

# Understanding Social Network Usage: Impact of Co-Presence, Intimacy, and Immediacy

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**Abstract**—This study examines individuals' intentions and behaviour on Social Networking Sites (SNSs). The study proposed model asserts that “Co-presence”, “Intimacy”, “Immediacy”, “Perceived Enjoyment”, and “Perceived ease of use” formed individuals' “Attitude” towards “behavioral intention” to use SNSs. The results support all formulated hypotheses. The proposed model in this study explains 69% of individual's attitude or feelings towards adoption the SNSs, 59% of the variance in “Behavioral Intention” and 54% of the variance in “Usage Behaviour”. The present study has shown the importance of social presence's factors, namely co-presence, intimacy, and immediacy, in explaining individuals' intentions and behavior. The study findings confirmed that social presence positively influence SNS usage indirectly through user attitude, and as aforementioned that three factors, namely co-presence, intimacy, and immediacy are framing the construct of social presence. Thus, this study is the first empirical effort to examine the impact of co-presence, intimacy, and immediacy in determining intention or behaviour.

**Keywords**—Social presence theory; Social networking sites; SNS; Factors; Adoption; Usage; Saudi Arabia

## I. INTRODUCTION

A Social Network Sites (SNSs) is a platform allows users to build social relations with others within and beyond their social circle [47, 19]. SNSs such as Facebook, LinkedIn, Twitter, and Google Plus have been growing rapidly in recent years [80].

This growth produced various types of SNSs. Some of SNSs have been built to be used by anyone; while others for limited purpose [45]. For example, LinkedIn and Medical Mingle, LinkedIn is the world's largest professional network and can be used by anyone, while Medical Mingle is a SNS has been built particularly for medical professionals.

With the pass of time, millions of people becoming members of one or more of these SNSs. As of March 2015, Facebook, for example, had attracted 1.44 billion active users [34]. Thus, this great success of SNSs opens a new frontier and opportunities for businesses. “More than one-third of marketers consider Facebook important for their businesses. In all, 67% of B2C and 41% of B2B companies have successfully acquired new customers through Facebook” [47]. Also, new opportunities for businesses companies can be provided by SNSs which help them to optimize their internal operations and to enhance customers' communication.

Moreover, e-commerce companies also tend to integrate SNS features into their existing web applications to enhance or retain their use in important applications [82]. Thus, due to this success, SNSs can be profitable business entities, making revenues for their stakeholders. This creates a sort of competition among the most popular SNSs, for example and “according to analytics released by ComScore in 2011, Twitter has proven to be a major competitor of Facebook, as the micro-blogging service has managed to increase its number of regular users by more than 500% since 2009” [51].

However, success of SNSs depends on their ability to attract customers using them. This is because SNS rely on number of their users and the interactions between them to increase their value. Therefore, it is important for SNSs providers to enhance their technology to attract more users and this can be done by understanding why people use SNSs. Thus, this study systematically examines what factors contribute to SNS usage. This topic matches to one of the five core research areas which forming the information systems (IS) discipline as identified by Sidorova, et al., [70]: (1) Information technology and organizations, (2) Information technology systems development, (3) Information technology and individuals, (4) Information technology and markets, and (5) Information technology and groups.

The information technology (IT) and individuals examines primarily psychological aspects of human-computer interactions, focusing on research themes such as individual technology acceptance, IT adoption, human resources issues in IS, computer self-efficacy, trust, and website design. Therefore, this study represents a mainstream area of IS research, contributing to the development of the discipline.

This study participates in this effort, theoretically and practically, by proposing an integrated theoretical model that lends itself to studying the adoption of new technologies and applies it to determine significant factors that influence adoption of SNSs. The study' proposed model brings together concepts from two distinct lines of research, the Decomposed Theory of Planned Behaviour (DTPB) from IS models and social presence theory from the social psychological theories of interpersonal communication and symbolic interactionism. Thus, the research question was:

RQ1. What are the factors that predict SNS usage?

## II. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

In the following sections, DTPB and Social presence theories are reviewed and discussed in relation to SNSs adoption in order to extract the most suitable framework for this study.

### A. The Decomposed Theory of Planned Behaviour (DTPB)

Define The Decomposed Theory of Planned Behaviour (DTPB) is a decomposed version of the TPB containing several constructs from TAM and DOI. It provides the same fit as the pure TPB model but has a somewhat better predictive power relative to the TAM and TPB models [74]. According to Taylor and Todd “the decomposed Theory of Planned Behaviour provides a fuller understanding of behavioural intention by focusing on the factors that are likely to influence systems use” [74] and as “it renders more transparent and easier to grasp the relations among beliefs, attitudes and intentions, it enables application of the model to a variety of situations” [39]. In the DTPB, attitudinal beliefs, normative beliefs, control beliefs are broken down into constructs extracted from the literature and the TAM/DOI theories decomposing the attitudinal belief structure to include perceived usefulness, ease of use and compatibility. Scholars have suggested that normative belief could be decomposed into relevant reference groups such as peers, superiors, and subordinates and that each may have differing views on the use of IT. Thus, two groups (peers and superiors) have been used by Taylor and Todd [74] to represent the decomposition of normative belief structures. While the control beliefs structure can be decomposed into two groups, self-efficacy and facilitating conditions. Self-efficacy is related to the perceived ability of using a new technology, whereas the facilitating conditions construct provides two dimensions for control beliefs: one relating to resource factors such as time and money and the other focusing on technology compatibility issues that could limit usage [39, 47].

### B. Social presence theory

Define Social presence is defined as the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships [69]. Tu and McIsaac [75] redefined social presence as “the degree of feeling, perception, and reaction to another intellectual entity in the computer-mediated communication environment”.

Three factors, namely co-presence, intimacy, and immediacy are framing the construct of social presence [15]. Co-presence, in the existing presence literature, is primarily used to refer to the sense of being together with other people, either, in a remote physical environment [58, 71], or in a technology-generated environment [33, 67]. In SNSs, user’ feeling of “being together” is a very important perception for taking part in activities and interaction in a SNSs.

Intimacy and immediacy refer to the sense of psychological involvement which are fundamentally related to social presence theory [65]. These constructs are applied to media from the social psychological work and focused on the role of nonverbal communication in interpersonal interaction [15] (please see [9, 6, 7, 54, 8]). Intimacy can measure to which extent would people taking care, trusting, expressing themselves, and making relationships with others [69, 72, 15].

While immediacy measures interpersonal communication to assess to which degree interactivity is achieved behaviorally and perceptually (please see [17, 16, 84]).

### C. Research model and hypotheses development

The research model incorporated two different theories: the Decomposed Theory of Planned Behaviour (DTPB) and social presence (see Fig. 1). A discussion of the model's constructs along with the formulated hypotheses is provided in the following sub-sections.

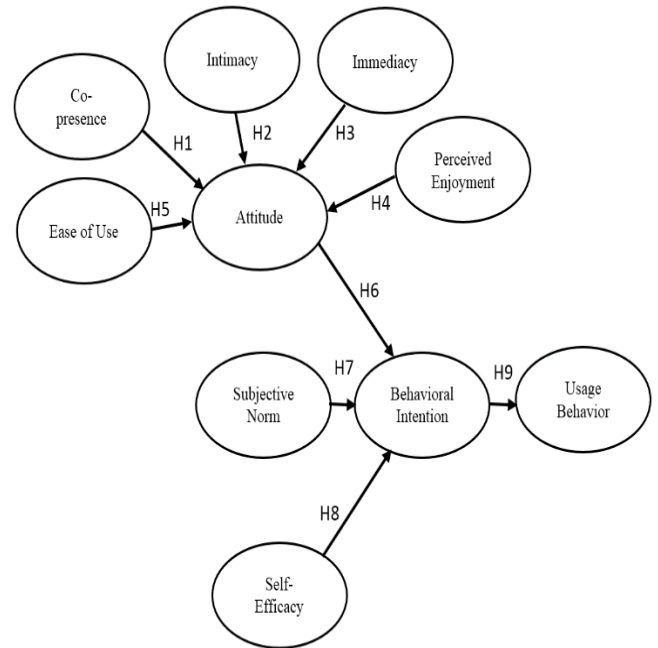


Fig. 1. The study model

#### 1) Social presence and user attitude

The Prior studies have identified both direct and indirect impacts of social presence on intention or usage of many information technologies such as the Internet, emails, IM and e-commerce [37]. Hassanein & Head [37] found that social presence has a positive impact on attitudinal antecedents. While Xu, et al., [80] found that social presence has a positive impact on SNS usage. In this study the researcher believes that social presence will positively influence SNS usage indirectly through user attitude, and as aforementioned the three factors, namely co-presence, intimacy, and immediacy are framing the construct of social presence [15] thus, the following three hypotheses are proposed:

- Hypothesis 1. Co-presence will positively influence user attitude.
- Hypothesis 2. Intimacy will positively influence user attitude.
- Hypothesis 3. Immediacy will positively influence user attitude.

#### 2) Perceived enjoyment and user attitude

Perceived enjoyment can be defined as the extent to which the activity of using a product or service is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated [28, 81, 38, 43, 55]. In other words, perceived enjoyment is the individual's perception of how much fun he/she has when he/she performs an activity [11, 66].

Scholars found that there is a relationship between perceived enjoyment and perceived control, and that influences the user interaction [78, 22, 42]. In other words, within a voluntary context, if someone enjoys doing some activity he will lose her/his self-consciousness and feeling of time and that affects his/her self-control [1, 42].

An affective reaction, such as emotion or enjoyment has been studied from a marketing perspective and it has been found that enjoyment influences cognitive perceptions or behavioral attitude [73]. Thus, the following hypothesis is proposed:

- Hypothesis 4. Perceived enjoyment will positively influence user attitude

#### 3) *Perceived ease of use and user attitude*

The perceived ease of use is defined as: "the degree to which a person believes that using a particular system would be free of effort" [26]. According to the Technology acceptance model (TAM) proposed by Davis [26], two constructs (1. perceived usefulness and 2. perceived ease of use) form the behavioural beliefs that influence individuals' attitude toward information technology, which in turn predicts their acceptance of IT [26, 53, 83]. Thus, the following hypothesis is proposed:

- Hypothesis 5. Perceived ease of use will positively influence user attitude.

#### 4) *Attitude and user behavioural intention*

Prior studies have shown that attitude positively influences behavioural intentions [3, 27, 2, 14, 5, 4]. Attitude is defined as an individual's feelings towards performing a specific behaviour, which is his positive or negative evaluation of performing the behaviour [27, 2].

As such, in the context of this study, attitude is defined as an individual's feelings towards adoption the SNSs and the following hypothesis is proposed:

- Hypothesis 6. Attitude will positively influence behavioural intention.

#### 5) *Subjective Norm and user behavioural intention*

The subjective norm (SN) represents a person's perception of social pressure from important referents to perform or not perform a behaviour [3, 2]. In other words, individuals usually become involved in actions or an object when they have a positive attitude toward it and when they believe that important individuals think they should do so [2]. According to the theory of group influence processes, people tend to conform to others' expectations to strengthen relationships with them or in some cases to avoid a punishment [30, 50]. For example, "a student may believe that the teacher thinks that he or she should use the

e-learning system. If that student is strongly motivated to comply with the expectations of the teacher, a positive impact on subjective norm may occur" [50]. This supports the effectiveness of subjective norm on behavioural intention. Therefore, the theory of reasoned action TRA [3] and the theory of planned behaviour TPB [2] measure social influence on behavioural intention through subjective norm. Accordingly, a positive relationship between subjective norms and behavioural intentions has hypothesized in many prior studies. Moreover, in the context of this study, Cheung and Lee [21] conducted a study to develop and empirically validate a research model on intentional social action in SNSs and they found that a stronger subjective norm leads to a higher level of intention to participate in an online social networking site. This finding has been also confirmed by study of Al-Debei et al. [4]. Thus, this hypothesis is proposed:

- Hypothesis 7. Subjective Norm will positively influence behavioural intention.

#### 6) *Self-efficacy and user behavioural intention*

Self-efficacy and facilitating conditions. Self-efficacy is related to the perceived ability of using a new technology. Self-efficacy refers to an individual's belief in his or her own capability to perform a specific task within a particular domain [24, 50]. Bandura [13] defined self-efficacy as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" [13].

Prior studies provided support for the relationship between computer self-efficacy and decisions involving IS adoption and usage [40, 27, 24, 44, 23, 77, 41, 32, 64].

In the context of SNS usage, online users with a higher magnitude of computer self-efficacy have a higher expectation of their ability to use a SNSs successfully with less reliance upon constant support, as a result they find using a SNS useful. Therefore, they are more likely to adopt SNS than others. Thus, the study propose that the self-efficacy construct indirectly influence usage behaviour through its direct effect on behavioural intention.

- Hypothesis 8. Self-efficacy will positively influence behavioural intention.:

#### 7) *User behavioural intention and Usage Behavior*

Behavioural intention is concerned the central factor in predicting the decision to perform a certain behaviour for many information systems theories such as the Theory of reasoned action model (TRA), the Technology Acceptance Model (TAM), the Theory of Planned Behaviour Model (TPB) and the Decomposed Theory of Planned Behaviour Model (DTPB). All these models have been widely used successfully in a range of situations and in many subject areas for predicting and understanding the performance of actual behavior [68, 20, 4] and all of them propose that an actual behaviour is significantly and directly affected by behavioural intention to perform the behavior [26, 2, 74]. Thus, the following hypothesis is proposed:

- Hypothesis 9. Behavioural intention will positively influence usage behavior.

### III. METHODOLOGY

#### A. Measurement

Identifying the concepts or constructs that a researcher intends to measure, and then choose appropriate measuring systems to measure those constructs is essential and has a significant impact on the accuracy of findings [85]. In order to answer the research question, the researcher developed the survey instrument. The items used in the survey instrument to measure the constructs were identified and adopted from prior research; particularly from the Communication field and IS research, in order to ensure the face (content) validity of the scale used. The items were widely used in the majority of prior studies indicating potential subjective agreement among researchers that these measuring instruments logically appear to reflect accurate measure of the constructs of interest. Table 1 lists the items developed for each construct in this study as well as set of prior studies where these items have been adopted from.

#### B. Data Collection Procedures

Data for this study were collected in two stages (6 months apart), from samples stratified into gender groups, by means of a survey conducted in Saudi Arabia in 2014. This type of sampling technique has been chosen due to the difficulty of drawing an actual representative sample in Saudi Arabia. Most Saudi people do not have their own mail boxes and mail services are not provided for every house. Moreover, it is hard to approach women in Saudi Arabia because of cultural

constraints and values. Therefore, stratified samples were drawn from several areas in the country and female relatives were engaged to distribute questionnaires to the female strata besides using electronic means to guarantee reaching females as well as males. The survey questionnaires were distributed to 1100 participants (550 male and 550 female). A total of 421 responses were received from male participants and 367 from female participants. After checking the data for validity, 657 were deemed fit for use in the analysis.

### IV. DATA ANALYSIS AND RESULTS

#### A. Reliability and validity

A reliability and internal consistency test was performed using data obtained from the pilot study of each construct in the instrument. The alpha values from the data obtained ranged from .864 to .947 with an overall alpha value of .974. Table 2 shows the Cronbach's alpha reliability of constructs in the study. The result indicated that all constructs of the model were reliable. Therefore, the internal consistency of the instrument was acceptable.

The Kaiser–Meyer–Olkin (KMO) and principal component factor analysis were conducted to examine the adequacy of the study sample and the validity of the study instrument, respectively. As the value of KMO was 0.812 as in Table3, the study sample was considered adequate and the appropriateness of using principal component factor analysis on the collected data was assured.

TABLE I. LIST OF ITEMS BY CONSTRUCT

Construct	Items	Adapted from
<b>Co-presence (CP)</b>	CP1. I felt like having others with me in my SNS website. CP2. I was aware of others' presence in my SNS website. CP3. I felt others close to me in my SNS website.	[79].
<b>Intimacy (IN)</b>	IN1. I had a warm and comfortable relationship with others in my SNS. IN2. I received considerable emotional support from others in my SNS. IN3. I felt emotionally close to others in my SNS website.	[79].
<b>Immediacy (IM)</b>	IM1. I found myself respected by others in my SNS website. IM2. I found myself encouraged by others in my SNS website. IM3. I found myself assisted by others in in my SNS website.	[79].
<b>Perceived enjoyment (NJ)</b>	NJ1. I would/do find it fun to use my SNS website. NJ2. I would/do find it exciting to use my SNS website. NJ3. I would/do find it enjoyable to use my SNS website. NJ4. I would/do find it interesting to use my SNS website. NJ5. Interacting with my SNS website would/ does spark my imagination. NJ6. Using my SNS website would/ does make me curious. NJ7. I feel spontaneous when I use my SNS website.	[59, 60].
<b>Perceived ease of use (ES)</b>	ES1. Learning to use SNS website was easy for me. ES2. I find SNS website easy to use. ES3. English language is not a barrier when I use SNS website.	[26, 60, 62, 49].
<b>Attitude (AT)</b>	AT1. I have positive opinion in SNS website. AT2. I think usage of SNS website is good for me AT3. I think usage of SNS website is appropriate for me	[26, 2, 4].
<b>Subjective Norm (SN)</b>	SN1. My friends would think that I should use SNS website. SN2. My colleagues/classmates would think that I should use SNS. SN3. People who are important to me would think that I should use SNS.	[74, 31, 4].

<b>Behavioural intention (BI)</b>	BI1. I intend to use SNS website in next three months. BI2. I expect my use of the SNS website to continue in the future.	[74, 57, 35, 4].
<b>Self-efficacy (SE)</b>	SE1. I can use SNS website even if there was no one around to show me how to do it. SE2. I can use SNS website with only the online help function for assistance SE3. If I wanted to, I could easily use any of SNS website on my own. SE4. I would be able to use SNS website even if I had never used a system like it before	[74, 62].
<b>SNS Usage (US)</b>	US1. On average, each week I use my SNS website often US2. For each log session, I use my SNS web site long US3. On my SNS, I often post something US4. On my SNS, I often view something US5. On my SNS, I often share something US6. On my SNS, I often reply to others	[5, 80].

TABLE II. CRONBACH'S ALPHA RELIABILITY OF CONSTRUCTS IN THE STUDY

Construct	Number of Items	Cronbach's Alpha
Co-presence	3	.876
Intimacy	3	.864
Immediacy	3	.938
Perceived Enjoyment	7	.947
Perceived ease of use	3	.905
Attitude	3	.912
Subjective Norm	3	.940
Self-efficacy	4	.900
Intention	2	.889
Usage	5	.938
Overall alpha value	36	.974

TABLE III. KMO AND BARTLETT'S TEST

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.812
Bartlett's Test of Sphericity	Approx. Chi-Square	5465.154
	Df	45
	Sig.	.000

Construct validity was assessed by conducting factor analysis to calculate a principal components analysis with a Varimax rotation. This analysis helped in evaluating the convergent and discriminant validity of items. The convergent validity was evaluated by examining whether items of a variable converged together on a single construct [63], and whether the factor loading for every item was  $> 0.45$ , as suggested by Comrey and Lee [25]. Comrey and Lee [25] suggested that loadings in excess of 0.45 could be considered fair, whereas it might be considered as good if loadings were greater than 0.55, and those of 0.63 very good, and those of 0.71 as excellent. The discriminant validity was evaluated by examining the cross loading of items on different factors. As the factor pattern shows in Table 4, loadings on the target factor are in the excellent range (22 out of 36), very good (5 out of 47), good (7 out of 47), and Fair (2 out of 47). As Table 4 shows, no weak loading was found indicating the validity of constructs applied in this study.

### B. Hypotheses testing

The study proposes a model that lends itself to studying the adoption of new technologies and applies it to determine significant factors that influence adoption of SNSs in Saudi Arabia. This model can be constituted through the test of 9 hypotheses. These hypotheses identify the relationship among factors as independent variables that impact adoption behaviour. Each accepted hypothesis represents an explanation of usage behaviour as dependent variables. Explanations are nomothetic and advance via deductive reasoning.

The simple correlation amongst all the study variables was conducted using Pearson's correlation analysis as shown in Table 5. As variables showed significant correlations ( $p \leq 0.01$ ), the researcher then utilized the regression model to test multicollinearity by examining collinearity statistics; i.e. Variance Inflation Factor (VIF) and tolerance.

To determine whether any multicollinearity effects existed, the researcher checked whether there was any warning message produced by the AMOS output that signalled a problem of multicollinearity. The results showed that there was no evidence of multicollinearity. The potential problem of multicollinearity can be further examined formally in the context of regression analysis.

In Table 6, the tolerance values ranged from 1.000 to 0.556. One way to quantify collinearity is with variance inflation factors (VIF). Although a variance inflation factor (VIF) that is less than or equal to 10 (i.e. tolerance  $>0.1$ ) is commonly suggested [10, 50]. Lee [48] suggested that a variance inflation factor (VIF) greater than 3 is an indicator of a serious problem of multicollinearity. In this study, a variance inflation factor (VIF) greater than 3 is considered to indicate a serious problem of multicollinearity. However, as shown in Table 3, there were no VIF values over 3 in the model; since the VIFs values ranged from 1.000 to 2.471. Thus there was no evidence of multicollinearity.

TABLE VI. MULTICOLLINEARITY TEST

Dependent variable	Path direction	Independent variables (predictors)	Collinearity Statistics	
			Tolerance	VIF
Attitude	←	Co-presence	.748	1.337
Attitude	←	Intimacy	.552	1.811
Attitude	←	Immediacy	.553	1.807

Dependent variable	Path direction	Independent variables (predictors)	Collinearity Statistics	
			Tolerance	VIF
Attitude	←	Perceived Enjoyment	.535	1.869
Attitude	←	Perceived ease of use	.405	2.471
Intention	←	Attitude	.562	1.780
Intention	←	Subjective Norm	.791	1.264
Intention	←	Self-efficacy	.667	1.499
Usage	←	Intention	1.000	1.000

To ensure the validity and reliability of the results and to use regression analysis in an appropriate manner data should be normally distributed. Jarque–Bera (skewness-kurtosis) test has been applied in this study to provide a comparison of the distributions of the research data and the normal distribution.

The symmetry of the distribution can be identified by Skewness values. If skewness value is positive, then data are clustered to the left of the distribution; otherwise data are clustered to the right of the distribution. While the height of the distribution can be measured by Kurtosis values. Positive kurtosis values indicate a peaked distribution, whilst negative kurtosis values suggest a flatter distribution (Hair, et al., 1998). Skewness–kurtosis acceptable values have been suggested by many scholars to be within the range of  $\pm 2.58$  at the 0.01 significance level [12, 4]. Thus, Jarque–Bera (skewness-kurtosis) test has been applied in this study and the result is summarized in Table 7. Table 7 shows that the study data are all within the recommended range and this gives us a green light to use the regression analysis.

TABLE IV. FACTOR ANALYSIS OF ITEMS SORTED BY CONSTRUCT (ROTATED COMPONENT MATRIX (A))

	Component						Its assessment
	1	2	3	4	5	6	
SE1	<b>.758</b>	.401	.016	.168	.197	.105	Excellent > 0.71
SE2	<b>.790</b>	.103	.269	-.001	.287	.290	Excellent > 0.71
SE3	<b>.754</b>	.215	.224	.131	.175	.096	Excellent > 0.71
SE4	.555	<b>.586</b>	-.040	.290	.235	.003	Good > 0.55
AT1	<b>.616</b>	.442	.146	.252	.191	.308	Good > 0.55
AT2	.503	.489	.139	<b>.508</b>	-.092	.213	Fair > 0.45
AT3	<b>.574</b>	.470	.311	.400	.101	.264	Good > 0.55
NJ1	.347	<b>.695</b>	.294	.270	.277	.087	Very good > 0.63
NJ2	.137	<b>.631</b>	.297	.325	.328	.181	Very good > 0.63
NJ3	.271	<b>.723</b>	.319	.223	.303	.013	Excellent > 0.71
NJ4	.240	<b>.807</b>	.297	.002	.131	.033	Excellent > 0.71
NJ5	.193	<b>.894</b>	.192	.072	-.045	.094	Excellent > 0.71
NJ6	.132	<b>.739</b>	.090	-.080	.128	.423	Excellent > 0.71
NJ7	.278	<b>.758</b>	.220	.135	.074	.361	Excellent > 0.71
IM1	.215	.334	<b>.875</b>	.088	-.018	-.031	Excellent > 0.71
IM2	.197	.274	<b>.834</b>	.052	.183	.100	Excellent > 0.71
IM3	.246	.173	<b>.828</b>	.018	.197	.130	Excellent > 0.71
IN1	.310	.313	<b>.587</b>	-.094	.441	.303	Good > 0.55
IN2	.177	.185	.565	-.016	.069	<b>.612</b>	Good > 0.55
IN3	.162	.153	<b>.833</b>	.227	.090	.227	Excellent > 0.71
CP1	.148	-.022	.388	.452	<b>.634</b>	.007	Very good > 0.63
CP2	.211	.234	.194	.281	<b>.799</b>	-.049	Excellent > 0.71
CP3	.344	.214	.076	.275	<b>.746</b>	.158	Excellent > 0.71
SN1	.203	.131	.069	<b>.904</b>	.186	-.078	Excellent > 0.71
SN2	.118	.096	.022	<b>.852</b>	.304	.122	Excellent > 0.71
SN3	.214	.089	.032	<b>.878</b>	.094	.102	Excellent > 0.71
ES1	.354	.448	.273	.105	.054	<b>.678</b>	Very good > 0.63
ES2	.231	.443	.139	.357	.035	<b>.641</b>	Very good > 0.63
ES3	.500	<b>.577</b>	.225	.186	-.106	.376	Excellent > 0.71

BI1	<b>.552</b>	.198	.264	.533	.287	.188	<i>Good &gt; 0.55</i>
BI2	<b>.517</b>	.302	.185	.460	.078	.381	<i>Fair &gt; 0.45</i>
US1	<b>.576</b>	.479	.317	.344	.174	.312	<i>Good &gt; 0.55</i>
US2	<b>.863</b>	.153	.114	.110	.076	.119	<i>Excellent &gt; 0.71</i>
US3	<b>.743</b>	.278	.114	.323	.256	-.184	<i>Excellent &gt; 0.71</i>
US4	<b>.801</b>	.059	.356	.167	.136	.165	<i>Excellent &gt; 0.71</i>
US5	<b>.745</b>	.385	.385	.161	-.089	.075	<i>Excellent &gt; 0.71</i>

Extraction Method: Principal Component Analysis.  
Rotation Method: Varimax with Kaiser Normalization.  
a. Rotation converged in 7 iterations.

TABLE V. CORRELATION ANALYSIS AMONGST THE VARIABLES

	US	BI	AT	NJ	IM	CP	ES	SN	SE
BI	.747**								
AT	.785**	.749**							
NJ	.629**	.539**	.764**						
IM	.730**	.638**	.768**	.802**					
CP	.556**	.678**	.584**	.515**	.485**				
ES	.679**	.638**	.729**	.771**	.922**	.384**			
SN	.455**	.412**	.460**	.396**	.295**	.412**	.367**		
SE	.573**	.521**	.577**	.355**	.431**	.144**	.499**	.246**	
IN	.761**	.619**	.770**	.828**	.903**	.532**	.838**	.477**	.255**

US: SNS Usage, BI: Behavioural intention, AT: Attitude, NJ: Perceived Enjoyment, IM: Immediacy, IN: Intimacy, CP: Co-presence, ES: Perceived ease of use, SN: Subjective Norm, SE: Self-efficacy.  
\*\*  $p \leq 0.01$

TABLE VII. NORMALITY TEST

	Skewness	Kurtosis
Subjective Norm	-.555	.153
Perceived ease of use	-.383	-.845
Co-presence	-.905	1.571
Immediacy	-.687	.090
Intimacy	-.922	.559
Perceived Enjoyment	-.394	-.525
Self-efficacy	.000	-.923
Attitude	-.639	.001
Behavioural intention	-.583	-.136
SNS Usage	-.944	.673

After assuring that necessary requirements are all adequately met, the study hypotheses were tested using multiple regression analysis.

First, “Co-presence”, “Intimacy”, “Immediacy”, “Perceived Enjoyment”, and “Perceived ease of use” were regressed on “Attitude”. As in Fig. 2, it was found that “Co-presence” ( $\beta = 0.227$ , Standardized path coefficient,  $p < 0.05$ ), “Intimacy” ( $\beta =$

0.138, Standardized path coefficient,  $p < 0.05$ ), “Immediacy” ( $\beta = 0.150$ , Standardized path coefficient,  $p < 0.05$ ), “Perceived Enjoyment” ( $\beta = 0.280$ , Standardized path coefficient,  $p < 0.05$ ), and “Perceived ease of use” ( $\beta = 0.172$ , Standardized path coefficient,  $p < 0.05$ ) are significantly and positively related to “Attitude” (adjusted  $R^2=0.69$ ) (see Table 8, Table 9 and Fig. 2). Thus, H1, H2, H3, H4 and H5 are supported.

TABLE VIII. COEFFICIENTS FOR PROPOSED MODEL

Dependent variable	Path direction	Independent variables (predictors)	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
			B	Std. Error			
Attitude	←	Co-presence	.258	.030	.227	8.515	.000
Attitude	←	Intimacy	.170	.069	.138	2.463	.014
Attitude	←	Immediacy	.172	.082	.150	2.088	.036
Attitude	←	Perceived Enjoyment	.331	.048	.280	6.854	.000
Attitude	←	Perceived ease of use	.196	.066	.172	2.967	.003
Intention	←	Attitude	.443	.027	.488	16.149	.000
Intention	←	Subjective Norm	.137	.022	.171	6.262	.000
Intention	←	Self-efficacy	.303	.032	.286	9.514	.000
Usage	←	Intention	.772	.028	.736	27.839	.000

P values less than 0.05 were considered statistically significant

TABLE IX. STANDARDIZED REGRESSION WEIGHTS

Criterion variable	Path direction	Criterion variable predictors	Estimate	(Significance)
Attitude	←	Co-presence	.227	Significant
Attitude	←	Intimacy	.138	Significant
Attitude	←	Immediacy	.150	Significant
Attitude	←	Perceived Enjoyment	.280	Significant
Attitude	←	Perceived ease of use	.172	Significant
Intention	←	Attitude	.488	Significant
Intention	←	Subjective Norm	.171	Significant
Intention	←	Self-efficacy	.286	Significant
Usage	←	Intention	.736	Significant

Thereafter, the three independent variables (i.e. “attitude”, “subjective norms” and “Self-efficacy”) were regressed on “Behavioral Intention”. Results, as in Fig. 2, indicate that all three variables are significantly and positively related to “Behavioral Intention” (adjusted  $R^2=0.590$ ): “attitude” ( $\beta = 0.488$ , Standardized path coefficient,  $p < 0.05$ ), “subjective norms” ( $\beta = 0.171$ , Standardized path coefficient,  $p < 0.05$ ) and “Self-efficacy” ( $\beta = 0.286$ , Standardized path coefficient,  $p < 0.05$ ) (see Table 8, Table 9 and Fig. 2). Thus, H6, H7 and H8 are supported.

Finally, the ninth Hypothesis was tested using multiple regression analysis which showed that “behavioural intention” ( $\beta = 0.736$ , Standardized path coefficient,  $p < 0.05$ ) has a significant and positive effect on “usage behavior” (adjusted  $R^2=0.540$ ) (see Table 8, Table 9 and Fig. 2). Thus, H9 is supported.

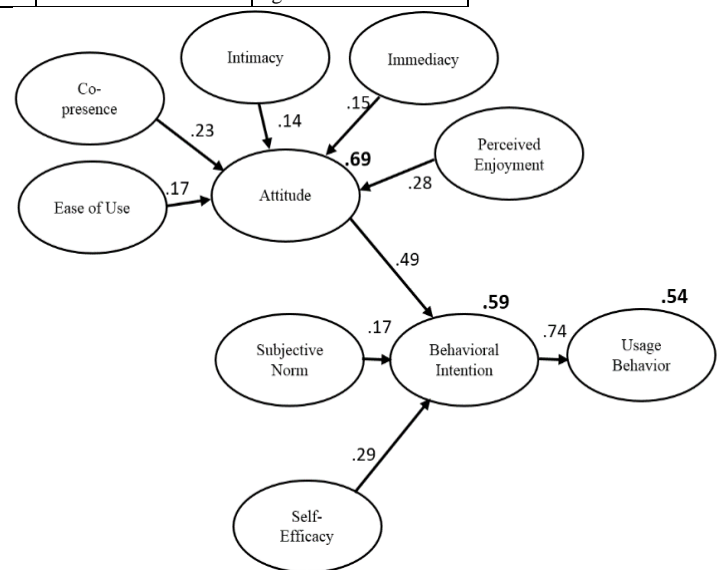


Fig. 2. The study results



V. DISCUSSION

Overall, the results support the validity of the proposed model. The study’ model shows that usage behaviour on online social networking services (SNSs) is determined by “behavioral intention” which in turn is determined by individuals’ “attitude”, “subjective norms”, and “self-efficacy”. The developed model also asserts that “Co-presence”, “Intimacy”, “Immediacy”, “Perceived Enjoyment”, and “Perceived ease of use” formed individuals’ “Attitude” towards “behavioral intention” to use online social networking services (SNSs). The results support all formulated hypotheses. The proposed model in this study explains 59% of the variance in “Behavioral Intention” and 54% of the variance in “Usage Behaviour”.

The results show that behavioural intention (BI) is the primary, direct determinant of usage behaviour (B) since "a person who intends to take a certain action is likely to carry out that behaviour" [46]. This result concurs with many prior studies such as Taylor and Todd study, according to their research, "behavioural intention plays an important substantive role, but is also important pragmatically in predicting behaviour" [74]. Likewise, De Guinea and Markus [29] indicate that IT use behaviour is the result of conscious, cognitive behavioural intention. The importance of behavioural intention towards usage behaviour is also reported in Venkatesh, Brown, Maruping and Bala [76]' study where they found that behavioural intention was a better predictor of duration of use and "behavioural intention will improve as a predictor of behaviour as individuals gain experience with the target behaviour" (p. 488). Thus most models position behavioural intention as an important mediating variable to be a primary predictor of behaviour, and simultaneously predicted by one or more independent variables. These independent variables or factors such as “attitude”, “subjective norms” and “self-efficacy” also influence significantly and indirectly the behavior.

The results also show that the constructs “attitude”, “subjective norms” and “self-efficacy” are significantly and positively related to “behavioral intention”. This result confirms the role of these constructs in shaping users’ behavioural intention in the SNS context. However and although all of the three constructs were found to be significant, the relation between “attitude” and “behavioral intention” is stronger ( $\beta = 0.49$ ,  $pb0.001$ ). Indeed, such a strong relation between the two constructs is evident in the literature [3, 27, 2, 14, 5, 4].

Consistent with the research hypotheses on individual’s “attitude”, the study’ findings suggest that “Co-presence”, “Intimacy”, “Immediacy”, “Perceived Enjoyment”, and “Perceived ease of use” have a significant positive impact on individual’s “attitude” towards SNSs usage.

A. Understanding Behaviour

The proposed models able to explain 54% of SNSs usage behavior. This ability relates to the diversity of the model’s constructs and the diversity of relations among their constructs. In the model, behavioural intention is the primary, direct determinant of behaviour on the premise that “a person who intends to take a certain action is likely to carry out that

behaviour” [46]. However, the additional explanatory power afforded by the other relative factors. An equation has been formulated and used to calculate the participation of every model’s construct in the model’s explanatory power. The formula was applied to the model using the total (direct and indirect) effects of each model’s construct on the SNSs usage behavior (see Table10, Table11 and Table 12) as follow:

$$A_x = \frac{\beta_x^2}{\sum_{k=1}^n \beta_x^2} \times R_B^2$$

Where:

$A_x$  = Participation of variable  $A_x$  in a model’ explanatory power

$\beta_x^2$  = Square of beta coefficients or standardized coefficients of variable

$R_B^2$  = Model’ explanatory power (*behaviour*)

$\sum_{k=1}^n \beta_x^2$  = Total of causal effects for the model’s constructs

TABLE X. DECOMPOSITION OF TOTAL CAUSAL EFFECTS FOR THE MODEL’S CONSTRUCTS

	NJ	IN	IM	ES	CP	SE	SN	AT	BI
A	.28	.138	.150	.172	.227	.000	.000	.000	.000
T									
BI	.137	.067	.073	.084	.111	.286	.171	.488	.000
US	.101	.050	.054	.062	.082	.210	.126	.359	.736

TABLE XI. STANDARDIZED DIRECT EFFECTS

	NJ	IN	IM	ES	CP	SE	SN	AT	BI
AT	.280	.138	.150	.172	.227	.000	.000	.000	.000
BI	.000	.000	.000	.000	.000	.286	.171	.488	.000
US	.000	.000	.000	.000	.000	.000	.000	.000	.736

TABLE XII. STANDARDIZED INDIRECT EFFECTS

	NJ	IN	IM	ES	CP	SE	SN	AT	BI
AT	.000	.000	.000	.000	.000	.000	.000	.000	.000
BI	.137	.067	.073	.084	.111	.000	.000	.000	.000
US	.101	.050	.054	.062	.082	.210	.126	.359	.000

Table 13 shows the participating models’ variables and their explanatory power. In the proposed models, behavioural intention is the primary, direct determinant of behaviour and its participation in the models’ explanatory power was the highest amongst the constructs. Behavioural intention was able to explain 39% of usage behaviour. This shows that behaviour is largely driven by behavioural intention and that has a notable impact on the model’s explanatory power.

TABLE XIII. PARTICIPATION OF MODEL’S VARIABLES IN THE MODELS’ EXPLANATORY POWER

Constructs	The proposed model
Intention	39%
Attitude	9.47%

Self-Efficacy	3.24%
Subjective Norm	1.16%
Perceived Enjoyment	0.75%
Co-presence	0.49%
Perceived ease of use	0.27%
Immediacy	0.21%
Intimacy	0.18%
Total	54%

This impact can be obviously seen when behavioural intention is excluded from the model, since the prediction of behaviour decreases substantially (from  $R^2(B) = 0.54$  to  $R^2(B) = 0.15$ ). The drop in predictive power when behavioural intention was omitted concurs also with the Taylor and Todd study, according to their research, "behavioural intention plays an important substantive role, but is also important pragmatically in predicting behaviour" [74]. Likewise, De Guinea and Markus [29] indicate that IT use behaviour is the result of conscious, cognitive behavioural intention. The importance of behavioural intention towards usage behaviour is also reported in Venkatesh, Brown, Maruping and Bala [76]' study where they found that behavioural intention was a better predictor of duration of use and "behavioural intention will improve as a predictor of behaviour as individuals gain experience with the target behaviour" (p. 488). Thus most models position behavioural intention as an important mediating variable to be a primary predictor of behaviour, and simultaneously predicted by one or more independent variables. These independent variables or factors also influence significantly and indirectly the SNSs usage behavior through behavioural intention. The three antecedents of behavioural intention ("attitude", "subjective norms" and "self-efficacy") explain around 14% of usage behavior, while, "attitude" alone explain 9.47% of SNSs usage behavior. Participation of "attitude" in the models' explanatory power refers to five antecedents which are "Perceived Enjoyment", "Co-presence", "Perceived ease of use", "Immediacy", and "Intimacy" which all form 69% of individual's attitude or feelings towards adoption the SNSs.

This result is consistent with the findings that the three factors, namely co-presence, intimacy, and immediacy which are framing the construct of social presence [15] have a positive impact on attitudinal antecedents [37] and in line with study of While Xu, et al., [80] which found that social presence has a positive impact on SNS usage. Moreover, the study' findings also confirm that "perceived Enjoyment" ( $\beta = 0.280$ , Standardized path coefficient,  $p < 0.05$ ), and "Perceived ease of use" ( $\beta = 0.172$ , Standardized path coefficient,  $p < 0.05$ ) are significantly and positively related to "Attitude" (adjusted  $R^2=0.69$ ). This result is consistent with the findings of Sun and Zhang, [73]'s study which found that enjoyment influences cognitive perceptions or behavioral attitude [73]. While result of impact of "perceived ease of use" on "attitude" confirms most prior studies [26, 53, 83] which found that "perceived ease of use" form the behavioural beliefs that influence individuals' attitude toward information technology, which in turn predicts their acceptance of IT.

The study' findings also confirm that the self-efficacy construct indirectly influence usage behaviour through its direct effect on behavioural intention. This indicates that SNSs users, who are confident of their abilities to use Internet and SNS'

sites are more likely to adopt such services. The result is consistent with the findings of most prior studies [40, 27, 24, 44, 23, 77, 41, 52, 32, 64] which provided support for the relationship between computer self-efficacy and decisions involving IS adoption.

The study findings also show that subjective norm has positive significant (.171) direct effects on intention to use SNSs. The result is consistent with the findings of Montesarchio [56]' study which found that subjective norm was positive explanatory variables of intent. Furthermore the result also is perfectly consistent with a study by Cheung and Lee which found that a stronger subjective norm leads to a higher level of intention to participate in an online social networking site [21]. This finding has been also confirmed by study of Al-Debei et al., [4].

## VI. IMPLICATIONS FOR THEORY AND PRACTICE

### A. Implications for theory and research

SNSs in general represent a rapidly growing phenomenon that touches upon several aspects of our lives, however, there is no theory-driven empirical research in the information systems literature tackling the adoption issues in this context from a behavioural and social perspective. This study contributes to the body of knowledge by exploring the behavioural and social factors affecting users' decisions to adopt SNSs as new technology.

The present study has shown the importance of social presence's factors, namely co-presence, intimacy, and immediacy, in explaining individuals' intentions and behavior. Prior to the current study, only limited number of research studies examined the role of social presence in technology adoption (e.g. Xu, et al., [80]), but not in depth as in this research.

In this study the researcher found that social presence positively influence SNS usage indirectly through user attitude, and as aforementioned that three factors, namely co-presence, intimacy, and immediacy are framing the construct of social presence. Thus, this study is the first empirical effort to examine the impact of co-presence, intimacy, and immediacy in determining intention or behaviour.

The study integrated theoretical model lends itself to studying the adoption of new technologies and applies it to determine significant factors that influence adoption of SNSs. The study' proposed model brings together concepts from two distinct lines of research, the Decomposed Theory of Planned Behaviour (DTPB) and social presence, as an attempt to build a more comprehensive model with a competitive ability to explain both technology adoption behaviour and behavioural intention.

As highlighted in the previous section, the study model explains 59% of the variance in "Behavioral Intention" and 69% of individual's attitude or feelings towards adoption the SNSs. Moreover, the proposed models also able to explain 54% of SNSs usage behavior. This ability relates to the diversity of the model's constructs and the diversity of relations among their constructs.

### B. Implications for practice

The study found that self-efficacy construct indirectly influence usage behaviour through its direct effect on behavioural intention. This indicates that SNSs users, who are confident of their abilities to use Internet and SNS' sites are more likely to adopt such services. This suggests that SNSs owners should develop effective strategies that take into account these differing levels of abilities by re-building policies and regulations for the sake of supporting users on the long run to help in increasing individuals' ability to use SNSs.

In addition to importance of self-efficacy, the study's findings also confirm that "perceived Enjoyment" ( $\beta = 0.280$ , Standardized path coefficient,  $p < 0.05$ ), and "Perceived ease of use" ( $\beta = 0.172$ , Standardized path coefficient,  $p < 0.05$ ) are significantly and positively related to "Attitude" (adjusted  $R^2=0.69$ ), thus, designing sites perceived to be easy to navigate could affect attitudes toward the site and can positively influence confidence levels. Moreover, SNSs should be designed also to be simple, user-friendly and providing users with enjoyable and pleasant experiences. SNSs used to be connected through desktop computers however it should be able to work through smart phones regardless of the operating system, thus service providers, and developers should take this design issues into their account.

### VII. CONCLUSIONS

This study examines individuals' intentions and behaviour on Social Networking Sites (SNSs), from a social and behavioural perspective. The study proposed model brings together concepts from two distinct lines of research, the Decomposed Theory of Planned Behaviour (DTPB) from IS models and social presence theory from the social psychological theories of interpersonal communication and symbolic interactionism as an attempt to build a more comprehensive model with a competitive ability to explain both technology adoption behaviour and behavioural intention. The proposed model shows that usage behaviour on online social networking services (SNSs) is determined by "behavioral intention" which in turn is determined by individuals' "attitude", "subjective norms", and "self-efficacy". The developed model also asserts that "Co-presence", "Intimacy", "Immediacy", "Perceived Enjoyment", and "Perceived ease of use" formed individuals' "Attitude" towards "behavioral intention" to use online social networking services (SNSs). The results support all formulated hypotheses. The proposed model in this study explains 69% of individual's attitude or feelings towards adoption the SNSs, 59% of the variance in "Behavioral Intention" and 54% of the variance in "Usage Behaviour".

The present study has shown the importance of social presence's factors, namely co-presence, intimacy, and immediacy, in explaining individuals' intentions and behavior. Prior to this study, only limited number of research studies examined the role of social presence in technology adoption, but not in depth as in this research. In this study we found that social presence positively influence SNS usage indirectly through user attitude, and as we aforementioned that three factors, namely co-presence, intimacy, and immediacy are framing the construct of social presence. Thus, this study is the

first empirical effort to examine the impact of co-presence, intimacy, and immediacy in determining intention or behaviour.

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