influence were adapted from Pee et al. [15]. We also wanted to examine the harmful consequences of such SNW use. This study used scenarios to evaluate various *social networking insecure behaviors*. Following the section on the SNW use we presented the scenarios and related questions following [7]. Scenarios are common in IS security studies (e.g., [7]) so as to provide a nonintrusive and unintimidating way to respond to sensitive issues. We developed two scenarios of information sharing for each of the sample groups – students and employees. The survey instrument is provided in Appendix 1.

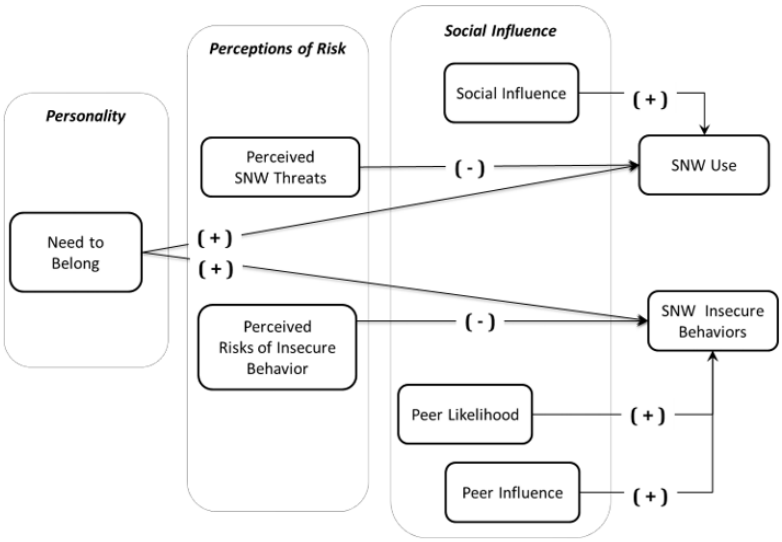

Figure 1. Research Model

3.1. Data Collection

We used a professional market research firm to randomly select and invite employed, computer-using professionals as well as students to take our survey. The final sample consisting of 622 usable responses was used for the data analysis.

4. Analysis and Results

We used SmartPLS 3 as the primary statistical tool to analyze the measurement and structural models because it is well-suited to handle large models with latent constructs. Following standard practice and bootstrap of 500 runs, we carried out preliminary analysis by testing the measurement model followed by the hypothesized structural relationships.

4.1. Measurement Model

We reviewed all study measures using criteria for formative and reflective measures and determined that all constructs were reflective. To assess reflective constructs in our measurement model, we examined construct reliability, convergent validity, and discriminant validity. Measurement reliability is assessed using composite reliability and Cronbach's alpha. A composite reliability of 0.70 or greater and a Cronbach's alpha of 0.70 is considered acceptable for research [5]. Internal consistencies of all variables were considered acceptable since they exceed 0.70, signifying satisfactory reliability.

Convergent validity assesses consistency across multiple items while discriminant validity examines the extent to which different constructs diverge from one another. To test the convergent and discriminant validity, AVE, latent construct correlations, and indicator loadings were examined. Convergent validity is shown when the PLS indicators load much higher on their hypothesized factor than on other factors (i.e., own loadings are higher than cross loadings). Items should load high (>0.7) on their respective constructs and no item should load higher on constructs other than the one it was intended to measure. All estimated standard loadings were significant ($p<0.001$)) and of acceptable magnitude (above 0.70) [8] (Appendix 3). Also, loadings were found to be much higher than all cross loadings, with cross loadings of items on other latent constructs than their own at least one magnitude smaller [8].

A measurement instrument and dataset are considered to have acceptable discriminant validity if the square-roots of the AVEs for each latent variable are higher than any of the correlations between that latent variable and other latent variables. As shown in Appendix 2, the square root of the AVE of all

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constructs was found to be much larger than all other cross-correlations. All AVEs are well above 0.50 suggesting that the principal constructs capture much higher construct-related variance than error variance. The correlations among all constructs are all well below the 0.90 threshold, suggesting that all constructs are distinct from each other.

Convergent and discriminant validity using the criteria: (1) the square root of AVE for each construct is larger than its correlations with the other constructs (i.e., the AVE shared between the construct and its indicators is larger than the AVE shared between the construct and the other items); (2) all AVEs are greater than .50; and (3) the PLS indicators load much higher on their hypothesized construct than on other constructs (i.e., own loadings are higher than cross loadings) suggested satisfactory validation of measurement properties of principal constructs (Appendix 2 and 3) [5, 8].

4.2. Structural Model

The hypotheses were tested by examining the structural model using a boostrapping using 500 resamples to determine the significance of the path coefficients. Results of the PLS structural model analysis are shown in Table 1 and Figure 2.

Table 1. Hypothesis Testing Results

Hypothesized Relationship	P-value	Testing Result
H1A: Need to Belong will be positively related to SNW regular use	0.174*** (p <0.001)	Strongly Supported
H1B: Need to Belong will be positively related to insecure SNW behavior Likelihood	0.124*** (p <0.001)	Strongly Supported
H2: Social Influence will be positively related to SNW use.	0.425***(p <0.001)	Strongly Supported
H3: Peer Influence (approval) will be positively related to SNW insecure behaviors.	0.368*** (p <0.001)	Strongly Supported
H4: Peer Likelihood will be positively related to SNW insecure behaviors.	0.332*** (p <0.001)	Strongly Supported
H5: Perceived SNW Threats will be negatively related to SNW Regular Use.	-0.118** (p <0.01)	Supported
H6: Risk in Insecure SNW Behavior will be negatively related to Insecure SNW Behavior Likelihood	-0.188*** (p <0.001)	Strongly Supported

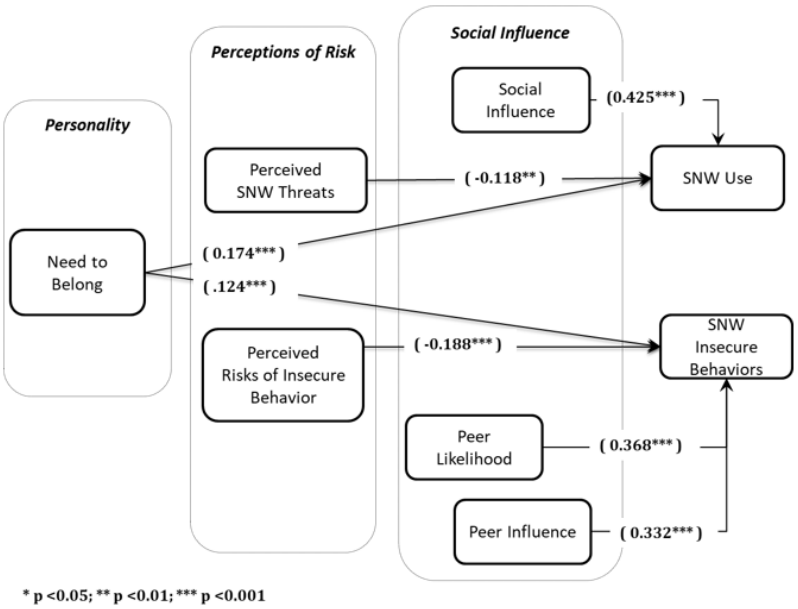

Figure 2. Results

The results suggest that the constructs considered in this study explain approximately 39 percent variance in the SNW regular usage and 58 percent variance in the delinquent behavior likelihood.

Testing the hypotheses 1A and 1B, *Need to Belong* was found to be positively related to *SNW regular use* ($\beta = 0.174$, $p<0.001$: H1A), thus strongly supporting hypothesis 1A; and it was also found to be positively related to *insecure SNW behavior Likelihood* ($\beta = 0.124$, $p<0.001$: H1B), strongly supporting hypothesis 1B.

In examining the role of social and peer influences in SNW behaviors, hypotheses 2, 3 and 4 were tested. As anticipated *social influence* was found to have significant positive effect on the *SNW use (*$\beta = 0.425$, $p<0.001$), strongly supporting hypothesis 2. Testing the role of *peer influence*, peer approval of engaging in such behaviors was found to have significant positive effect *(*$\beta = 0.368$, $p<0.001$) on the likelihood of individuals engaging in *SNW insecure behaviors*. Thus hypothesis 3 was supported. We also tested whether the likelihood of peers engaging in such behaviors will impact the user likelihood of engaging in SNW insecure behaviors. Our hypothesis was strongly supported ($\beta = 0.332$, $p<0.001$, hypothesis 4).

Finally examining the role of perceived risks and their effect in SNW behaviors, general perceptions of *SNW threats* was found to be negatively related to *SNW regular use* ($\beta = -0.118$, $p <0.01$: H5), supporting hypothesis 5. While examining particular scenarios of insecure behaviors, *perceived risk in insecure SNW behavior* was found to be negatively related to *insecure SNW behavior likelihood* ($\beta = -0.188$, $p<0.001$: H6), strongly supporting hypothesis 6.

5. Discussion

Motivated by the growth in social networks usage and the potential security implications, we developed and empirically tested a model of SNW use and engagement in risky SNW behaviors. We wanted to examine the role of personality attributes, namely need-to-belong, and social influences, in individuals' engagement in SNW use. We also wanted to examine how risk perception, both general awareness of threats of SNW use as well as risk perceptions related to more specific SNW behaviors will impact user engagement in SNW behaviors.

In testing the personality related construct – *need to belong*, the results were as anticipated. Need-to-belong positively influenced regular use of social networks by individuals. People who have more need to maintain interpersonal relationships and social bonds will tend to engage in social networking on a more regular basis. We also believed that people who are more keen in staying connected will be more likely to forward messages or share information even if it might be little riskier behavior. The results indicated this to be true.

Social network usage is obviously encouraged by individual's own need to be connected, but it is also driven by the push to be connected by similar others in their friends, family, or social circles. Examining the role of risks, first we tested user understanding of the threats generally known to plague the social networking platforms and how it might impact users' usage of the networks. We found that higher perceptions of risks in networking environments would reduce the overall regular use of social networks by individuals.

We also wanted to test if that would be the case in specific scenarios of such risky situations. Thus, we tested two commonly observed scenarios. Our data suggests that the individuals who perceived higher risks in those situational scenarios indicated that they would be less likely to engage in those behaviors. For example, in case of a spam message containing a joke with a link, if an individual perceives higher levels of risks in forwarding such message, a person is less likely to forward such message. In another instance, the scenario captured sharing of a project related information. If an individual perceived that posting such information is more risky, then s/he will be less likely to post such information.

However, approval or disapproval of such behaviors can have significant implications. Our data reveals that peer influence (approval) of such behaviors was positively related to SNW insecure behaviors. Thus, if the peers do not disapprove of such behaviors, individuals are likely to continue engaging in such behaviors. Similarly, beliefs of whether peers also engage in similar behaviors was also significant contributor to individuals engaging in such risky behaviors.

5.1. Limitations and Opportunities for Future Research

The limitations of this study provide additional prospects for future research. First, the phenomenon of risky SNW behaviors in this study is limited to two common incident types. Although we chose these scenarios based on the literature and feedback from our practitioner panel, there may be other possibilities. Future research should test our model on additional forms of risky SNW usage to further validate our findings.

This study did not examine the role of habit in SNW use. This presents another potential avenue for future work. Prior research and case studies have highlighted the strength of habit in technology related behaviors. On this point, future research can explore the interactive effects of habit and interventions in shaping SNW behaviors. This study used cross-sectional data collection which has

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several shortcomings. Thus, future studies that incorporate longitudinal investigations as well as many other additional inquiries can be useful addition to the literature on this important technological and societal phenomenon.

6. Conclusion

The phenomenon of social networking, while extant, is relatively new, and mainstream IS research in this area is burgeoning. With extensive use of social networks various SNW behaviors plague our society with various security concerns. While some research has tried to understand the SNW usage, risky SNW behaviors have much scope to be examined in the literature. People's need to maintain interpersonal relationships and social bonds is a significant contributor not only in their regular use of these platforms, but also in their engagement in insecure of risky behaviors on these platforms. We found evidence that social and peer influences play a vital role not only in SNW use but also is likely to result in risky behaviors on SNWs. However, understanding of various SNW threats and risks in particular kind of SNW situations can help reduce individuals engaging in insecure SNW behaviors.

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APPENDIX

Appendix 1. Survey Instrument

Social Network Use	
SNUseFrq1	During the past month, I used Facebook: (Not at all; Less than once a week; about once a week; 2 or three times a week; several times a week; about once a day; several times each day)
SNUseFrq2	In the past week, on average, approximately how many minutes per day have you spent on Facebook? (less than 10; 10–30; 31-60; 1-2 Hours; 2-3 Hours; More than 3 hours)
SNUseFrq3	On average, I use Facebook while I am at home about…_____ times a day
SNUseFrq4	On average, I use Facebook while I am at home about…_____ times a week.
SNUseFrq5	On average, I use Facebook while I am at the workplace about…_____ times a day.
SNUseFrq6	On average, I use Facebook while I am at the workplace about…_____ times a week.
NeedBelong_5	I want other people to accept me.
NeedBelong_6	I do not like being alone.
NeedBelong_8	I have a strong need to belong.
NeedBelong_9	It bothers me a great deal when I am not included in other people's plans.
NeedBelong_10	My feelings are easily hurt when I feel that others do not accept me.
PerThreat_3	Information I post on social media websites could be made available to unknown individuals and entities without my knowledge.
PerThreat_4	I feel the information I post to social media websites is vulnerable to misuse.
PerThreat_5	It is possible that personal information I share on social media websites will be used in a way which I would not approve.
PerThreat_6	I believe sharing information on online social media websites could have negative consequences.
SocInf_1	People who are important to me think I should use Facebook.
SocInf_2	My family thinks it is good for me to use Facebook.
SocInf_3	My friends expect me to use Facebook.
SocInf_4	Most of my colleagues use Facebook.

Social Network (In)Secure Behaviors	
Taylor has a Facebook account that he uses to keep in touch with many of his coworkers, friends and family. One day Taylor received a Facebook message from a friend with a link to a jokes site. The friend mentioned in the message that the jokes were hillarious. After reading the message, Taylor clicked on the link and went to the site. He found the jokes to be very funny. Taylor immediately thought of some friends that would also enjoy the jokes, so he sent them a Facebook message that contained the link to the jokes site.	
Craig's company recently received a multi-million dollar contract to provide their services to ABC Corporation. Craig is chosen to work as a member of a team on this project. Excited for the company's new business and to be chosen to work on this endeavor, Craig updated his Facebook status to "Great day for me and my company! I am now a team member on Project Alpha for our company's new contract with ABC Corporation."	
Realism	How realistic do you think this scenario is? (highly unrealistic/highly realistic)
SNInsLike1	If you were Taylor, what is the likelihood that you would have sent the Facebook message? (very unlikely … very likely)
SNInsLike2	I could see myself sending the message just as Taylor did: (very low … very high)
PerScRisk_1	I think that sending such a message does NOT lead to considerable risks:
PerScRisk_2	There is high potential risk in sending such a message:

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PerScRisk_3	There are potential negative consequences of sending such a message:
peerLikelihood_1	The likelihood that a typical student within your university would have sent the message, just as Taylor did is:
peerLikelihood_2	Most of your other Facebook friends would have sent the message, just as Taylor did is:
peerLikelihood_3	I am convinced that the many of my other Facebook friends would have sent a message, just as Taylor did:
PeerInf_1	If you sent the message as Taylor did, your friends would: (disapprove/approve)
PeerInf_2	If you sent the message as Taylor did, fellow colleagues would: (disapprove/approve)
PeerInf_3	If you sent the message as Taylor did, your family would: (disapprove/approve)
Notes: (1) Following the general SN site use items, the scenarios and scenario specific above items followed in scrambled order; (2) the items above pertain to the message forwarding scenario - item wordings were slightly modified to fit the other scenario	

Appendix 2. Measurement Model – Reliability and Validity Testing

Constructs	***Composite Reliability***	***Cronbach Alpha***	***AVE***	***Construct Cross Correlations***							
				11	12	21	22	23	3	4	5
11_SNWThreat	0.89	0.85	0.67	**0.82**							
12_PerRisk	0.82	0.73	0.61	0.17	**0.78**						
21_SocInf	0.91	0.86	0.70	0.06	-0.05	**0.84**					
22_PeerInf	0.92	0.87	0.79	0.01	-0.50	0.33	**0.89**				
23_PeerLikelihood	0.89	0.82	0.74	0.05	-0.26	0.32	0.66	**0.86**			
3_NTB	0.89	0.84	0.62	0.15	-0.07	0.39	0.20	0.20	**0.78**		
4_RegUse	0.92	0.90	0.67	-0.07	-0.12	0.56	0.30	0.27	0.36	**0.82**	
5_InsLikelihood	0.94	0.87	0.89	-0.03	-0.47	0.31	0.69	0.64	0.26	0.29	**0.94**
				Bold values in diagonal cells are square root of AVE values**.**							

Appendix 3. Item Loadings, Cross Loadings, and Significance

Constructs: 11_SNWThreat; 12_PerRisk; 21_SocInf; 22_PeerInf; 23_PeerLikelihood; 3_NTB; 4_RegUse; 5_InsLikelihood										
	11	12	21	22	23	3	4	5	T Stat	P value
PerThreat_3	0.77	0.09	0.07	0.02	0.02	0.15	-0.03	-0.02	4.07	0.001
PerThreat_4	0.79	0.12	0.04	0.02	0.07	0.22	-0.05	0.02	3.82	0.001
PerThreat_5	0.83	0.13	0.07	0.03	0.10	0.15	-0.03	-0.02	4.57	0.001
PerThreat_6	0.88	0.18	0.04	-0.01	0.01	0.05	-0.08	-0.06	3.86	0.001
PerScRisk_1_R	0.00	0.84	-0.15	-0.56	-0.38	-0.20	-0.18	-0.50	29.46	0.001
PerScRisk_2	0.26	0.75	0.07	-0.22	-0.02	0.12	-0.01	-0.22	14.33	0.001
PerScRisk_3	0.31	0.75	0.08	-0.21	-0.04	0.08	0.00	-0.24	14.32	0.001
SocInf_1	0.04	-0.08	0.86	0.30	0.24	0.35	0.47	0.29	58.49	0.001
SocInf_2	0.02	-0.02	0.81	0.25	0.21	0.34	0.44	0.24	42.76	0.001
SocInf_3	0.09	-0.01	0.86	0.23	0.28	0.33	0.48	0.23	56.02	0.001
SocInf_4	0.05	-0.06	0.82	0.32	0.33	0.29	0.49	0.28	45.91	0.001

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PeerInf_1	0.07	-0.39	0.30	0.88	0.62	0.15	0.25	0.65	68.11	0.001
PeerInf_2	-0.02	-0.46	0.31	0.92	0.64	0.18	0.27	0.61	100.24	0.001
PeerInf_3	-0.04	-0.48	0.27	0.86	0.50	0.20	0.29	0.58	65.31	0.001
peerLikelihood_1	0.00	-0.16	0.27	0.51	0.84	0.16	0.23	0.50	53.15	0.001
peerLikelihood_2	0.04	-0.24	0.26	0.59	0.89	0.15	0.21	0.55	88.18	0.001
peerLikelihood_3	0.07	-0.27	0.29	0.60	0.85	0.20	0.26	0.60	63.22	0.001
NeedBelong_10	0.10	-0.04	0.25	0.09	0.11	0.80	0.25	0.14	34.17	0.001
NeedBelong_5	0.20	-0.06	0.29	0.14	0.14	0.69	0.23	0.15	21.62	0.001
NeedBelong_6	0.07	-0.09	0.30	0.21	0.18	0.75	0.29	0.26	32.67	0.001
NeedBelong_8	0.12	-0.05	0.36	0.18	0.16	0.85	0.29	0.25	66.38	0.001
NeedBelong_9	0.12	-0.03	0.31	0.15	0.18	0.83	0.32	0.20	39.78	0.001
UseLstMonth	-0.09	-0.08	0.54	0.23	0.18	0.34	0.88	0.21	102.12	0.001
UsePerDay	-0.05	-0.11	0.45	0.28	0.24	0.32	0.79	0.29	49.77	0.001
UseTimesDayHome_7	-0.05	-0.10	0.48	0.25	0.29	0.33	0.88	0.27	107.23	0.001
UseTimesDayOff_7	-0.04	-0.09	0.35	0.25	0.21	0.21	0.71	0.22	30.30	0.001
UseTimesWeekHome_7	-0.10	-0.10	0.53	0.22	0.20	0.31	0.88	0.23	102.18	0.001
UseTimesWeekOff_7	0.00	-0.10	0.37	0.25	0.21	0.22	0.73	0.20	32.97	0.001
likleihood_1	-0.02	-0.42	0.25	0.61	0.57	0.24	0.23	0.94	130.55	0.001
likleihood_2	-0.04	-0.45	0.33	0.69	0.64	0.25	0.32	0.95	204.90	0.001

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