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# Determinants of Perceived Usefulness and Perceived Ease of Use in Individual Adoption of Social Network Sites

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## ABSTRACT

A large-scale online survey (n=1327) was utilized to investigate determinants of perceived usefulness and perceived ease of use as well as other effects on the formation of a behavioral intention to use social network sites (SNS). Findings show that need-based motivations such as social deficit, communication need, and community need do positively impact perceived usefulness while hedonic need and contribution need do not. Additionally, perceived ease of use was affected by technology-oriented self-efficacy. Trust and privacy considerations impacted perceived usefulness as well, while external threats to security did not. Finally, age and gender effects on the underlying technology acceptance model constructs were also explored.

## Keywords

Social Network Sites, Perceived Usefulness, Perceived Ease of Use, Technology Acceptance, Individual Characteristics

## INTRODUCTION

As the number of Social Network Sites (SNS) and usage of those sites continue to grow in society it becomes increasingly important to understand what individual characteristics drive individual perceptions and then likelihood of usage. Although understanding this dramatic change in how humans interact with each other is critical from a sociology and anthropology-based perspective, it may also be critical for organizations to understand as professional analogues to these voluntary social sites continue to expand in popularity. These are primarily used to support internal and external business communities and collaborative teams. Understanding why individuals choose to use these sites in purely voluntary social environments may aid organizations – and technology vendors who serve them – to better design business analogues to maximize participation and goal realization.

SNS refers to groups of people who interact over the Internet around shared purposes, interests, or needs (Preece, 2000). Chiu, Hsu, and Wang (2006) defined virtual communities as “online social networks in which people with common interests, goals, or practices interact to share information and knowledge, and engage in social interactions (p. 1880).”

SNSs are playing an increasingly important role in their members’ daily life, which ranges from supplementing face-face communications (Wellman, Quan-Haase, Witte, and Hampton, 2001), establishing and maintaining friendships and romantic relationships (Park and Floyd, 1996), learning and knowledge sharing (Constant, Sproull, and Kiesler., 1996; Powers, 2004), and information exchange for consumer products (Kozinets, 1999). More recently, SNSs have also become a popular vehicle for enhancing business processes, such as new product development, customer support (Gu and Jarvenpaa, 2003), professional support (Wasko and Faraj, 2005), and healthcare (Leimeister, Ebner, and Krcmar, 2005).

The success of an SNS depends on the commitment and voluntary participation of its members (Ren, Kraut & Kiesler, 2007). Such participation may take a variety of formats—such as chatting, posting blogs, and online forums, status updates, and avatar-based role playing. Based on the directions of information flow, participation in an online community can be categorized into four general types of activities: 1) posting personal content, 2) viewing others’ content, 3) responding to others’ content, and 4) communicating directly with others.

Many studies have been conducted on individuals' participation in SNSs. For example, Bagozzi and Dholakia (2002) conceptualized participation in online community as an intentional social action. Drawing upon the Model of Goal-Directed Behavior, the authors found that "we-intentions" are a function of individual factors (positive anticipated emotions and desires) and community influences (social identity).

Dholakia, Bagozzi, and Pearo (2004) found that perceived values, including purposive value, self-discovery, maintaining interpersonal connectivity, social enhancement, and entertainment value and social identity including cognitive social identity, affective social identity, and evaluative social identity affect individuals' participation in online communities.

Chiu, Hsu, and Wang (2006) suggested that participation in SNSs is essentially a knowledge-sharing process. They found that the facets of social capital, including social interaction ties, trust, norm of reciprocity, identification, shared vision and shared language, have an impact on individuals' knowledge sharing in SNSs. Langerak, Verhoef, Verlegh, and Valck (2004) suggested that membership length had a positive effect on online community member participation.

## NEED-BASED MOTIVATIONS

People interact socially on a SNS to satisfy their own needs (Andrews, Preece, and Turoff, 2002). Ardichvili (2008) classified motivational factors into utilitarian factors, value-based factors, and factors associated with sense of community and belonging. Kollock (1999) outlines three types of motivations: anticipated reciprocity, increased recognition, and sense of efficacy. Smith (1992) borrowed a term from social psychology, "sense of community", to describe motivation for participation in an SNS.

Individuals may contribute valuable information because the act results in a sense of efficacy, that is, a sense that they have had some effect on this environment. There is well-developed research literature that has shown how important a sense of efficacy is, and making regular and high quality contributions to the group can help individuals believe that they have an impact on the group and support their own self-image as an efficacious person.

Wang and Fesenmaier (2004) investigated the relationships between member needs and their level of participation in an online travel community. They found that social and hedonic needs have positive effects on level of participation while functional needs have a negative effect.

Shen and Khalifa (2008) found that an SNS user's intrinsic motivation and extrinsic motivation positively affect his participation in the community.

Ren, Kraut & Kiesler (2007) found that common identity-based attachment and bond-based attachment increase members' evaluation of the community, their commitment to it, and their levels of participation.

## RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

### Extended TAM2 Hypotheses

The primary contribution of this research is not in re-validating a TAM model in another technology setting, but rather to illuminate what individual characteristics leads an individual to different levels of perceived usefulness and perceived ease of use in regards to SNS usage. However, since the TAM2 model is the lens that these relationships are studied through, it is important to explicitly validate these relationships. The basic model employed is an enhanced TAM2 model (Venkatesh & Davis, 2000) where the attitude mediator preceding behavioral intention is retained as in the original TAM (Davis, 1989). Attitude was thought to be important and differentiated from perceived usefulness in this context since the use of these sites is general completely voluntary in the context studied. Since the usage of these sites has become a ubiquitous social phenomenon, it has also become charged with emotional and social opinion that may affect attitude in ways that it does not affect usefulness. An analogy may be found in the context of viewing television, one might find television to be 'useful' for entertainment or informational purposes but have a negative attitude due to other perceived consequences of television watching. The TAM2 component is the addition of social norm to the original TAM. It is expected that social norms will play a significant role in an individual's opinion on attitude, usefulness, and on the eventual decision to engage in the behavior. Additionally, for the reasons discussed above, it is thought that perceived usefulness and ease of use may not be fully mediated by attitude toward the behavior so direct paths between these items and behavioral intention are also analyzed in the model. This leads to the following hypotheses:

*H1: An individual's perceived usefulness of SNS will increase their attitude toward participating in an SNS.*

*H2: An individual's perceived usefulness of SNS will increase their behavioral intention of participating in an SNS.*

- H3: An individual's perceived ease of use of SNS will increase their attitude toward participating in an SNS.
- H4: An individual's perceived ease of use of SNS will increase their behavioral intention of participating in an SNS.
- H5: An individual's perceived ease of use of SNS will increase their perceived usefulness of SNS.
- H6: An individual's perceived social norm toward SNS will increase their attitude toward participating in an SNS.
- H7: An individual's perceived social norm toward SNS will increase their behavioral intention of participating in an SNS.
- H8: An individual's perceived social norm toward SNS will increase their perceived usefulness of SNS.
- H9: An individual's attitude toward participating in an SNS will increase their behavioral intention of participating in an SNS.

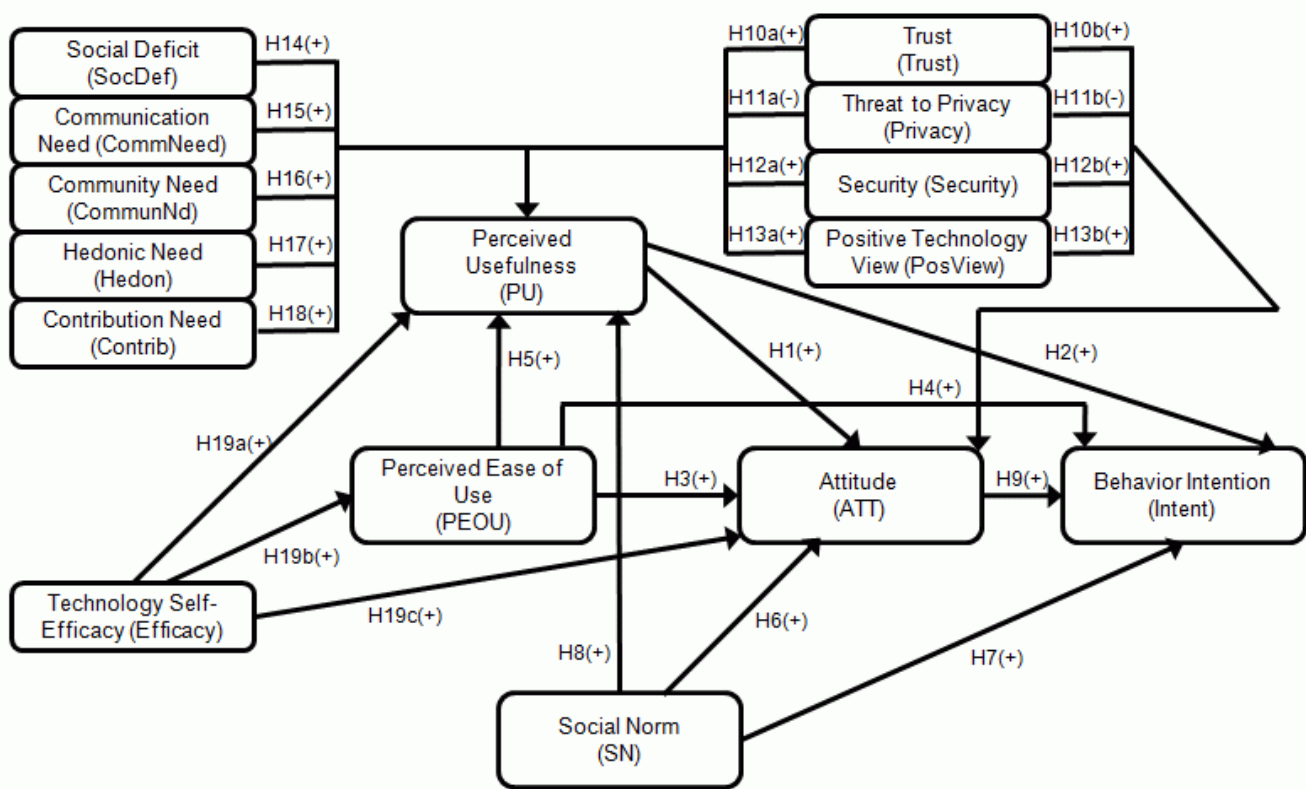


Figure 1. Abbreviated Research Model

**Trust, Privacy, Security, and Technology View Effects on Perceived Usefulness and Attitude**

Trust, privacy and security have all been demonstrated to be important in technology acceptance decisions where these factors are relevant, often in online activities such as e-commerce and online banking. It is reasonable to hypothesize based on these past studies that these issues would play a role in the decision to engage in SNS activities. While probably not considered as sensitive as those issues associated with online banking, certainly it is common to post information on these sites that the user does not want to be viewed by anyone with an internet connection. Therefore, we hypothesize:

*H10a, H10b: Increased trust associated with SNSs will increase perceived usefulness (a) and their attitude toward participating in an SNS (b).*

*H11a, H11b: Increased perceived threat to privacy associated with SNSs will decrease perceived usefulness (a) and their attitude toward participating in an SNS (b).*

*H12a, H12b: Increased belief in the security associated with SNSs will increase perceived usefulness (a) and their attitude toward participating in an SNS (b).*

In addition to these factors we believe that the potential user's belief in whether technology, in general, is positive and beneficial to themselves and society would also play a similar role. Thus, we suggest that a belief in the overall 'goodness' of technology (positive general view of technology) would increase attitude and perceived usefulness for many technologies, especially those that are social in nature. Therefore:

*H13a, H13b: Increased positive general view of technology will increase perceived usefulness (a) and their attitude toward participating in an SNS (b).*

### **Individual Needs Effects on Perceived Usefulness**

The development of this set of hypotheses is important but involved and requires substantial space for legitimate explanation. Space limitations require the authors to point interested readers to the full paper for this discussion. These hypotheses were informed by the more recent literature briefly touched upon above as well as well known works such as Ajzen, 1988; Ajzen and Fishbein, 1980; Fishbein and Ajzen, 1975; Maslow, 1943, 1954, 1971; Maslow and Lowery, 1998; and Petri, 1991. Brief definitions are provided below for these five constructs.

*Social Deficit* – Belief that the individual lacks sufficient social contact with individuals and groups.

*Communication Need* – The need to have sufficient people or groups to communicate with.

*Community Need* – The need to be a part of a community (also called tribal need or group need).

*Hedonic Need* – The need to engage in pleasurable activities.

*Contribution Need* – The need to contribute ones ideas or solutions to other individuals or groups.

*H14: An increased individual level of social deficit will increase their perceived usefulness of SNS.*

*H15: An increased individual level of communication need will increase their perceived usefulness of SNS.*

*H16: An increased individual level of community need will increase their perceived usefulness of SNS.*

*H17: An increased individual level of hedonic need will increase their perceived usefulness of SNS.*

*H18: An increased individual level of contribution need will increase their perceived usefulness of SNS.*

### **Technology Self-Efficacy Effects**

*H19a, H19b, H19c: An increased individual level of technology self-efficacy will increase their perceived usefulness (a), perceived ease of use (b), and attitude (c) associated with SNS.*

### **Gender and Age Related Effects**

#### *Direct Effects*

*H20a, H20b, H20c, H20d: A person's gender will affect their perceived usefulness (a), perceived ease of use (b), and attitude (c) associated with SNS, as well as their general technology self-efficacy (d).*

*H21a, H21b, H21c, H21d: The higher a person's age the lower will be their perceived usefulness (a), perceived ease of use (b), and attitude (c) associated with SNS, as well as their general technology self-efficacy (d).*

#### *Moderating Effects*

Gender and age are commonly employed moderators related to studies such as this. Here we explore the moderating effects of these items on how levels of the TAM2 items relate to other TAM2 items. Specifically those relationships associated with

H1 through H9. This will require evaluation of 18 possible moderation effects. Only effects that show at least marginal significance ( $p \leq 0.10$ ) will be retained in the final model. As this is an exploratory element in an otherwise confirmatory study these effects will be discussed in the results section within the context of exploratory limitations of such analyses (in full paper). We will not enumerate the 18 implied hypotheses here for brevity.

## METHODOLOGY

### Sample and Data Collection

A large scale online survey ( $n=1327$  usable responses) was performed on a population of individuals in the email database of a large state university in the U.S.A. Subjects included students, faculty, staff, and alumni.

## RESULTS

### Overall Model Fit

WarpPLS provides three different fit indices. These are the average path coefficient (APC), the average R-squared (ARS), and the average variance inflation factor (AVIF). The APC and ARS also provide p-values that are calculated “through a complex process that involves resampling estimations coupled with Bonferroni-like corrections (Kock, 2010, p. 16).” It is recommended that a model with good fit have p-values for APC and ARS that are less than 0.05 (Kock, 2010). The reported p-values for both indices are  $p \leq 0.001$ , indicating a good fit. Likewise, the AVIF is recommended to be less than 5 (Kock, 2010). The reported AVIF is 1.445, also indicating a good fit.

Testing the measurement model includes the measurement and assessment of reliability, convergent validity and discriminant validity. Cronbach’s Alpha can be considered a lower bound for reliability while composite reliability is considered a better true estimate (Sánchez-Franco, 2006). The lowest composite reliability for any latent variable is 0.827 which exceeds the 0.7 cutoff suggested by Nunnally (1978) for all latent variables (LVs). This demonstrates adequate reliability.

To assess discriminant and convergent validity the average variance extracted (AVE) and LV correlations are utilized. An AVE that is greater than 0.5 demonstrates adequate convergent validity. All LVs have AVE greater than 0.5 with the lowest being Communication Need (CommNeed) for the incentive subgroup (0.525). Table 1 shows latent variable correlations along with the square root of the AVE for each structural model. To demonstrate adequate discriminant validity each square root of the AVE (diagonal elements in bold) must be greater than the correlation of that LV and any other LV in the model. Therefore, adequate discriminant and convergent validity is demonstrated.

Further, a measure of variance explained provided by the  $R^2$  value for endogenous (dependent) variables gives an indication of the explanatory power of the overall model. Here 53.5% of the variance of behavioral intention to use an SNS is explained by the model, 57.3% of the variance of PU is explained, and 59.4% of the variance of attitude toward the behavior is explained (shown in Figure 2). This demonstrates a very high explanatory power of the model and further demonstrates its validity.

### Hypotheses Testing and Discussion

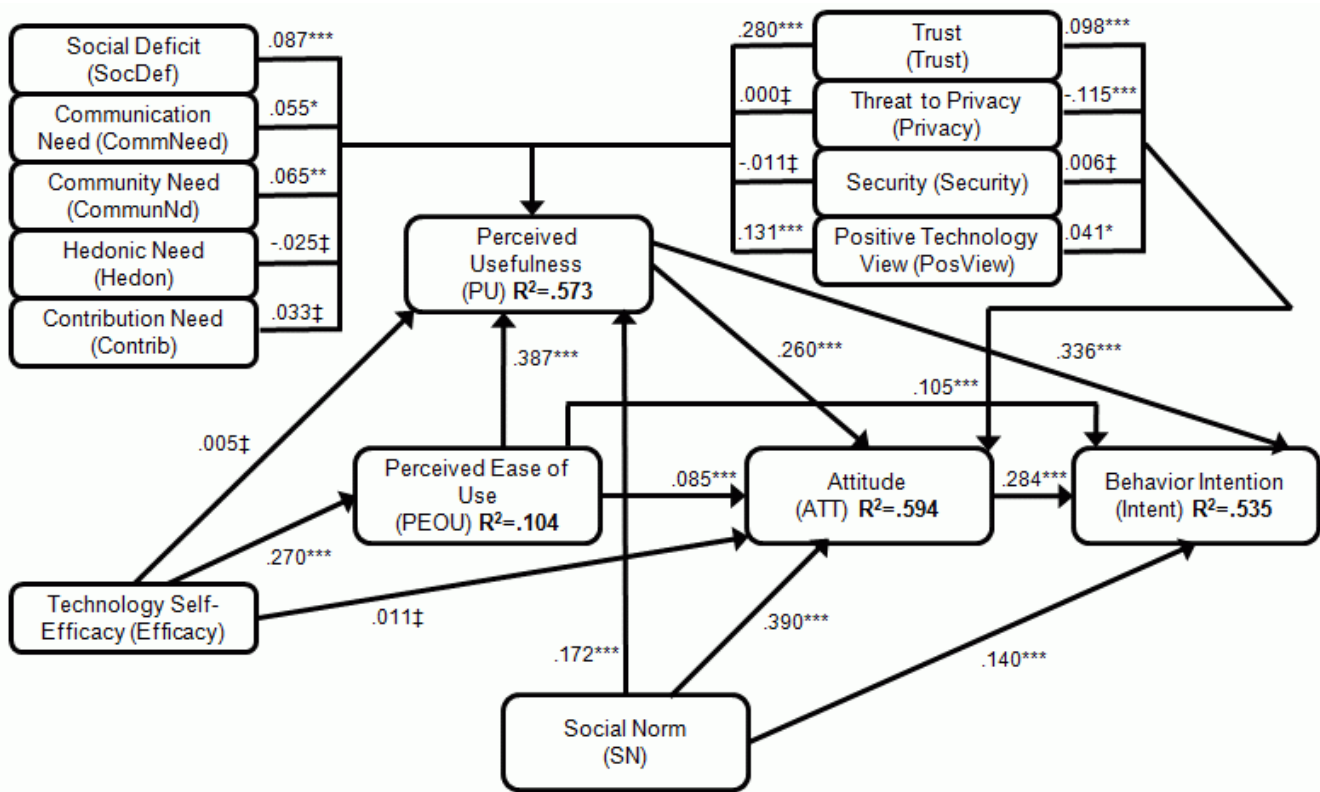
Hypotheses testing for hypotheses shown in the abbreviated research model (Figure 1) are shown in Figure 2.

#### Extended TAM2 Hypotheses

Hypotheses H1 through H9 detailed above all pertain to the extended TAM2 model used as a lens in which to view the other interactions central to the goals of this research. Each of these is confirmed in direction of effect (all positive) and all are significant at the  $<0.001$  level. The purpose of these hypotheses were to simply validate the underlying model and as there is vast literature detailing these interactions, this discussion will simply state that the model is validated and readers are referred to the full paper for more detailed discussion. The one exception to this that deserves some discussion here is the role of social norms (SN).

Social norms measure the perceived degree that people who influence the decision maker believe that they should engage in the activity. In many TAM models SN has not proven to be significant. The influence of SN on PU, attitude, and behavioral intention in this context demonstrates that an individual’s level of these items is influenced (greatly influenced in the direct effect on attitude) by the perceived opinions of others. While this might be expected for a socially-linked technology, it does also point to an important managerial implication for professional analogues. If the analogue holds (further research is

necessary), organizations that focus on opinion leadership and technological evangelism concerning these systems might yield significant benefits in terms of end usage levels.



Legend: ‡= not significant, \*=significant at .05, \*\*=significant at .01, \*\*\*=significant at .001

Figure 2. Path Coefficients and Significance for Abbreviated Research Model

*Trust, Privacy, Security, and Technology View Effects on Perceived Usefulness and Attitude*

The level of trust individual’s have in SNS had a significant positive effect ( $p < 0.001$ ) on both perceived usefulness and attitude. The effect size of trust on PU is greater than any other non-TAM contributor (only PEOU is greater). This points to an argument that the level of an individual’s trust in the system plays a powerful role in determining how useful the SNS is. It may be true that if the motivation of an individual to use an SNS is predominantly need-based, the ability to trust the system is central to need satisfaction and therefore perceived usefulness of the system.

It is quite interesting that this does not seem to be the case in regards to privacy. Perceived threat of usage to privacy has no demonstrated impact on PU but does have a significant ( $p < 0.001$ ) effect on attitude. The path coefficient is negative in this case since the variable was modeled as threats to privacy, it would be equivalent to say that increased faith in system privacy positively affects attitude toward usage. This shows that privacy does impact overall attitude towards using the system but this impact is not predominantly mediated through perceived usefulness as might be expected. Users believe that privacy is important but does not impact how useful the system is to them.

Security issues do not seem to play a role in either PU or attitude. While trust and security are related conceptually, here trust was modeled to reflect internal integrity of the system, operators, and community while security measured perceived threats from external sources (such as hackers). It appears that these external threats do not play much of a role in determining PU or attitude toward the system.

ATT	<b>0.788*</b>																
PU	0.623	<b>0.812</b>															
PEOU	0.502	0.638	<b>0.827</b>														
SN	0.649	0.475	0.382	<b>0.767</b>													
Intent	0.641	0.650	0.518	0.531	<b>0.932</b>												
Efficacy	0.213	0.255	0.267	0.149	0.251	<b>0.875</b>											
PosView	0.361	0.451	0.422	0.271	0.295	0.345	<b>0.843</b>										
CommNeed	0.306	0.289	0.256	0.248	0.237	0.100	0.249	<b>0.725</b>									
SocDef	0.089	0.006	0.089	0.101	0.022	0.050	0.048	0.295	<b>0.785</b>								
CommunNd	0.285	0.266	0.196	0.262	0.231	0.121	0.231	0.668	0.313	<b>0.853</b>							
Hedon	0.290	0.225	0.234	0.204	0.209	0.169	0.253	0.533	0.271	0.481	<b>0.747</b>						
Contrib	0.248	0.238	0.200	0.184	0.180	0.263	0.257	0.519	0.258	0.485	0.447	<b>0.843</b>					
Trust	0.471	0.536	0.384	0.336	0.486	0.235	0.291	0.121	-0.024	0.117	0.130	0.124	<b>0.849</b>				
Security	0.245	0.204	0.096	0.218	0.232	0.054	0.084	0.006	-0.032	0.022	-0.002	0.039	0.440	<b>0.793</b>			
Privacy	-0.367	-0.281	-0.247	-0.229	-0.354	-0.176	-0.177	-0.001	0.029	-0.029	-0.076	-0.044	-0.433	-0.308	<b>0.756</b>		
	ATT	PU	PEOU	SN	Intent	Efficacy	PosView	CommNeed	SocDef	CommunNd	Hedon	Contrib	Trust	Security	Privacy		

\*Note: Square roots of average variances extracted (AVE's) shown on diagonal.

Table 1. Latent Variable Correlations for Discriminant Validity



Positive technology view does increase perceived usefulness ( $p \leq 0.001$ ) and attitude ( $p \leq 0.05$ ) significantly. Positive technology view includes non-SNS specific attitudes toward computer and internet usage. In other words, is using these technologies “good” overall? These results demonstrate that those with an overall positive view of these technologies are more likely to find SNS to be useful and are more likely to display a positive general attitude toward SNS in addition to the effect mediated through PU.

#### *Individual Needs Effects on Perceived Usefulness*

An increased level of social deficit has a positive significant effect ( $p \leq 0.001$ ) of perceived usefulness. The individual’s perception that they are lacking in access to social resources does lead to a more positive view of the usefulness of SNS. This confirms the belief that a feeling that something is “missing” socially will likely lead to more SNS usage mediated by PU. This adds to the evidence of a need-based motivation for SNS usage.

Likewise, the need to communicate also demonstrate a significant positive effect ( $p \leq 0.05$ ) on PU. This intrinsic need to communicate with others provides additional need-based motivation for SNS usage.

The need to feel to be part of a community (sometimes referred to as group or tribal need) also leads to an increase in the perceived usefulness of the system.

Finally, neither hedonic need nor contribution need have significant relationships to perceived usefulness of the system. Therefore, the need for enjoyment does not seem to play a role in the perceived usefulness of the system. Perhaps this is due to a more utilitarian view of the individual towards what might be considered “useful” than that brought about by simple personal enjoyment. Likewise the need to contribute ideas and solutions to other individuals and groups does not seem to play a role.

Taken together these results have some interesting implications. Neither the most self-focused need studied (arguably hedonic need) nor the least self-focused need studied (arguably contribution need) seem to play an important role. Conversely, the needs more focused on interactions between the individual and other groups or individuals do play an important role.

#### *Technology Self-Efficacy Effects*

Technology self-efficacy does not significantly impact perceived usefulness or attitude. This is interesting because it demonstrates that an individual who perceives themselves as not especially technology-savvy may still perceive these systems as useful and have a positive attitude toward the system except for the effects that are mediated through PEOU. The significant effect of self-efficacy on PEOU is not very surprising since those that are more comfortable with technology are likely to perceive any technology-based system as being more easy to use. This confirms other studies that the effect of self-efficacy is fully mediated by PEOU in TAM-based models.

#### *Gender and Age Related Effects*

Gender and age-based effects are commonly used as both direct effects in TAM models as well as moderators. The inclusion of these elements caused the graphic representation of the research model to be overly complex, significantly lessening its clarity so these items are not shown in the figures. Age is coded in years and gender is coded as 1=female, 0=male. See table 2 for results.

*H20a, H20b, H20c, H20d: A person’s gender will affect their perceived usefulness (a), perceived ease of use (b), and attitude (c) associated with SNS, as well as their general technology self-efficacy (d).*

*H21a, H21b, H21c, H21d: The higher a person’s age the lower will be their perceived usefulness (a), perceived ease of use (b), and attitude (c) associated with SNS, as well as their general technology self-efficacy (d).*

Hypothesis	Path Coefficient	Significance
H20a: Gender→PU	0.013	n.s.
H20b: Gender→PEOU	0.054	P<=0.05
H20c: Gender→ATT	0.026	P<=0.10
H20d: Gender→Efficacy	-0.245	P<=0.001
H21a: Age→PU	-0.013	n.s.
H21b: Age→PEOU	-0.175	P<=0.001
H21c: Age→ATT	-0.074	P<=0.001
H21d: Age→ Efficacy	-0.054	P<=0.05

**Table 2. Gender and Age-Related Direct Effects**

The age-related effects show that the older a person is the lower the PEOU and attitude toward SNS. This is consistent with the view that these systems are currently dominated by younger participants (though that dominance may be ebbing). Also consistent with other research is that, the older you are, the lower your technology self-efficacy is likely to be. This makes sense since the youngest participants in this study (participants must be 18) have never known a world without computers and the Internet which undoubtedly increases their comfort with these types of technologies. The most interesting aspect of these direct effects is the lack of a significant relationship with PU. In other words, age seems to have no effect on PU other than that mediated by PEOU. This suggests that older individuals would find SNS to be just as useful as younger individuals if their self-efficacy and PEOU were increased to the same level. There does not seem to be an age-related negative bias on usefulness other than comfort with the technological aspects.

Gender-based direct effects confirm other research that there remains a negative gap in technology self-efficacy for females. What is highly interesting here is that there is a positive direct effect on PEOU for females. This may seem to be in conflict when looked at in isolation but in the context of the model it shows that, while females appear to be less self-efficacious concerning technology in general, this effect is mediated through efficacy to PEOU and the positive direct effect on PEOU can be interpreted as showing that females have a higher PEOU of SNS than would be otherwise suggested by their general efficacy scores than their male counterparts. In simpler terms, females likely perceive SNS technologies as easier to use than other technologies.

Gender and age were also tested as moderators to all TAM2 relationships and only moderation effects that showed at least a P<=0.10 level of significance were retained in the final model. In brief summary, these results show that being female increases the effect of social norm on attitude and decreases the effect of social norm on behavioral intent. Being older increases the effect of perceived usefulness on attitude and increases the effect of social norm on behavioral intent. All other tested moderation effects were not significant.

## CONCLUSION

The results and brief discussion above does yield some additional interpretation. However, space limitations do not allow exploring those here. Readers are encouraged to contact the authors for the full paper. The authors also acknowledge that there are many occasions above where literature citations are necessary but omitted. These are omitted here due to space limitations and again encourage interested readers to contact the authors for the complete references, literature review, theoretical development, and discussion.

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