Acceptance of SNW amongst Students-An Application of Theory of Diffusion of Innovation

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Abstract

Diffusion of Innovations (DOI) is a theory of how, why, and at what rate new ideas and technology spread through cultures. This study tested the attributes of DOI empirically, using Social networking websites (SNW) as the target innovation. The study was conducted among students of the Post Graduate in New Delhi. The population comprised of people already connected to one social networking site or the other. Data collection instrument was a structured questionnaire administered to 1200 respondents of which 1020 were returned giving 85% return rate. Principal Factor Analysis and Multiple Regression were the analytical techniques used. From the factor analysis performed, it was revealed the constructs: relative advantage, and complexity, of SNW positively affect the attitude towards using the technology while the compatibility, observability and trialability of SNW does not positively affect the attitude towards using the technology. The study concluded that the attitude of students towards SNW does not positively affect the intention to use the technology.

Keywords: Diffusion of Innovation, Social networking websites, Adoption, Intention.

INTRODUCTION

Social networking websites (SNW) such as MySpace, Facebook, Cyworld, Bebo BlackPlanet, Dodgeball, and twitter have attracted millions of users, many of whom have integrated these websites into their daily practices. A social network service focuses on building online communities of people who share interests and/or activities (Dwyer et al., 2014). The websites allow users to build on-line profiles, share information, pictures, blog entries, music clips, etc. After joining a social networking site, users are prompted to identify others in the system with which they have a relationship. The label for these relationships differs depending on the site-popular terms include "Friends," "Contacts," and "Fans." Most SNW require bi-directional confirmation for Friendship. Diffusion is defined as the process by which an innovation is adopted and gains acceptance by members of a certain community. A number of factors interact to influence the diffusion of an innovation (Lee, 2004). The four major factors that influences the diffusion process are the innovation itself, how information about the innovation is
communicated, time, and the nature of the social system into which the innovation is being introduced (Rogers, 1995).

The Diffusion of Innovation Theory (DOI) is used in this study to examine the factors influencing adoption of social networking websites innovation. The theory proposed five beliefs or constructs that influence the adoption of any innovation (Davis et al, 1989). These are relative advantage, complexity, compatibility, trialability, and observability. The essence of the use of these constructs is to empirically test part of DOI’s attributes with a view to exploring factors that brought about the adoption of the innovation of social networking websites (Penning and Harianto, 2014). Therefore in this paper, the constructs that could affect the adoption of these networking websites were studied. The theory of diffusion of innovation will therefore be extended to social networking among Post Graduate students to determine the extent of use and acceptance with a view to knowing what could be done to prevent or allow the inhibition surrounding its use. Thus, it could be reasoned that the benefits of these websites would accrue to adopters when barriers to their diffusion and adoption are identified. The DOI theory was used in an attempt to model the adoption of social networking websites, so that the progression of its use could be anticipated and fully catered for. Hence, the study analyses the adoption of social networking websites among the Post Graduate Students and their intention of using it with selected constructs such as relative advantage, complexity, compatibility, trialability, and observability.

Review of the Literature
Social networking websites (SNWs) have grown in popularity among all segments of society, but particularly among younger groups such as university students. Facebook is an example of the enormous amount of social interaction that occurs on these websites. Approximately 85% of all American university students at 4-year institutions use Facebook. There are 67 million active users worldwide, half of whom log in at least once each day for an average of twenty minutes. Approximately 250,000 people apply for profiles each day. Nearly 14 million photos are uploaded each day. Of course, Facebook is just one of dozens and dozens of SNWs that each has millions of active users. Popular business and news magazines such as Business Week and Time run near-weekly articles about the impact of SNWs on business and society. SNWs are often pointed out as important forms of communication within the workplace and intriguing avenues
for marketing, even changing the way business is done. Other articles indicate that such optimism for usefulness in the workplace is exaggerated and that there are downfalls to social networking websites in the workplace.

Since the enormous amount of social interaction facilitated by SNWs throughout the world is a fairly new phenomenon, research about cross-national differences in attitudes and usage of SNWs is particularly warranted. India and the United States are countries which engage in a great deal of online communication due to the rise in customer service, computer programming, and other service positions outsourced to India from the United States [Pal, M., & Buzzanell, P. (2008)]. An understanding of cross-national differences among university students’ attitudes toward and usage of SNWs can help provide insight into how cross-national virtual work will be conducted in the future. A great deal of research has been conducted about cross-cultural values and communication practices, yet scant research addresses how these findings apply to the online environment, particularly for SNWs. SNWs are a relatively new form of online communication. The first SNW was SixDegrees.com, which was launched in 1997. The current popularity of SNWs, however, is an even more recent phenomenon and it wasn’t until 2003 when they were considered mainstream. The top two SNWs, MySpace and Facebook, began in 2003 and 2005, respectively [Boyd, D. M., & Ellison, N. B. (2014)]. In June 2014 these two websites combined for nearly 170 million unique visitors [ComScore, Inc]. While the popularity of SNWs has become a global phenomenon, various websites have become market leaders in various countries and regions around the world: Orkut in Brazil and India, Mixi in Japan, Lunar Storm in Sweden, Hi5 in smaller Latin American countries, Bebo in the United Kingdom, or Cyworld in Korea, to name a few. Each website contains features that appeal to the various national cultures [Boyd, D. M., & Ellison, N. B. (2014)].

Literature about SNWs is fairly limited and has mostly focused on impression management and security Boyd, D. M., & Ellison, N. B. (2014). One consistent finding has been that SNWs are used primarily to sustain existing offline relationships—few users use SNWs to meet people. However, no cross-cultural studies of SNWs are known to have been conducted. In a 2008 analysis of the literature on SNWs, Boyd and Ellison concluded that “scholars still have a limited understanding of who is and who is not using these websites, why, and for what purposes, especially outside of the U.S.” (p. 15) [Boyd, D. M., & Ellison, N. B. (2014)
ComScore, Inc. (NASDAQ: SCOR), a leader in measuring the digital world, today released a report on the top social networking sites in India, finding that visitation to the site category increased 51 percent from the previous year to more than 19 million visitors in December 2008. The study also found that global social networking brands continued to gain prominence in India during the year, with Orkut, Facebook, hi5, LinkedIn and MySpace each witnessing significant increases in visitation.

“Social networking continued to grow strongly in India this past year, with several of the top global brands carving out a more prominent position,” said Will Hodgman, ComScore executive vice president. “While there is certainly room for several players in the social networking space in India, the sites that have the right blend of having both a strong brand and cultural relevance will be best positioned for future growth.”

ComScore, Inc. (NASDAQ: SCOR), a leader in measuring the digital world, today released a report on traffic to Social Networking sites in India, revealing that Facebook.com grabbed the number one ranking in the category for the first time in July with 20.9 million visitors, up 179 percent versus year ago.

“The social networking phenomenon continues to gain steam worldwide, and India represents one of the fastest growing markets at the moment,” said Will Hodgman, ComScore executive vice president for the Asia-Pacific region. “Though Facebook has tripled its audience in the past year to pace the growth for the category, several other social networking sites have posted their own sizeable gains.”

More than 33 million Internet users age 15 and older in India visited social networking sites in July, representing 84 percent of the total Internet audience. India now ranks as the seventh largest market worldwide for social networking, after the U.S., China, Germany, Russian Federation, Brazil and the U.K. The total Indian social networking audience grew 43 percent in the past year, more than tripling the rate of growth of the total Internet audience in India.

The social networking websites associated to a particular region differs; hence the reason for joining these websites differs from one person to another. Although, social networking websites have been in existence for quite a while, its adoption in India has recently increased. Social networking websites are built for users to interact for different purposes like business, general
chatting, meeting with friends and colleagues, etc. It is also helpful in politics, dating, with the interest of getting numerous advantages with the people they meet. Recently, the use of network websites has increased overtime in India with the improvement in technology and the use of mobile phone to surf the web and statistic have shown that 90% of people on the internet at one point in time or the other are visiting social network websites (Boyd and Ellison, 2014).

In India, social networking websites is becoming widely spread than it has ever been before and it tends to be majorly accepted by the youths. Yet the widespread adoption by users of these websites is not clear, as it appears that people’s perception of this technology is diverse, which in turn affects their decision to actually trust these websites or not. Moral panic is a major problem to trusting the innovation (Adler and Kwon, 2002; Bargh and Mckenne, 2004). These one-directional ties are sometimes labeled as "Fans" or "Followers," but many websites call them Friends as well. The term "Friends" can be misleading, because the connection does not necessarily mean friendship in the Olusegun Folorunso, Rebecca O. Vincent, Adebayo Felix Adekoya & Adewale Opeoluwa Ogunde everyday vernacular sense, and the reasons people connect are varied (Boyd, 2004). Unsafe disclosure of information to both known and unfamiliar population, reputation of individuals, cyber bullying, addiction, risky behavior and contacting dangerous communities are issues affecting trust of SNW, though, it is adopted. The primary reason for its adoption may be unknown. There is obviously, a need to investigate the issue of adoption of social networking websites in this context, because the diffusion of the innovation of these websites can be specifically perceived by the users through their attitudes and actions.

Many researchers have studied the Innovation diffusion theory, but only one has applied it to Social networking websites. Olusegun Folorunso, Rebecca O. Vincent, Adebayo Felix Adekoya & Adewale Opeoluwa Ogunde (2014) revealed the constructs: relative advantage, complexity, and observability of SNS do not positively affect the attitude towards using the technology while the compatibility and trialability of SNS does positively affect the attitude towards using the technology. The study concluded that the attitude of university students towards SNS does positively affect the intention to use the technology. Among them are Lee (2004), who applied Everett Rogers’ innovation-diffusion model to analyze nurses’ perceptions toward using a
computerized care plan system. Twelve nurses from three respiratory intensive care units in Taiwan voluntarily participated in a one-on-one, in-depth interview. Data were analyzed by constant comparative analysis. The content that emerged was compared with the model’s five innovation characteristics (relative advantage, compatibility, complexity, trialability, and observability), as perceived by new users. Results indicated that Rogers’ model can accurately describe nurses’ behavior during the process of adopting workplace innovations (Shao, 2014). Also, related issues that emerged deserve further attention to help nurses make the best use of technology. (Lee, 2004). The application of health information technology to improve healthcare efficiency and quality is an increasingly critical task for all healthcare organizations due to rapid improvements in IT and growing concerns with regard to patient’s safety.

Oladokun and Igbinedium, (2009) presented a work on the adoption of Automatic Teller Machines (ATM) in Nigeria: An Application of the Theory of Diffusion of Innovation. The study tested the attributes of the theory of diffusion of innovation empirically, using Automatic Teller Machines (ATMs) as the target innovation. The study was situated in Jos, Plateau state, Nigeria. The population comprised banks customers in Jos who used ATMs. The sampling frame technique was applied, and 14 banks that had deployed ATMs were selected. Cluster sampling was employed to select respondents for the study. Data collection instrument was a structured questionnaire administered to 600 respondents of which 428 were returned giving 71.3% return rate. Principal Factor Analysis and Multiple Regression were the analytical techniques used. The demographic characteristics of the respondents revealed that most of them were students and youths. From the factor analysis, it was revealed that the respondents believed in their safety in using ATM; that ATMs were quite easy to use and fit in with their way of life; that what they observed about ATMs convinced them to use it and that ATM was tried out before they use it.

Olusegun Folorunso et al. 2009 conducted among students of the University of Agriculture, Abeokuta in Nigeria. The population comprised of people already connected to one social networking site or the other. Data collection instrument was a structured questionnaire administered to 120 respondents of which 102 were returned giving 85% return rate. Principal Factor Analysis and Multiple Regression were the analytical techniques used. Demographic characteristics of the respondents revealed that most of them were students and youths. From the
factor analysis performed, it was revealed the constructs: relative advantage, complexity, and observability of SNW do not positively affect the attitude towards using the technology while the compatibility and trialability of SNW does positively affect the attitude towards using the technology. The study concluded that the attitude of university students towards SNW does positively affect the intention to use the technology.

Zhenghao et al, 2009 worked on the 3G Mobile Phone Usage in China: Viewpoint from Innovation Diffusion Theory and Technology Acceptance Model. The paper analyzed the reasons behind Innovation Diffusion Theory (IDT) and Technology Acceptance Model (TAM) perspectives. Some suggestions were also given to 3G business operators and researchers. Others who researched on SNW include Boyd and Ellison (2014), who described features of SNW and propose a comprehensive definition for it. They presented a perspective on the history of social network websites, discussing key changes and developments. Ellison et al (2014) also examined the relationship between the use of Facebook, a popular online social networking site, and the formation and maintenance of social capital. In addition to assessing bonding and bridging social capital, they explored a dimension of social capital that assesses one's ability to stay connected with members of a previously inhabited community, which was called - maintained social capital. Regression analyses was conducted on results from a survey of undergraduate students (N=286), which suggested a strong association between use of Facebook and the three types of social capitals, with the strongest relationship being the bridging social capital. In addition, Facebook usage was found to interact with measures of psychological well-being, suggesting that it might provide greater benefits for users experiencing low self-esteem and low life satisfaction. Their results demonstrated a robust connection between Facebook usage and indicators of social capital, especially of the bridging type that Internet use alone did not predict social capital accumulation, but intensive use of Facebook did.

- Relative Advantage
- Compatibility
- Trialability
- Observability
- Attitude Intention to use
Dwyer et al, 2014 analyzed an online survey of two popular social networking websites, Facebook and MySpace, compared perceptions of trust and privacy concerns, along with willingness to share information and develop new relationships. Members of both websites reported similar levels of privacy concern. Facebook members expressed significantly greater trust in both Facebook and its members, and were more willing to share identifying information. Even so, MySpace members reported significantly more experience using the site to meet new people. These results suggested that in online interaction, trust is not as necessary as the building of new relationships, as it is in face to face encounters. They also showed that in an online site, the existence of trust and the willingness to share information do not automatically translate into new social interaction. This study demonstrated online relationships can develop in websites where perceived trust and privacy safeguards are weak.

RESEARCH MODEL

Figure 1 shows the research model. Relative advantage indicates the usefulness of an innovation; compatibility is the degree to which an innovation is perceived as consistent with existing values, past experiences, and the needs of the potential adopter; complexity is the degree to which an innovation is perceived as relatively difficult to understand and use; trialability is trying out or testing an innovation so that it makes meaning to the adopter; and observability is the degree to which the results of an innovation are visible to others.

FIGURE 1: Research model
The research model adopted in this study depicts what should occur given the constructs that was proposed by Rogers (1995) concerning the adoption of a technology. These constructs ought to affect the intention to use a particular innovation which in this case is Social Networking websites. Thus, the model indicates that the five constructs: relative advantage, complexity, compatibility, trialability and observability of using social network websites would affect the intention of the adopter to use these websites. The study will analyze the adoption of social networking websites among the Post-graduate Students and their intention of using it with selected constructs such as relative advantage, complexity, compatibility, trial ability, and observability.

The null hypotheses proposed for this study are as follows:

H_{01}: The relative advantage of using social networking websites does not positively affect users’ attitude towards using the technology.

H_{02}: The complexity of the use of social networking websites does not positively affect users’ attitude towards using the technology.

H_{03}: The compatibility of social networking websites with the adopter’s values does not positively affect users’ attitude towards using the technology.
H_{04}: The trial ability of social networking websites does not positively affect users’ attitude toward using the technology.

H_{05}: The observability of social networking websites does not positively affect users’ attitude towards using the technology.

H_{06}: The attitude towards social networking websites does not positively affect users’ intention to use the technology

**SAMPLE AND PROCEDURE**
The six attributes measured users’ perception regarding the advantage, trust and security of SNW to the Post Graduate students and most especially the rate of adoption of the innovation. Relative advantage, complexity, compatibility, trialability, observability and trust were measured to access individual perceptions and adoption of effectiveness of the innovation. The survey subjects were mainly students in graduate Post graduate students of NCR India. A close-ended questionnaire was designed to collect relevant data on the relative advantage of using social networking websites, whether any complications had been encountered from the use of these websites, and on the suitability of using these websites with the belief system, moral and ethical values of the respondents. Information on how the experiences of the respondents with the use of social networking websites have affected their intentions regarding the continuous use the SNW technology

**DATA ANALYSIS AND RESULTS**

**Factor Analysis**
Factor analysis is a data reduction statistical technique that allows simplifying the correlation relationship between a numbers of continuous variables. Exploratory factor analysis is used in order to identify constructs and investigate relationships among key interval scaled questions regarding reasons for intention of use of social networking websites.

The data collected were analysed using Cronbach’s alpha which was to determine the internal consistency and reliability of the individual and multiple scales. Cronbach’s alpha was used in this study because every item in the questionnaire measured an underlying construct. The validity of the measures was verified by observing the correlations between the items on the
various scales. All pre-existing constructs used in the diffusion theory met the criteria of validity and reliability except trust which is a newly introduced construct.

Table below showed the Cronbach alpha that was computed for the items that made up each construct used in this study. A measurement scale such as the one developed during this research must be both reliable and valid. Reliability is concerned with the internal consistency of the scale, that is, “does the scale behaves similarly when administered by different people?” The most widely used reliability coefficient is Cronbach alpha which can range from 0 to 1 with higher figures indicating better reliability. From the table above, it is clear that the recorded an overall reliability score of 0.95, 0.74, 0.695, 0.92, 0.698 and 0.766 exceeding the usual recommendation of alpha = 0.70. The alpha values for the 5 constructs (from 0.487 and 0.863) indicated that the items that formed them have reasonable internal consistency reliability. The scores used for the constructs in this study were standardized using SPSS package for the regression analysis.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Cronbach alpha</th>
<th>no.of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>0.863</td>
<td>4 items</td>
</tr>
<tr>
<td>Complexity</td>
<td>0.487</td>
<td>6 items</td>
</tr>
<tr>
<td>Compatibility</td>
<td>0.711</td>
<td>4 items</td>
</tr>
<tr>
<td>Trailability</td>
<td>0.741</td>
<td>3 items</td>
</tr>
<tr>
<td>Observability</td>
<td>0.729</td>
<td>6 items</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.623</td>
<td>3 items</td>
</tr>
<tr>
<td>Intention</td>
<td>0.768</td>
<td>3 items</td>
</tr>
</tbody>
</table>
Structural Equation Modeling

SEM is an extension of the general linear model (GLM) that enables a researcher to test a set of regression equations simultaneously. SEM software can test traditional models, but it also permits examination of more complex relationships and models, such as confirmatory factor analysis and time series analyses.

The basic approach to performing a SEM analysis is as follows:

The researcher first specifies a model based on theory, and then determines how to measure constructs, collects data, and then inputs the data into the SEM software package. The package fits the data to the specified model and produces the results, which include overall model fit statistics and parameter estimates. The input to the analysis is usually a covariance matrix of measured variables such as survey item scores, though sometimes matrices of correlations or matrices of covariances and means are used. In practice, the data analyst usually supplies SEM
The model consists of a set of relationships among the measured variables. These relationships are then expressed as restrictions on the total set of possible relationships. The results feature overall indexes of model fit as well as parameter estimates, standard errors, and test statistics for each free parameter in the model.

Chi-square/degrees of freedom (χ²/df) ratio, root mean-square error of approximation (RMSEA), Tuck Willis index (TLI), normed fit index (NFI), comparative fit index (CFI), incremental fit index (IFI). As the RMSEA = 0.047, TLI = 0.907, NFI = 0.846, CFI = 0.916, and IFI = 0.917. All measures fulfill the suggested values. Therefore, CFA model can be said as a good fit model.

<table>
<thead>
<tr>
<th></th>
<th>Estimate</th>
<th>S.E.</th>
<th>C.R.</th>
<th>P</th>
<th>Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>attitude &lt;--- relative advantage</td>
<td>.211</td>
<td>.043</td>
<td>4.865</td>
<td>***</td>
<td>par 55</td>
</tr>
<tr>
<td>attitude &lt;--- complexity</td>
<td>.115</td>
<td>.106</td>
<td>1.084</td>
<td>***</td>
<td>par 56</td>
</tr>
<tr>
<td>attitude &lt;--- compatibility</td>
<td>-.227</td>
<td>.168</td>
<td>-1.351</td>
<td>.177</td>
<td>par 57</td>
</tr>
<tr>
<td>attitude &lt;--- Trialability</td>
<td>-.025</td>
<td>.094</td>
<td>-.271</td>
<td>.787</td>
<td>par 58</td>
</tr>
<tr>
<td>attitude &lt;--- Observability</td>
<td>.293</td>
<td>.053</td>
<td>5.578</td>
<td>***</td>
<td>par 59</td>
</tr>
<tr>
<td>Attitude &lt;--- Intention</td>
<td>-.139</td>
<td>.072</td>
<td>-1.925</td>
<td>.054</td>
<td>par 61</td>
</tr>
</tbody>
</table>

**Test of Hypotheses**

Following are the result of the hypothesis tested against p values that were obtained from the above results.

**H₁**: The relative advantage of using social networking sites positively affect users’ attitude towards using the technology. **Accepted**

**H₂**: The complexity of the use of social networking sites positively affect users’ attitude towards using the technology. **Accepted**
H₃: The compatibility of social networking sites with the adopter’s values positively affect users’ attitude towards using the technology. **Rejected**

H₄: The Trialability of social networking sites positively affect users’ attitude toward using the technology. **Rejected**

H₅: The observability of social networking sites positively affect users’ attitude towards using the technology. **Accepted**

H₆: The attitude towards social networking sites positively affect users’ intention to use the technology. **Accepted**

**Conclusions**

Relative Advantage does have significant positive effect on the attitude towards using social networking sites. From the responses, the advantages of using these sites make them prefer social network sites use to the previous one used. Some of these advantages include speed, efficiency, availability, ease of use, faith in the security of their personal information. The contribution of the Complexity construct was also significant to the model and complexity of a technology affects how well that technology diffuses in a social network system because if the technology is easy to use, more people are likely to adopt its use. Findings from this study suggested that social networking sites were quite easy to use and are more likely to be more widely adopted. The Compatibility construct was found not to positively contribute to the DOI model. This suggested that the compatibility of usage social networking sites to the lifestyle of the respondents was unimportant. The Observability construct does not have impact on the attitude towards the use of these sites. The Observability construct was simply about watching others using the technology. Of the five constructs, Trialability had no impact on the attitude towards using social networking sites. The results implied that the respondents have were well versed with SNW before adopting its use.

The Attitude towards SNWs positively and significantly affected the Intention to use the technology. The low impact of Attitude on Intention to use social network sites expressed the importance of how Attitude could affect the Intention to use social networking sites. A positive attitude meant that a potential adopter or a past user of social sites would have the Intention to use it in future and vice versa. The contribution of Attitude to Intention in the DOI model has been in line with the findings of other studies such as those of Davis et al (1989).
The findings showed that attitudinal dispositions do not have significant influence on the use of social network sites. All five attitudinal constructs have strong influences on adoption and intention to use social networking sites. Relative advantage and Complexity also do not have significant relationship with intention to use it. Analysis for compatibility revealed that the use of social networking sites was not compatible with the lifestyle of the respondents. The study also revealed that the use of social networking sites is widespread and a current practice today because of its usefulness. The implications of observability construct showed that the observations made by the respondents effectively convinced them to use SNW. Influence was apparently a factor for using social networks, probably because the students quickly get influenced by their colleagues. Another construct that influenced attitude and trust of SNW supported in this study is trialability. Potential social networking sites adopters will be more inclined to use even if they could not try it out first. These findings have shown what the Diffusion of Innovation model in the diffusion of Social networking sites. It is therefore noteworthy for builders of these sites to examine the attributes of the model to see how they could improve on the use of these sites.

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