

A Structural Equation Modeling Approach to Social Comparison and Digital Engagement Among Iranian University Students

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Article Info	ABSTRACT
Article type: Research Article	Digital engagement has become a central aspect of social interaction in online environments. However, the psychological mechanisms shaping individuals' engagement with digital platforms remain insufficiently understood, particularly in non Western contexts. This study examines the role of social comparison in explaining digital engagement among university students, while also considering the influence of social influence and self esteem. Survey data were collected from university students in Iran, and structural equation modeling (SEM) was used to test the proposed relationships among the constructs. The findings indicate that social comparison significantly shapes the patterns of digital engagement and influences how individuals interpret and respond to social information encountered on digital platforms. In addition, social influence and self esteem contribute to explaining variations in users' engagement behaviors. The results provide empirical evidence on the psychological drivers of digital engagement within a cross cultural context and highlight the importance of evaluative social processes in online environments. This study contributes to the literature on digital behavior by offering a quantitative modeling perspective and insights from an understudied cultural setting.
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1) Introduction

Digital connectivity, underpinned by rapid technological advancement, has become a cornerstone of modern life. Social comparison theory, gender differences, and self-esteem are important constructs studied in the social sciences (Carlo, 2021). With more than five billion global internet users—32.2% of whom are under 30—online engagement has become a defining feature of contemporary society (Zeng et al., 2024). Social Networking Sites (SNSs) are central to this digital shift and have drawn scholarly attention for their profound influence on cognitive, emotional, and personality-related processes (Nekkanti & Datti, 2024). Unlike traditional media, SNSs provide young users with instant, continuous access to rich social content, functioning not only as entertainment platforms but also as spaces for forging social connections, identity exploration, and self-expression (Ibrahim et al., 2024; Naga & Ebardo, 2025).

Platforms such as Instagram and Facebook facilitate global interaction and reshape communication patterns and consumer behavior through features like messaging, liking, and content sharing (Van Ouytsel et al., 2016; Keshavarz & Liu, 2026). Defined by user profiles, visible social graphs, and interconnected networks, SNSs serve as powerful tools for relationship maintenance and community building. However, they also introduce challenges such as social comparison pressure and technostress, both of which may affect users' psychological states and patterns of digital engagement (Naga & Ebardo, 2025).

Although SNSs can fulfill fundamental psychological needs for belonging and self-expression (Guo & Li, 2024), excessive use has been associated with psychological risks, including modest increases in depressive symptoms and potential behavioral addiction, especially among university students (Andreassen et al., 2013; Vahedi & Zannella, 2021). Problematic social media use (PSMU), a specific form of PIU characterised by excessive or inappropriate engagement with social media, has been associated with psychological and physiological health issues, including depression and eating disorders, through mechanisms such as social comparison, body dissatisfaction, low self-esteem, and psychological distress (Hu et al., 2025). These concerns highlight the importance of understanding how young adults engage with SNSs and how underlying psychological and social mechanisms shape their online behaviors.

Within this context, social comparison plays a critical role in shaping digital engagement, as individuals frequently evaluate their abilities, appearance, and social standing in relation to others in the online environment (Festinger, 1954; Verduyn et al., 2017). Gender differences may further moderate these processes, as societal expectations and social role orientations shape how men and women navigate online interactions and respond to evaluative cues. In addition, constructs such as self-esteem (Chang et al., 2022; Orth et al., 2016; Rosenberg et al., 1995) and social influence (Cialdini, 2021; Venkatesh et al., 2003) contribute to a deeper understanding of user motivation and behavior.

Drawing on these theoretical foundations, the present study examines the digital engagement of academic youth, with particular emphasis on their self-disclosure and participation in commercial activities on SNSs. Building on prior research, we propose and test a conceptual model using data from 300 Iranian university students, incorporating the moderating roles of social comparison and gender. By situating the analysis within a non-Western cultural context, this study expands existing

knowledge on digital engagement and offers new insights into how psychological and social mechanisms intersect to shape young adults' online behaviors (Abdalla, 2024; Qu et al., 2025;).

2) Literature Review and Hypotheses Development

This study examines two key outcome variables: users' intention to disclose personal information and their participation in commercial activities on SNSs.

2.1 Theoretical Perspectives

Participation in Commercial Activities Engaging in self-initiated activities aligned with personal aspirations is linked to enhanced self-esteem and reduced depression (Xie et al., 2023). As a key dimension of social engagement, participation fosters well-being and goal attainment (Douglas et al., 2017). SNSs provide a uniquely accessible and flexible medium for such participation, lowering barriers to engagement and enabling users to create, share, and discuss content, thereby reaching broader audiences (He et al., 2025; Lin, 2022).

Self-Disclosure—the voluntary sharing of personal information—is a cornerstone of digital communication, enabling relationship building and the fulfillment of emotional needs (Jourard & Lasakow, 1958; Xiao et al., 2025). While vital for fostering trust and intimacy (Zhang & Fu, 2020), it carries inherent risks of privacy breaches and data misuse (Acquisti & Gross, 2006). Digital platforms amplify this process through instant sharing features, prompting users to carefully manage their online identities.

2.2 Hypothesis Development

The conceptual framework of this study, as illustrated in Figure 1, delineates the hypothesized relationships between the core constructs. Drawing upon Social Comparison Theory, this model posits that Self-Esteem serves as a primary predictor of Social Influence. Furthermore, to provide a more nuanced understanding of this relationship, we incorporate Social Comparison as a mediating mechanism. As depicted in Figure 1, the model proposes that Self-Esteem not only exerts a direct effect on Self Disclosure and Participation but also operates indirectly through Social Comparison. Specifically, we hypothesize that higher levels of Social Influence may lead to an increase in Social Comparison, which subsequently influences the final outcomes of Self-Disclosure and Participation. This structured approach allows for a clearer examination of both the direct and indirect pathways, ensuring that the theoretical framework is intuitive and easily accessible to the reader.

Self-Esteem and Its Social Influence: Self-esteem, as an individual's overall subjective sense of personal worth (Rosenberg et al., 1995), is a core psychological construct. Individuals with high self-esteem typically possess a positive self-image and are less susceptible to negative social comparisons on SNSs (Guo & Li, 2024). This self-perception influences their susceptibility to social influence, as self-worth evaluation shapes online behaviors like content sharing (Chang et al., 2022; Orth et al., 2016). Thus, we hypothesize:

H1: Users' perceived self-esteem on SNSs significantly influences their susceptibility to social influence.

Social Influence on Behaviors: Social influence refers to the extent to which individuals perceive that important others approve of their behavior (Venkatesh et al., 2003). Peer interactions and social norms are powerful drivers of technology adoption and behavioral patterns on SNSs (Abdalla, 2024). This

influence, which can be explicit or implicit, significantly shapes opinions and actions (Cialdini, 2021; Qu et al., 2025). Therefore, we propose:

H2: Users' perceived social influence on SNSs significantly influences their self-disclosure.

H3: Users' perceived social influence on SNSs significantly influences their participation in commercial activities.

The Moderating Role of Social Comparison: Drawing on Social Comparison Theory (Festinger, 1954), individuals constantly evaluate themselves against others. SNSs are engineered to facilitate upward comparisons with others who appear more successful, which can lead to envy and reduced self-appraisal (Guo & Li, 2024; Verduyn et al., 2017). This comparative process can intensify or weaken the relationship between an individual's self-esteem and their sensitivity to social influence. Consequently, we hypothesize:

H4: Social comparison moderates the relationship between self-esteem and social influence on SNSs.

The Moderating Role of Gender: Gender Role Theory (Eagly & Karau, 2002) suggests potential gender-based differences in online behavior. While women often exhibit greater privacy concerns (Fogel & Nehmad, 2009), findings on gender's moderating effect on self-disclosure are inconsistent (Baruh et al., 2017). To clarify this, we hypothesize:

H5: Gender moderates the relationship between social influence and self-disclosure on SNSs.

H6: Gender moderates the relationship between social influence and participation in commercial activities on SNSs.

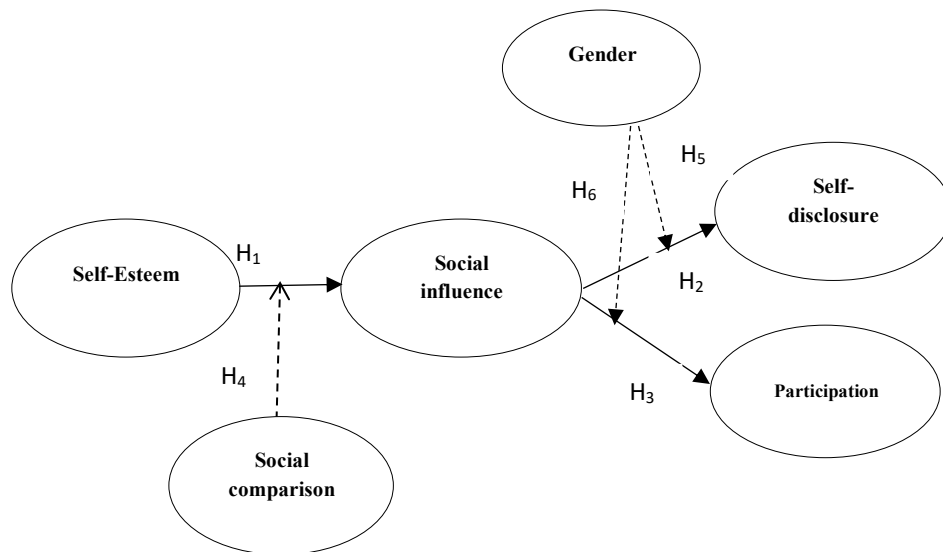


Figure 1. The Proposed Conceptual Model

This study explores the impact of self-esteem on social influence and, in turn, how social influence affects users' willingness to disclose personal information and engage in commercial activities on social networking sites. The research framework is grounded in psychological and social theories, emphasizing the interplay between individual traits and online behaviors.

Furthermore, the study incorporates two moderating variables—social comparison and gender—to provide deeper insights into these relationships. Social comparison is expected to

moderate the relationship between self-esteem and social influence, as users frequently assess their social standing relative to others on SNSs. Meanwhile, gender is hypothesized to moderate the impact of social influence on both self-disclosure and commercial participation, acknowledging potential behavioral differences between male and female users.

3) Research Methodology

This study examines the role of social comparison in explaining digital engagement among university students, while also considering the influence of social influence and self-esteem.

Survey data were collected from university students in Iran, and structural equation modeling (SEM) was used to test the proposed relationships among the constructs.

To test the research hypotheses, partial least squares structural equation modeling (PLS-SEM) was employed. The statistical analysis was conducted using PLS 4.0 software.

3.1 Participants

Participants were recruited using a convenience-stratified sampling approach across diverse academic faculties at a major university in Iran. Inclusion criteria required participants to be currently enrolled students and active users of at least one social networking site (SNS). Data collection occurred between January and November 2024. Following a data cleaning process, which involved the exclusion of incomplete responses ($n = 112$) and multivariate outliers identified via Mahalanobis distance ($p < 0.001$), a final sample of 300 valid responses was achieved. This sample size exceeds the minimum requirement of 158 calculated via G*Power ($power = 0.95, \alpha = 0.01, f^2 = 0.03$).

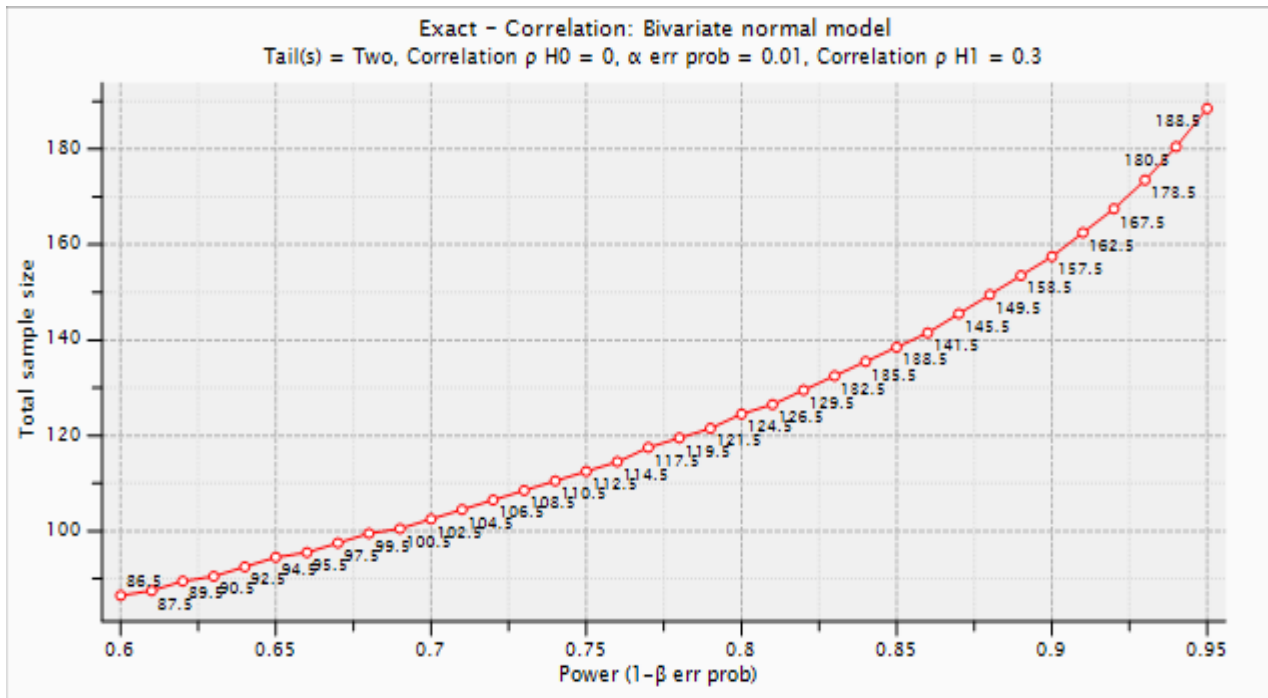


Figure 2. G*Power 3.1.9.2 Software Export

Table 1. Demographic Information of the Sample

Properties		Frequency	Percent %
Education	B.Sc.	180	60.0
	M.Sc.	112	37.3
	PhD	8	2.7
The most commonly used SNSs	Facebook	22	7.3
	Google	151	50.3
	Linkedin	29	9.7
	Instagram	83	27.7
	Twitter	15	5.0
Gender	Male	72	24.0
	Female	228	76.0
Frequency of usage of SNSs	Daily	162	54.0
	Few times a week	88	29.33
	Few times a month	35	11.67
	Few times a year	15	5.0
Years of usage of social SNSs	<5	146	48.7
	6–10	132	44.0
	>10	22	7.3
Total number of respondents		300	100.0

The sample predominantly consisted of female participants (76%), with the majority holding a B.Sc. degree (60%). Google emerged as the most frequently used social networking site (50.3%), followed by Instagram (27.7%), suggesting a preference for visually oriented and professional platforms. Notably, more than half of the respondents (54%) reported daily SNS usage, with nearly half (48.7%) having less than five years of experience on these platforms.

The data further reveal interesting platform preferences, with traditional networks like Facebook (7.3%) and Twitter (5%) being significantly less popular than Google+ and Instagram. The high frequency of daily usage (54%) coupled with moderate years of experience (48.7% with < 5 years) suggests that while engagement is intensive, many users are still in the early stages of their digital socialization process. These patterns may reflect both cultural preferences in platform selection and the evolving nature of SNS adoption among Iranian academic youth.

3.2 Measures

All measurement instruments were adapted from established scales. To ensure linguistic and cultural equivalence, a forward-backward translation procedure was conducted: two bilingual experts translated the items into Persian, and a third translator performed a back-translation into English. Discrepancies were resolved through consensus. A pilot study ($n = 30$) confirmed that the instruments were clear and conceptually sound. All items were measured on a five-point Likert scale (1 = “strongly disagree” to 5 = “strongly agree”).

3.3 Variables

3.3.1 Dependent Variables

Participation in commercial activities on social networking sites was assessed using three items, while self-disclosure was measured through four items developed by Ng (2016). The original items, which were in English, were translated into Persian for Iranian respondents. Each item was rated on a five-point Likert scale ranging from “strongly disagree” (1) to “strongly agree” (5).

3.3.2 Independent Variables

Self-esteem was measured using five items adapted from Chang et al. (2022), while social influence was assessed through four items developed by Ng (2016). The items were originally in English and were translated into Persian for Iranian participants. Responses were recorded on a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5).

3.3.3 Moderator Variables

Social comparison was measured using ten items adapted from Gibbons and Buunk (1999). These items were initially in English and were translated into Persian for the Iranian sample. The responses were recorded on a five-point Likert scale from "strongly disagree" (1) to "strongly agree" (5).

Additionally, gender was considered as a moderating variable in this study. A binary nominal variable was used to classify participants' gender (1 = male, 0 = female). The questionnaire also included a third option, "Other," but as no participants selected this option, it was excluded from the final analysis.

3.3.4 Validity, Reliability, and Model Fit Assessment

The measurement model was evaluated using SmartPLS 4.0. Internal consistency was verified through Cronbach's Alpha (CA) and Composite Reliability (CR), both exceeding the 0.70 threshold. Convergent validity was confirmed, as all factor loadings were > 0.70 , and Average Variance Extracted (AVE) values were > 0.50 . Discriminant validity was established through the Fornell-Larcker criterion (where the square root of AVE for each construct exceeded its correlations with other constructs) and the Heterotrait-Monotrait (HTMT) ratio (all values < 0.85).

To assess the structural model, we reported the Standardized Root Mean Square Residual (SRMR) and the Normed Fit Index (NFI). The model yielded an SRMR of 0.048 and an NFI of 0.912, both within recommended ranges. Furthermore, predictive relevance was confirmed as all cross-validated redundancy (Q^2) values were above zero. Common Method Bias was assessed via Harman's single-factor test, with the first factor accounting for 27.3% of the variance, confirming that bias is not a significant concern.

The study evaluated Composite Reliability (CR) and Cronbach's Alpha (CA) to ensure internal consistency, considering Convergent Validity, Factor Loadings, and Average Variance Extracted (AVE). A threshold of 0.7 or higher is deemed acceptable for both Composite Reliability and Cronbach's Alpha (Ciampi et al., 2021). Additionally, all examined constructs demonstrated AVE values surpassing the 0.50 benchmark established by Hair et al. (2017). Self-esteem was measured using five items adapted from Chang et al. (2022), while social influence was assessed through four items developed by Ng (2016). The items were originally in English and were translated into Persian for Iranian participants. Responses were recorded on a five-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5).

Table 2. Scale Items, Validity Coefficients, Reliabilities and Confirmatory Factor Analysis Results

Scale Items	Standardized loadings	t-values	CA	CR	AVE
Self-Esteem (SE) (Adapted from Chang et al., 2022)	-	-	0.890	0.919	0.695
SE1: I perceive myself as having unique abilities in comparison to my peers.	0.778	17.261	-	-	-
SE2: I am capable of performing tasks as effectively as most individuals.	0.902	50.180	-	-	-
SE3: I consider myself to be a person of value, on par with others.	0.868	28.373	-	-	-
SE4: I hold a generally positive perception of myself.	0.745	11.620	-	-	-
SE5: Overall, I feel content with who I am.	0.864	34.180	-	-	-
Social Influence (SI) (Adapted from Ng, 2016)	-	-	0.861	0.906	0.707
SI1: My friends actively engage with social networking sites on a regular basis.	0.859	39.612	-	-	-
SI2: My friends often post status updates on social networking platforms.	0.902	67.401	-	-	-
SI3: My friends routinely share their interests and activities on social networking sites.	0.836	37.275	-	-	-
SI4: My friends frequently interact by leaving comments on social networking platforms.	0.761	23.004	-	-	-
Social Comparison (SC) (Adapted from Gibbons & Buunk, 1999)	-	-	0.838	0.886	0.610
SC1: I frequently observe how my actions compare to those of others.	0.856	36.508	-	-	-
SC2: When evaluating my performance, I often measure my results against those of others.	0.605	5.678	-	-	-
SC3: I regularly assess my social standing, including my social skills and popularity, in comparison to others.	0.738	22.440	-	-	-
SC4: I rarely engage in comparing myself with others. (reversed)	0.806	34.295	-	-	-
SC5: I tend to compare my life achievements with those of my peers.	0.566	3.005	-	-	-
SC6: I enjoy discussing shared perspectives and experiences with others.	0.812	34.787	-	-	-
SC7: I actively seek out the opinions of people facing similar challenges to mine.	0.601	10.605	-	-	-
SC8: I am always interested in understanding how others in similar situations would act.	0.681	13.486	-	-	-
SC9: When I want to gain deeper insights into a topic, I look for others' opinions on it.	0.543	9.902	-	-	-
SC10: I never evaluate my life circumstances in relation to others. (reversed)	0.557	11.088	-	-	-
Self-disclosure (SD) (Adapted from Ng, 2016)	-	-	0.792	0.863	0.612
SD1: I have a well-detailed profile on social networking platforms.	0.768	19.470	-	-	-
SD2: I consistently update my profile to keep it current.	0.813	20.902	-	-	-
SD3: I use social networking sites to keep my friends updated about my life.	0.802	21.437	-	-	-
SD4: Whenever I have something to share, I choose to post it on social media.	0.744	13.112	-	-	-
Participation in Commercial Activities on Social Networking Sites (PAR) (Adapted from Ng, 2016)	-	-	0.824	0.896	0.744
PAR1: I often share information about shopping deals and special offers on social networking platforms.	0.934	103.321	-	-	-
PAR2: I have followed and liked fan pages of different brands.	0.901	72.197	-	-	-
PAR3: I frequently express my views on various products or brands through social media	0.740	18.792	-	-	-

The study evaluated Composite Reliability (CR) and Cronbach's Alpha (CA) to ensure internal consistency, considering Convergent Validity, Factor Loadings, and Average Variance Extracted (AVE). A threshold of 0.7 or higher is deemed acceptable for both Composite Reliability

and Cronbach's Alpha (Ciampi et al., 2021). Additionally, all examined constructs demonstrated AVE values surpassing the 0.50 benchmark established by Hair et al. (2017).

4) Results

4.1 Results of the Measurement Model

In Partial Least Squares Structural Equation Modeling (PLS-SEM), it is essential to assess both the measurement and structural models. This study utilized SmartPLS 4.0 for SEM analysis. The measurement model was examined to evaluate the reliability, convergent validity, and discriminant validity of the latent constructs (Hair et al., 2021).

4.1.1 Convergent Validity

The convergent validity of the reflective measurement model was assessed using three key indicators: factor loadings, composite reliability (CR), and average variance extracted (AVE). The results of the confirmatory factor analysis (CFA) are presented in Table 2, detailing the factor loadings of individual items. According to Hair (2009), factor loadings should ideally exceed 0.70 to be considered acceptable, a criterion that was met in this study.

During the CFA process, certain items, including SC2 (0.605), SC5 (0.566), SC7 (0.601), SC9 (0.543), and SC10 (0.557), were removed due to their low factor loadings, which were significantly below the recommended threshold. However, Hair et al. (2017) suggest that items with factor loadings between 0.4 and 0.6 should be retained if the CR and AVE values of the construct remain within acceptable ranges. As the CR and AVE values for all variables exceeded the recommended thresholds of 0.7 and 0.5, respectively (Hair et al., 2019), the measurement model's convergent validity was confirmed.

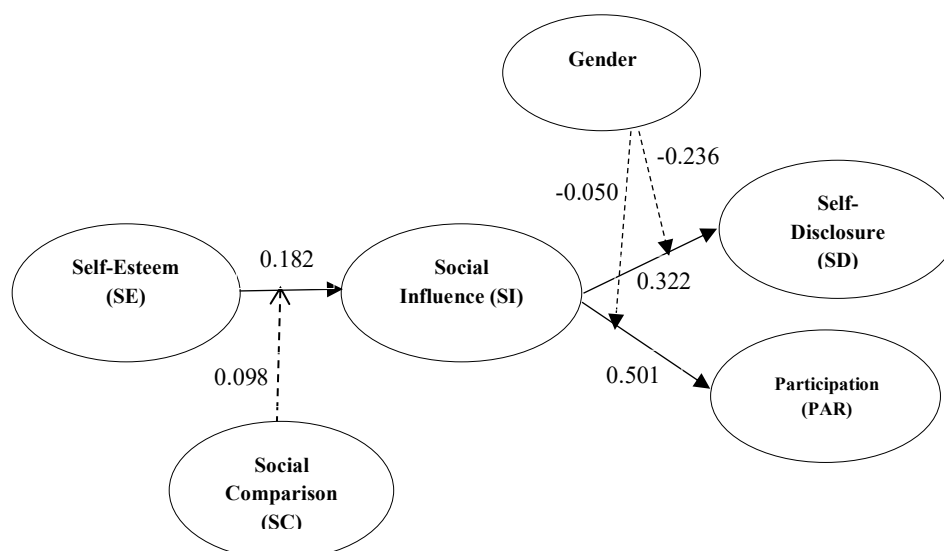


Figure 3. Result of SEM Measurement Model

As illustrated in Table 2, the standardized loadings range from 0.681 to 0.934. Additionally, all reliability coefficients exceed the recommended threshold of 0.70, as suggested by Nunnally (1978), confirming that the results fall within an acceptable range. These findings indicate that the five variables are strongly associated with Iranian university students, validating the reliability of the

assessment tool. Therefore, the model remains viable, incorporating the necessary adjustments in SmartPLS 4.0. Figure 3 presents the results of the SEM measurement model.

4.1.2 Discriminant Validity

To assess discriminant validity, two approaches were utilized. First, the Fornell and Larcker (1981) criterion was applied. According to this method, discriminant validity is established when the square root of the AVE—represented by diagonal values—exceeds the correlations with other constructs, represented by the off-diagonal values in the same row and column. Table 3 confirms that all constructs fulfill this requirement.

Table 3. The Results of the Fornell-Larcker Criterion

	<i>PAR</i>	<i>SC</i>	<i>SD</i>	<i>SE</i>	<i>SI</i>
<i>PAR</i>	0.862	-	-	-	-
<i>SC</i>	0.470	0.781	-	-	-
<i>SD</i>	0.419	0.370	0.782	-	-
<i>SE</i>	0.329	0.160	0.123	0.833	-
<i>SI</i>	0.492	0.403	0.275	0.301	0.841

Second, the heterotrait-monotrait ratio (HTMT) was also examined, revealing that all constructs had values below the 0.85 threshold. This further supports the conclusion that the measurement instrument maintains discriminant validity. As a result, we can confirm that the multi-item constructs used in this study do not present issues related to convergent or discriminant validity. Thus, discriminant validity is achieved. Table 4 displays the HTMT ratios with a 95% confidence interval (CI) based on a bootstrapping procedure with 5000 resamples.

Table 4. The HTMT Ratios of the Variables

	<i>PAR</i>	<i>SC</i>	<i>SD</i>	<i>SE</i>	<i>SI</i>
<i>PAR</i>	-	-	-	-	-
<i>SC</i>	0.580	-	-	-	-
<i>SD</i>	0.512	0.451	-	-	-
<i>SE</i>	0.381	0.177	0.148	-	-
<i>SI</i>	0.578	0.472	0.320	0.337	-

Evaluating the goodness-of-fit indices is crucial for assessing the convergent validity of measurement model (Farhi et al., 2023). Hair (2009) emphasizes that these indices serve as key benchmarks for determining how well the observed values align with expected values. Table 5 presents the goodness-of-fit indices for the measurement model, demonstrating that the standardized root mean square residual (SRMR) is below 0.85, thereby meeting the criterion established by Sun (2005).

Table 5. Goodness-of-Fit and Its Tests

<i>Indicator</i>	<i>Threshold</i>	<i>Estimated model</i>	<i>Author</i>	<i>Decision</i>
<i>SRMR</i>	<0.85	0.065	Sun (2005)	Acceptable
<i>NFI</i>	>0.90	0.915	Fábregas et al. (2018)	Acceptable

4.2 Evaluation of Structural (Inner) Model

Following the confirmation of the reliability and validity of measurement model, the performance of the structural model was assessed using multiple criteria. These included an examination of collinearity among constructs, the strength and statistical significance of path coefficients, the coefficient of determination (R^2) for endogenous variables, as well as the measures of effect size and

predictive relevance (Hair et al., 2014). The model's explanatory capability is primarily reflected through the R^2 values of the dependent variables.

In this study, the R^2 value shows that Self-Esteem (SE) accounts for 23.6% of the variance in Social Influence (SI) when the moderating effect of Social Comparison (SC) is considered. Additionally, Social Influence (SI) explains 24.4% of the variance in Participation in Activities (PAR), and 9.1% of the variance in Self-Disclosure (SD).

Table 6. Values for R^2 and Adjusted R-Squared

	<i>R-square</i>	<i>R-square adjusted</i>
<i>PAR</i>	0.244	0.236
<i>SD</i>	0.091	0.082
<i>SI</i>	0.236	0.228

4.3 Testing the Hypotheses of the Structural Model

To evaluate the proposed theoretical relationships, the structural model was tested using SmartPLS 4. The significance of each hypothesized path was determined using t-values, where a t-value ≥ 1.96 was considered statistically significant at the 5% level. The results of the path analysis (see Figure 4 and Table 7) lend support to the majority of the proposed hypotheses.

The following relationships were found to be statistically significant:

- Self-Esteem $\rightarrow$ Social Influence ($\beta = 0.182$, $T = 3.138$, $P = 0.002$)
- Social Influence $\rightarrow$ Self-Disclosure ($\beta = 0.322$, $T = 4.769$, $P = 0.000$)
- Social Influence $\rightarrow$ Participation in Commercial Activities ($\beta = 0.501$, $T = 7.240$, $P = 0.000$)
- Moderating Effect of Social Comparison on the SE–SI Relationship ($\beta = 0.098$, $T = 1.967$, $P = 0.049$)

Accordingly, all hypotheses were supported except for H5 and H6. These outcomes reinforce the overall robustness of the structural model, confirming that most of the proposed relationships are both meaningful and statistically significant.

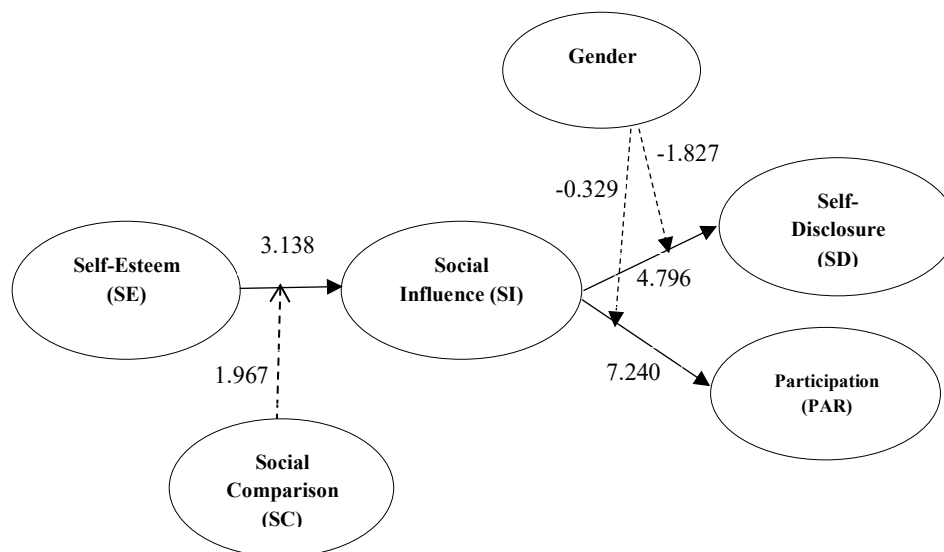


Figure 4. Structural Model Solved (T-Values)

The structural model presented in Figure 4 further clarifies these pathways, showing that the indirect effects remain statistically significant even when controlling for demographic variables. The visual layout of the paths underscores the central role of social comparison as a mediating mechanism, as the standardized coefficients (β) indicate a robust flow from SNS engagement to psychological outcomes.

Table 7. Model Findings

Hyphothesis	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Supported
SE -> SI	0.182	0.188	0.058	3.138	0.002	Yes
SI -> SD	0.322	0.326	0.067	4.796	0.000	Yes
SI -> PAR	0.501	0.499	0.069	7.240	0.000	Yes
SC -> SI	0.348	0.347	0.067	5.224	0.000	Yes
SC x SE -> SI	0.098	0.092	0.050	1.967	0.049	Yes
Gender -> SD	0.204	0.209	0.140	1.455	0.146	No
Gender x SI -> SD	-0.236	-0.226	0.129	-1.827	0.068	No
Gender -> PAR	0.100	0.099	0.130	0.765	0.444	No
Gender x SI -> PAR	-0.050	-0.055	0.152	-0.329	0.742	No

4.3.1 Role of Social Comparison as a Moderator

To assess the moderating effect of Social Comparison, a specific hypothesis was integrated into the conceptual framework. The results pertaining to this hypothesis are presented in Table 7. The analysis revealed that Social Comparison significantly moderates the relationship between Self-Esteem and Social Influence (H4: $\beta = 0.098$, $T = 1.967$, $P = 0.049$). This interaction effect is further visualized in the accompanying figure, which illustrates the moderating dynamics.

As depicted in the graph, both regression lines—corresponding to low and high levels of Social Comparison—demonstrate a positive slope. This indicates that higher levels of Self-Esteem are associated with increased Social Influence across both groups. Notably, the strength of this relationship intensifies under conditions of higher Social Comparison, suggesting that individuals with elevated tendencies to compare themselves socially experience a stronger linkage between their self-esteem and perceived social influence.

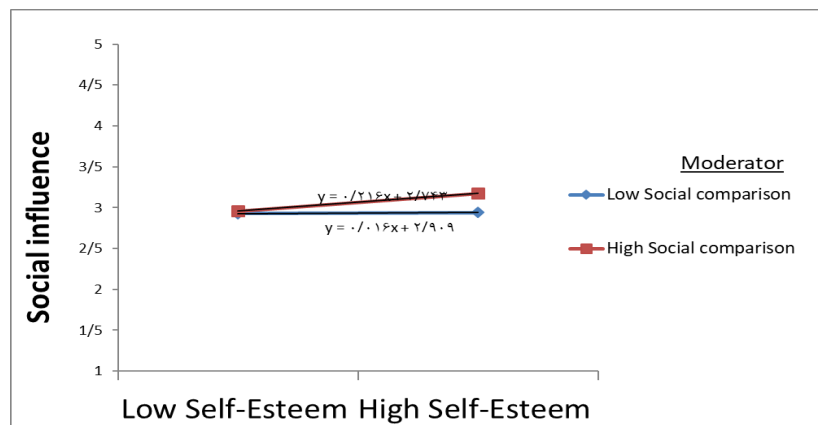


Figure 5. Moderation Effects of Social Comparison

As illustrated in Figure 5, the moderation analysis reveals a clear interaction effect through the differing slopes of the regression lines. Specifically, for individuals with low self-esteem (the steeper slope), the positive relationship between SNS usage and social comparison is significantly more pronounced, suggesting a heightened vulnerability to digital content. Conversely, for those with high self-esteem (the flatter slope), the relationship is considerably weaker, indicating a protective effect of self-worth against upward social comparison. This visual evidence from the slope analysis confirms that self-esteem doesn't just shift the outcome, but fundamentally changes the 'intensity' of the impact of social media on the user's psychological state.

5. Discussion and Conclusion

This study investigated the psychological and behavioral factors influencing users' engagement on social networking sites (SNSs), with particular emphasis on self-esteem, social influence, and two moderating variables: social comparison and gender. Drawing on data collected from 300 Iranian university students and using partial least squares structural equation modeling (PLS-SEM), the study provides empirical validation of a conceptual model, explaining how internal psychological states influence users' willingness to disclose personal information and participate in commercial activities on SNSs, such as Facebook, Instagram, Twitter (X), Google, and LinkedIn.

The findings confirm that self-esteem significantly affects social influence (H1), aligning with earlier studies conducted by Orth et al. (2016), Schubert and Bowker (2017), and Poudel et al. (2020), who identified self-worth as a determinant of susceptibility to social influence. However, this result diverges from Chang et al. (2022), who found no such relationship in the context of SNSs. Moreover, the results show that social influence significantly impacts both self-disclosure (H2) and participation in commercial activities (H3)—consistent with Ng's (2016) findings, who emphasized peer pressure as a driving factor in SNS-based commercial engagement.

Critically, social comparison was found to moderate the relationship between self-esteem and social influence (H4), indicating that upward social comparison may enhance the effect of self-esteem on perceived social influence. The divergence between our findings and Chang et al. (2022) may reflect differences in cultural context, sample characteristics, and measurement procedures. Since our study was conducted among Iranian university students, social comparison processes may operate differently than in the context examined by Chang et al. (2022). These factors may help explain the contrasting results. This finding contrasts with studies such as Abosag et al. (2020), which either found no moderation effect or reported inverse patterns. In contrast, gender did not moderate the relationship between social influence and either self-disclosure or participation in commercial activities (H5, H6). While our analysis did not yield significant gender differences in the studied paths, these results should be interpreted with caution. The sample was predominantly female (76%), which may have resulted in a lack of statistical power to detect subtle gender-based variations in how social comparison affects digital engagement. This sample imbalance suggests that the observed non-significance might be a reflection of the sample's composition rather than an absence of gender effects in the broader population. This finding aligns with Baruh et al.'s (2017) meta-analysis, which reported no significant gender differences in self-disclosure behavior, yet it stands in contrast to other works (e.g., Zhang & Fu, 2020) that identified gender-based variations in privacy concerns and disclosure practices.

These findings carry several theoretical and practical implications. Theoretically, the study extends SNS usage models by integrating psychological constructs—particularly self-esteem and social comparison—into frameworks of online behavior. It emphasizes that users' comparative evaluations of themselves are not merely passive reflections but active moderators of digital engagement. Practically, the results underscore the importance of user education, platform design, and digital well-being strategies to address the potential adverse effects of upward social comparison. Although moderate upward comparison can be motivating (Meier & Johnson, 2022), it may also foster unrealistic self-presentation and digital fatigue if not addressed carefully.

Beyond its theoretical contributions, this study offers several practical insights for platform designers and educators. Since social comparison significantly moderates digital engagement, platform designers could implement features that mitigate the negative effects of upward comparison. For instance, interfaces could offer “low-comparison” modes or algorithms that de-emphasize metrics such as likes and follower counts, which often trigger detrimental social comparisons.

For educators and practitioners, these results suggest that digital literacy interventions should move beyond technical skills to include psychological resilience. Intervention strategies should focus on enhancing self-esteem and critical thinking regarding social influence. For example, workshops could be designed to help students recognize the curated nature of digital content, thereby reducing the pressure of upward comparison.

Furthermore, our gender findings indicate that these interventions might need to be gender-specific. Since social comparison may affect genders differently, educators should tailor media literacy programs to address the unique social pressures faced by male and female students. By targeting the specific ways social influence affects self-esteem through comparison, these strategies can promote healthier digital engagement and overall psychological well-being.

In conclusion, the study highlights that while social media platforms offer opportunities for self-expression and digital commerce, they also create environments where psychological vulnerabilities, such as self-doubt and social comparison, can shape online behavior. Designers and policymakers should consider these psychological dynamics in developing healthier digital ecosystems. Future research could benefit from exploring emotional and cultural moderators across diverse user groups to further understand the nuanced impacts of social media use on behavior and well-being.

5.2 Theoretical Implications

This research offers a deeper understanding of digital engagement by integrating social comparison and gender as moderating variables. Rather than viewing these factors in isolation, our model shows how they interact to shape student behavior. Our findings extend several established theoretical frameworks:

- **Theory of Planned Behavior (TPB):** Our results suggest that social influence and social comparison act as critical precursors to “subjective norms.” This indicates that digital engagement is not just a personal choice but is heavily driven by perceived social pressures and peer comparisons.
- **Uses and Gratifications Theory (UGT):** The study highlights that students use digital platforms not only for information but also to fulfill psychological needs related to self-esteem

and social standing. The moderating role of social comparison explains why certain users seek more “social validation” through high engagement.

- **Social Comparison Theory:** By contextualizing this theory within Iranian digital spaces, we show that upward comparison significantly impacts engagement levels, though its effect may vary depending on the user’s baseline self-esteem.

From a theoretical standpoint, the non-significant findings regarding gender challenge some established notions in social comparison theory, which often suggest higher sensitivity among females. However, our study highlights the importance of sample representativeness in testing such theories. The results suggest that in contexts where one gender significantly outweighs the other in a digital environment, the traditional gender-based frameworks may require more rigorous testing with balanced cohorts to confirm their cross-gender applicability.

5.3 Practical Implications

Practical interventions should focus on digital literacy. Specifically, programs should teach students how to manage the psychological impact of ‘upward comparison.’ Platform designers could also use these insights to create safer digital environments. For instance, reducing the visibility of social-competition metrics could help lower the pressure on users with low self-esteem. The findings of this study provide actionable insights for three primary stakeholder groups:

For University Counselors and Mental Health Professionals: Our results highlight that high levels of social comparison among students can amplify the pressure of social influence, potentially leading to digital fatigue and diminished self-worth. Counselors should integrate “Digital Well-being” workshops into university orientation programs. These sessions should focus on cognitive restructuring techniques to help students distinguish between curated online personas and reality. By fostering a more critical approach to social media, counselors can empower students to reduce the negative psychological impacts of upward social comparison and maintain a healthier self-concept.

For University Administrators and Educators: Universities can leverage these findings to promote digital literacy as a core competency. Educators should encourage students to use social platforms for constructive engagement (e.g., academic networking, professional development) rather than passive, comparison-driven consumption. Promoting digital literacy curricula—that address the psychological pitfalls of SNSs—can help mitigate impulsive self-disclosure and commercial participation that might stem from peer pressure or the need for external validation.

For Policymakers and Platform Designers: The study underscores the necessity of designing “human-centric” digital ecosystems. Policymakers should advocate for transparent algorithmic designs that do not exacerbate upward social comparison. For platform designers, this implies integrating features that minimize comparison-triggering metrics (e.g., making ‘like’ counts optional) or providing users with “nudge” notifications that encourage reflective usage after prolonged periods of engagement. Policymakers should also support public awareness campaigns targeting young adults, emphasizing that SNSs are often environments for idealized self-presentation, and encouraging a balanced perspective on digital interaction.

5.4 Limitations and Directions for Future Research

This study acknowledges significant limitations. The exclusive focus on Iranian university students restricts generalizability across cultures, age groups, and professional demographics. The cross-sectional design also prevents establishing causal relationships among the variables.

Future research should employ longitudinal methods to trace the evolution of self-esteem, social influence, and comparison behaviors over time. Investigations should expand to include emotional factors like FoMO and anxiety, and examine how individual traits (e.g., neuroticism) and platform-specific features (e.g., algorithmic content) moderate psychological outcomes. Ultimately, interdisciplinary work is needed to explore the negative behavioral consequences of upward social comparison, such as digital fatigue and cyberbullying.

A limitation of this study is that the proposed practical interventions, including digital literacy programs and low-comparison platform design features, were not empirically tested. Future research should examine their effectiveness using longitudinal and experimental designs across different cultural and occupational groups. The use of self-report measures may introduce social desirability or recall bias, as participants might overestimate or underestimate their social media engagement and self-esteem levels. Second, while the research instruments were carefully translated from English to Persian using back-translation methods, linguistic and cultural nuances might still affect the equivalence of the constructs across different cultures. This could potentially impact the psychological depth captured by the original scales.

To enhance the rigor of future studies, researchers should consider using objective data collection methods (e.g., actual screen-time logs or digital trace data) to complement self-report surveys. Additionally, future research could focus on the cross-cultural validation of these instruments and explore how specific cultural idioms of distress or well-being in the Persian context might influence the relationship between digital literacy and social comparison.

Statements and Declarations

Ethics Statement: The author affirms that this research was carried out in compliance with recognized ethical standards and principles. All information sources have been appropriately cited and credited. Where required, ethical clearance was granted, and informed consent was obtained from all participants. No instances of plagiarism, data fabrication, or falsification were involved in this study.

Use of Artificial Intelligence: The author confirms that AI-based tools were employed exclusively for language polishing and grammatical correction. All AI-generated assistance was thoroughly examined, validated, and revised by the author, who bears full responsibility for the precision, authenticity, and integrity of the final manuscript. AI tools were not utilized to produce or alter research data or to substitute essential scholarly reasoning.

Conflicts of Interest: Any possible conflicts of interest, including financial or personal relationships that might affect the research, are disclosed. The author states that there are no competing interests.

Compliance with Regulations: The author verifies that this study adhered to all relevant institutional, national, and international rules, and that all required permissions for data usage and reproduction were secured.

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