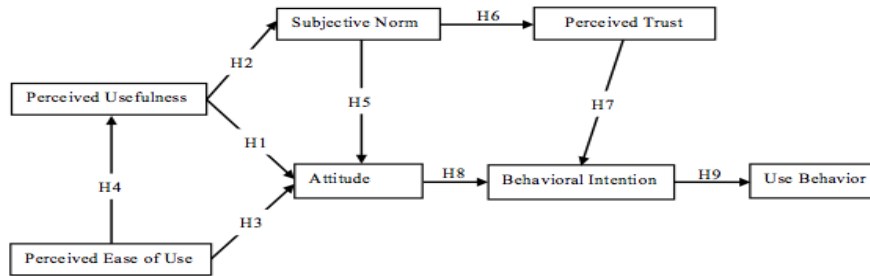


Fig. 1. Proposed Research Model (Source: Adapted from Davis, [12])

Inclusion of *subjective norm* in the proposed research model is also important as this model examines the adoption of a social network service such as Facebook for which the people's opinions who are close to the user are very important. Similarly, employing trust perceptions in the uncertain context of social media is also reasonable. Drawing upon these constructs, this paper theoretically develops and empirically validates a research model (see Fig. 1) that predicts young adults' acceptance of Facebook in a relatively straggling state like Sikkim in India.

## 2.2 Hypotheses Development

Under the proposed research model, we have formulated nine hypotheses based on the relationships between seven constructs adopted. A brief summary of the various hypotheses is presented below in Table 1.

Table 1. Hypotheses development

H#	Hypothesis Statement	Source(s)
H1	Perceived Usefulness → Attitude	[16]
H2	Perceived Usefulness → Subjective Norm	[17]
H3	Perceived Ease of Use → Attitude	[13][18]
H4	Perceived Ease of Use → Perceived Usefulness	[19]
H5	Subjective Norm → Attitude	[20]
H6	Subjective Norm → Perceived Trust	[21]
H7	Perceived Trust → Behavioral Intention	[22]
H8	Attitude → Behavioral Intention	[23, 24]
H9	Behavioral Intention → Use Behavior	[12][25]

## 3 Research Methodology

The sample of this study consists of young adults including undergraduate and postgraduate students and young members of faculties within the age range of 19-39

years from couple of degree level colleges from one of the smallest states called Sikkim in India. We conducted the web-based questionnaire survey through the young students and faculties in these colleges during their computer lab sessions and provided them the Google document link to click and respond to the online questionnaire. The whole exercise was done through various lab sessions, which were conducted in a week of time in September 2015. The concerned faculties of the modules were also requested to take part in the survey although it was completely done in a voluntary manner.

A seven-point Likert scale of [1-7] was chosen as the key instrument in the questionnaire. All the questions were close-ended to make sure that the respondents do not face any difficulty while responding to the questions. After a week time, we were able to obtain 211 completed responses out of which nine responses were discarded because the respondents' age range was found to exceed 39 years mark. This scrutiny was done to avoid any influenced results being obtained due to biased responses. As result, we were left out with 202 usable responses, which made the basis for our empirical analysis for measuring users' behavioral intentions and use of Facebook.

## 4 Results

### 4.1 Respondents' Demographic Profile

As per the questionnaire results, the average respondents' age ranges from 19 to 25 with 72.3% of the overall respondents lie in this age group, with males accounting for 76.7% of the sample and 23.3% were female. As far as the extent of use of Internet is concerned, largest 53% of the respondents used Internet several times a day whereas 23.8% used it even on hourly basis. In terms of the Facebook use, the highest 43.1% of the overall respondents were found to use it several times a day whereas 6.4% used it on hourly basis. When we asked them about the number of friends on Facebook, the largest 34.7% indicated to have more than 500 friends in their friend list.

### 4.2 Descriptive Statistics and Measurement Model

The high overall mean values (see Table 2) for most of the constructs indicate that respondents react favorably to the all the measures directly or indirectly related to respondents' actual use of Facebook. The overall minimum mean for perceived trust as '4.40' on the Likert scale [1-7] indicates that although respondents have not shown remarkable trust on the use of Facebook, they have not distrusted its various features and applications either.

Table 2. Descriptive statistics

Variable	Mean	S.D.
Perceived Ease of Use (PEU)	5.79	1.12
Perceived Usefulness (PU)	4.56	1.17
Attitude (AT)	5.20	1.18

Subjective Norm (SN)	4.73	1.29
Perceived Trust (PT)	4.39	1.43
Behavioral Intention (BI)	5.17	1.50
Use Behavior (UB)	5.05	1.14

[Legend: S.D. = Standard Deviation]

Convergent and discriminant validity of the scales were tested with confirmatory factor analysis. Convergent validity is examined using three ad hoc tests recommended by [26]. Table 3 lists the standardized factor loadings, composite reliabilities, and average variance extracted. Standardized factor loadings are indicative of the degree of association between scale items and a single latent variable [27]. The loadings are highly significant in all the cases. Composite reliabilities for all the variables were found well beyond the minimum limit of 0.70.

Table 3. Results of Confirmatory Factor Analysis (CFA)

Measure	FL	CR	AVE
Perceived Ease of Use (PEU)		0.857	0.784
PEU1	0.79		
PEU2	0.87		
PEU3	0.69		
PEU4	0.74		
Perceived Usefulness (PU)		0.775	0.589
PU1	0.54		
PU2	0.63		
PU3	0.73		
PU4	0.64		
PU5	0.65		
Attitude (AT)		0.856	0.603
AT1	0.73		
AT2	0.75		
AT3	0.78		
Subjective Norm (SN)		0.739	0.580
SN1	0.73		
SN2	0.70		
SN3	0.66		
Perceived Trust (PT)		0.897	0.705
PT1	0.80		
PT2	0.81		
PT3	0.87		
Behavioral Intention (BI)		0.725	0.554
BI1	0.71		
BI2	0.72		
BI3	0.62		
Use Behavior (UB)		0.774	0.648
UB1	0.69		
UB2	0.72		
UB3	0.78		

[Legend: AVE: Average Variance Extracted, CR: Composite Reliability, FL: Factor Loading]

Average variance extracted (AVE) is a measure of the variation explained by the latent variable to random measurement error [28] and ranged from 0.554 to 0.784 for all constructs. Again, these estimates exceed the recommended lower limit of 0.50

[29]. All tests support the convergent validity of the scales. Discriminant validity was assessed with the test recommended by Anderson and Gerbing [26]. The squared correlation between a pair of latent variables (see Table 4) should be less than the AVE of each variable (Table 4). Each combination of latent variables was tested, and each pairing passed, providing indication of the discriminant validity of the scales.

Table 4. Squared pairwise correlations and alpha internal reliabilities

Var	PEU	PU	AT	SN	PT	BI	UB
PEU	0.885 <sup>b</sup>						
PU	0.450 <sup>a</sup>	0.767 <sup>b</sup>					
AT	0.537 <sup>a</sup>	0.641 <sup>a</sup>	0.776 <sup>b</sup>				
SN	0.312 <sup>a</sup>	0.446 <sup>a</sup>	0.547 <sup>a</sup>	0.761 <sup>b</sup>			
PT	0.335 <sup>a</sup>	0.379 <sup>a</sup>	0.441 <sup>a</sup>	0.441 <sup>a</sup>	0.839 <sup>b</sup>		
BI	0.473 <sup>a</sup>	0.558 <sup>a</sup>	0.616 <sup>a</sup>	0.517 <sup>a</sup>	0.466 <sup>b</sup>	0.744 <sup>b</sup>	
UB	0.424 <sup>a</sup>	0.596 <sup>a</sup>	0.615 <sup>a</sup>	0.467 <sup>a</sup>	0.503 <sup>b</sup>	0.655 <sup>b</sup>	0.805 <sup>b</sup>

[Legend: <sup>a</sup>Square root of AVE shown on the main diagonal <sup>b</sup>Significant at  $p < 0.01$ ]

### 4.3 Structural Model Testing

The overall model fit is acceptable, as can be seen from Table 5. As the Chi-square test of absolute model fit is absolute to sample size and non-normality, a better measure of fit is Chi-square over degrees of freedom [27]. The ratio of Chi-square over degrees of freedom (i.e., 1.495) is well within suggested 3 to 1 bracket [30,31]. Typically, researchers also report a number of fit-statistics to examine the relative fit of the data to the model (see Table 5). We found the fit-indices and RMSEA (Root Mean Square Error of Approximation) well within the recommended level, which measures the discrepancy per degree of freedom [32].

Table 5. Model fit summary for the proposed research model

Fit Index	Model	Recommendation
Chi-Square	354.40	N/A
Degree of Freedom (DF)	237	N/A
P	0.000	Non-Significant
Chi-Square/DF	1.495	<3.000 (see [30])
GFI (Goodness-of-Fit Index)	0.903	>0.90 (see [33])
AGFI (Adjusted GFI)	0.848	>0.80 (see [30])
CFI (Comparative Fit Index)	0.951	>0.90 (see [34])
TLI (Tucker-Lewis Index)	0.950	>0.95 (see [35])
RMSEA	0.050	<0.06 (see [35])

Having established the relative adequacy of the model's fit, it is appropriate to examine individual path coefficients corresponding to our hypotheses. This analysis is presented in Table 6. All nine hypotheses are supported.

Table 6. Path coefficients and hypotheses testing

H#	Hypothesis	PC	CR	Sig.
H1	Perceived Usefulness → Attitude	0.514	4.405	***
H2	Perceived Usefulness → Subjective Norm	0.633	5.972	***
H3	Perceived Ease of Use → Attitude	0.218	2.959	**
H4	Perceived Ease of Use → Perceived Usefulness	0.591	6.101	***
H5	Subjective Norm → Attitude	0.339	3.797	***

H6	Subjective Norm → Perceived Trust	0.587	6.430	***
H7	Perceived Trust → Behavioral Intention	0.226	3.649	***
H8	Attitude → Behavioral Intention	0.849	9.121	***
H9	Behavioral Intention → Use Behavior	0.866	9.178	***

[Legend: CR: Critical Ratio, H#: Hypothesis Number, PC: Path Coefficient, Sig.: Significance]

All relationships except between PEOU and AT were found significant at the levels of  $p < 0.001$  whereas that of between PEOU and AT was found significant at  $p < 0.01$  level. The higher level of significance and strong path coefficients for majority of relationships are also indicated by relatively higher critical ratios between different relationships. The variance explained by the validated research model on dependent variables including perceived usefulness, subjective norm, attitude, behavioral intentions and use behavior were found as 35%, 40%, 34%, 84% and 75% respectively.

## 5 Discussion

Among all other social media portals, Facebook has become a universal phenomenon to support users' communication, interactions, entertainment and social bonding. Motivated by the global and unparalleled popularity, this research seeks to understand what leads to acceptance of such social media usage [13] by young adults from academic institutions located in a landlocked and one of the least populous states in India. Fig. 2 presents the validated research model using the data collected through young adults on Facebook adoption from one of the remotest and least populace states in India.

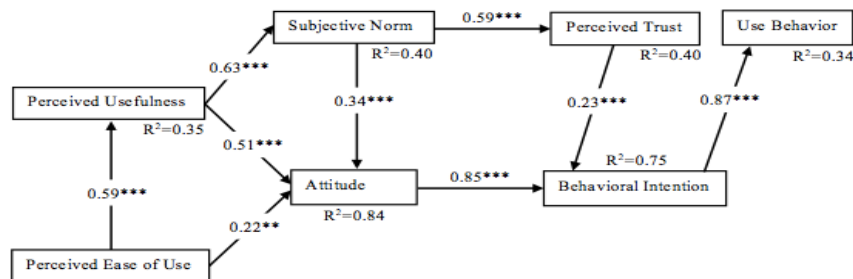


Fig. 2. Validated research model

Firstly, the strong and significant impact of perceived usefulness on user's attitude (i.e., Hypothesis H1) indicates that perceived usefulness or benefits derived from using Facebook influences users' positive beliefs, feelings and positive thoughts toward using it. One of such obvious benefits could be to use Facebook to interact with the friends, community and society. It is consistent with the findings of prior studies (e.g., [13], [36]) on social media adoption. The results also indicated the strongly positive and significant impact of perceived usefulness on subjective norm (i.e., Hypothesis H2). This indicates that the perceived usefulness or benefits offered by this social networking channel would allow the existing Facebook users to refer it to their friends, family and colleagues.



Secondly, perceived ease of use was found to significantly influence users' attitude (i.e., Hypothesis H3) and perceived usefulness (i.e., Hypothesis H4). The findings supporting these hypotheses indicate that designers and developers of social media websites, applications, and pages should focus more on how to create value for the social media users [13]. In other words, the developers and designers of Facebook should make sure that users can easily perform activities including photo and file uploading and downloading, profile editing, and using the menus efficiently [37]. Managing such features and Facebook content without much effort would influence users' attitude toward using this social media channel. Also, easy to access interface and features provided by designers would help users to better understand Facebook's usefulness and benefits, which eventually help them accept and use this social media channel.

Thirdly, subjective norm was found to exert significant impact on attitude (i.e., Hypothesis H5) and perceived trust (i.e., Hypothesis H6). The significant impact of subjective norm on attitude indicates that social network users are more likely to base their positive perceptions integrating their sense of image and opinions from their informal social network rather than following the fad blindly [20]. This relationship indicates that users' attitude toward using Facebook is socially influenced by their friends, colleagues, family or any significant others who already have their presence on this social media site [38]. Moreover, the support to use social media site such as Facebook from significant others also leads to significantly improved trust toward using this channel. Many early adopters of the social media sites such as Facebook stop using it because of the combination of technical difficulties, social collisions and a rupture of trust between users and the site [39]. We believe that with constant social and interpersonal influence, users would gain more support and motivation to use Facebook and get connected to their important others in a closed loop network. The users tend to trust any information disseminated through their closed loop colleagues more than information randomly being floated through anyone else and significance of this relationship justifies it well.

Fourthly, the significant impact of perceived trust on behavioral intention (i.e., Hypothesis H7) indicates that intention to use social media is also shaped by trust on the social media site. In other words, through this finding, it is established that trusting young adults are more likely to engage with Facebook. Reports on privacy and security concerns on social media sites such as Facebook have made everyday front-page news. In order to freely participate and engage, users need to trust this site [13]. From its moderate path-coefficient on intentions, it can be inferred that trust apparently plays a role in enhancing intentions (Shin, 2010). The findings support prior research on trust and emphasised the value of trust in the online environment [40,41]. This is largely up to developers and designers to provide adequate security and privacy provisions in the site that allows the users to trust it and so improves their intentions to use it. Also, in the prior online environment research, trust has been found to be indispensable to virtual community members' intention to exchange information with other members [42,43,44].

Finally, the strong and significant impacts of attitude on behavioral intention (i.e., Hypothesis H8) and behavioral intention on use behavior (i.e., Hypothesis H9) indicate that users' positive beliefs lead to their intention to know more friends and use Facebook to interact with their friends and continue to use it in the future, which

in turn results in its use for enjoyment and interacting with improved efficiency in sharing information and connecting with others. The facilitators of Facebook should keep very close eyes on this social media system to meet the users' expectations and constantly improves its interface keeping the users' requirements in mind. A number of studies (e.g., [13], [41]) on social network have supported these relationships.

### **5.1. Implications for Researchers and Practitioners**

This research provides several implications for information systems (IS) researchers as well as Facebook service providers. Researchers have advocated extending and re-validating past theories and frameworks in a new context [13][45]. Following that, this study represents the first widespread investigation of the user acceptance of a social media site such as Facebook using scales derived from existing literature and in a completely new context of young adults from one of the smallest, technologically lagging and landlocked states in India. The composite reliabilities of our constructs (such as PEU, PU, AT, SN, PT, BI and UB) reflect reliable instruments that can be adopted for future studies in the field of social media adoption.

The findings from factor analysis and the measurement model help in classifying the significant dimensions for the extended TAM model for social media adoption. We believe that this contribution is a substantial accumulation to the social media literature [13]. The study sheds light on developing a new theory by grounding additional variables (i.e., subjective norm and trust) in the TAM and applying it in the emerging context of Facebook adoption in context of India. The inclusion of additional variables found valid and significant in this study. This result ensures a consistent model of the drivers for social technology and established theory development. Hence, the proposed research model provides a significant contribution to emerging literature on social media adoption [41] in developing countries' context in general.

Similarly, this study can draw practical implications of this research for vendors, managers and Facebook service providers. To develop good practices of managing and developing social media related strategies, the research findings based on extended TAM model can be referenced by practitioners of social media as well [13]. The inclusion of trust in the model and its positive impact on behavioral intentions indicate that vendors should establish user's trust by ensuring that their services are conducted in accordance with users' expectations [41]. The Facebook providers also need to understand the ease of services provided to users so that they can easily explore the Facebook to seamlessly avail all its features and get in touch with their online friend community.

The results of this research are also important to academic community to get in touch with each other and by realising the actual benefits of using Facebook in real sense. For instance, its usefulness in terms of using the "Facebook Chat" and special feature of "News Feed" allow users to sense the presence of their friends in Facebook and accept it as a social media channel to use it on 24x7 basis [46]. Particularly, with widespread adoption of smartphones and the use of Facebook messenger in them have allowed users to come even closer to their friends for all recent updates and news.

## 5.2. Limitations and Future Research

First, the sample size considered for this research was only 202 young adults from degree colleges in one of the Northeastern states in India. The future study should consider even larger and diversified sample to analyse the adoption of Facebook in Indian context. Second, the study represents mostly the student users of Facebook. Therefore, the care must be taken when extrapolating the findings to the other types of online social networks that target different groups of users such as professionals in LinkedIn or Twitter. Third, as the responding users of this research are young adults, it does not provide a comprehensive picture of the entire social media community. The future research can consider a sample of different groups of users across the various age groups.

## 6 Conclusion

This research proposed an extended TAM model for enhancing our understanding of a social media user's attitude and intentions to use Facebook. The findings indicate that usefulness, ease of use, friends and family influence, trust and positive attitude are some of the significant factors that positively influence young adults' intention and actual use of the social media sites like Facebook. Based on the TAM model, this research also validates the attitude-intention-behavior relationship in the context of the social media site Facebook. Moreover, adding additional constructs such as subjective norm and perceived trust makes the TAM model more meaningful for understanding the acceptance and use of social media.

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