

Interactivity in Context: Access Points and Gender Moderates Social Media Networks, Social Capital and Sustainable Development Initiatives Nexus

Zaharudin Ibrahim¹, Augustine Uzoma Madu^{*2}, Norhayati Hussin¹

¹*Fakulti Sains Maklumat, Universiti Teknologi MARA Cawangan Selangor, Kampus Puncak Perdana, 40150 Shah Alam, Selangor, Malaysia*

²*Department of Library and Information Science, University of Maiduguri, Nigeria.*

**Corresponding Authors' Email Address: maduau@unimaid.edu.ng*

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ABSTRACT

The study investigates the relationship between social media, social capital and sustainable development initiatives. It further examined the moderating role of gender and social media access points in the relationships with 431 library users from private universities and public libraries in northern Nigeria. A quantitative research design through a descriptive correlational approach was adopted; data were collected through an online Google Forms survey. The instrument was designed on a seven-point Likert scale to measure respondents' perceptions. The data were analysed using structural equation modelling (SMARTPLSSEM). The results indicate that social media networks had a significant relationship with sustainable development initiatives and social capital. Social capital is also significantly related to sustainable development initiatives. Moderation analysis reveals that gender had a significant moderation effect on the link between social media and social capital but failed to moderate the link between social media and sustainable development initiative. Also, the social media access point significantly moderated between the SM-SDI and SC-SDI paths. Theory, practical and policy implications were proffered.

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INTRODUCTION

Sustainable Development Initiatives (SDI) embody a practical, grassroots approach to sustainability that focuses on local, actionable strategies rather than broad, frequently unmet global objectives. In developing countries like Nigeria, SDI aim to address serious socio-economic challenges through the mobilization of community resources to promote entrepreneurship and facilitate skills acquisition (Adepoju et al., 2023). Conceptual effectiveness lies in community-driven solutions that increase local capacity building and participatory problem-solving (Kurniawan et al., 2023; Krishnendu et al., 2025). Notably, SDI rely on relational assets such as Social Capital (SC), trust, shared norms, and networks that enable coordinated

collective action (Putnam, 2000; Claridge, 2018), which are further strengthened through engagement on social media network sites.

Social media (SM) is an interactive application that allows users to create and modify content through technology (Bhonsle et al., 2023). Platforms such as Facebook, X, YouTube, TikTok, and LinkedIn contribute to the creation and maintenance of relationships through profile building, information sharing, and network building (Boyd & Ellison, 2007; Selvakumar et al., 2025). SM networks (SMNs) establish and nurture social relationships, in addition to bonding and developing trust, reciprocity, and shared values, which are components of SC (Boyd & Ellison, 2007; Selvakumar et al., 2025). Through user-generated content, community engagement, and communication, SMNs contribute to knowledge sharing, community building, and establishing networks that transcend geographical and social boundaries (Dong et al., 2022). In doing so, they nurture SC by allowing users to form online relationships that strengthen offline relationships, group identity, and the willingness to work together on common goals (Putnam, 2000; Bohn et al., 2014). It is becoming increasingly popular in areas such as entrepreneurship, talent acquisition, joint ventures, and collaboration. Unlike traditional media, SNSs encourage real-time communication and interaction (Mugil & Kenzie, 2025; Dong et al., 2022), creating SC through trust, friendship, and norms in social networks (Putnam, 2002; Li, 2020). SNSs have become platforms for community engagement and problem-solving, allowing knowledge exchange and relevant practices for sustainable development (Choi et al., 2021). SNSs facilitate trust, reciprocity, and knowledge exchange across geographic boundaries, lower the cost of coordination and facilitate market access, collaboration, and collective action (Li, 2020). Recent studies show that SNS-mediated SC catalyzes collective actions, citizen mobilization, and grassroots economic initiatives that strengthen community resilience and fulfil SDI (Choi et al., 2021; Auliah et al., 2025). SC refers to resources within networks that facilitate outcomes (Putnam, 2000; Lin, 2002), including processes of interaction, networking, and interdependence (Szreter and Woolcock, 2004; Wahid et al., 2024). Research emphasizes the important role of SC in cooperation building, cost reduction, cohesion, and support of community action for sustainable development (Liu, 2023; Zhao et al., 2025; Auliah et al., 2025). For example, SNSs provide spaces where entrepreneurs can acquire business skills, network with mentors and markets, and seek support (Wegbue & Kediehor, 2025). Furthermore, SNS applications improve cooperative behavior, promote knowledge sharing in the community, and solve environmental and social problems (Li, 2020). Thus, by fostering SC, SNSs act as vehicles for sustainable development, empowering individuals and communities to organize, innovate, and engage in collective actions for long-term well-being and resilience.

Despite emergent universal proof that SM enhances SC and promotes SDI through collective action and community engagement (Lee, 2021; Hoda & Naim, 2023; Gil de Zúñiga et al., 2012), empirical research in emerging settings, particularly Nigeria, remains deficient. Despite the emergent body of research on digital inequality, current studies largely focus on social media access or gender disparities in isolation, with limited integration of how these factors collectively impact consequences such as social capital and sustainable development. Information suggests that access points to social media, particularly mobile devices compared to library platforms, greatly inspire social media engagement (van Dürsen & van Dijk, 2018), while gender differences continue to limit digital participation and prospects (Islam & Manchanda, 2023; Kumari et al., 2024). Although library-based research was not the primary emphasis of the aforementioned sources, it becomes a gap this study attempts to fill. Moreover, sufficient empirical attention has not been given to the moderating role of access points and gender in the relationship between

social media use, social capital formation, and sustainable development initiatives in available studies. This study addresses these gaps by integrating access points and gender as moderating variables to provide a more comprehensive framework for understanding technology-driven development achievements.

Furthermore, a comprehensive model that simultaneously explains how SM, SC, and SDI interact, while considering contextual factors such as access inequalities and gender, has not been explored yet. This knowledge gap necessitates this study, which seeks to provide empirical evidence and expand theoretical understanding within the Nigerian context. This leads to the research objective, to examine library users preferred SM platforms and access points, explore the relationships between SC, SM use, and SDI in northern Nigeria, and assess how SM access points and gender moderate these relationships.

LITERATURE REVIEW

Theoretical Background and Hypothesis Development

This study integrates social capital theory (Putnam, 2000; Bourdieu, 1986), social cognitive theory (Bandura, 1991), structure theory (Giddens, 1991), Social network theory (Wasserman & Faust, 1994) and relational cohesion theory (Lawler & Yoon, 1996) to explore how digital interactions contribute to significant development outcomes. Social capital theory highlights social networks as enablers of relationship building, bridging, and linking relationships crucial for collective action in sustainable development, and these relationships depend on the quality of interactions. Social Cognitive Theory asserts that interactivity fosters observational learning and self-efficacy, enabling users to participate effectively in development networks. Structuration Theory presents access points of ICT infrastructure such as social media network sites as both facilitators and constrainers, influencing user activity. Gender, analysed through the feminist technology and gender and development theory perspectives, emerges as a critical moderating factor. Feminist technology theory (Haraway, 1985) argues that technology reflects existing gender hierarchies, while the gender and development approach (Moser, 2012) focuses on social structures rather than solely viewing women as beneficiaries, advocating for equality and empowerment. This framework elucidates how interactivity, accessibility, and gender shape the relationship between social media, social capital, and sustainable development, filling a significant gap in the literature of digital sociology and information science

Social network theory posits that individuals and organizations operate within interconnected relationships that facilitate the flow of information and resources (Wasserman & Faust, 1994). The value derived from these networks, SC, depends on the strength and structure of social ties (Granovetter, 1973; Putnam, 2000) and supports trust, cooperation, and collective problem-solving (Burt, 2005). In sustainability contexts, networks enable knowledge sharing, resource mobilization, and coordinated community action. SM intensifies these links by extending networks beyond geographical boundaries, enhancing participation and collective engagement in addressing socioeconomic challenges (Ouya et al., 2025). Furthermore, relational cohesion theory (Lawler & Yoon, 1996) explains how repeated positive interactions generate emotional attachment, trust, and commitment, strengthening group cohesion and fostering sustained collaborative behavior (Huang et al., 2018; Thye et al., 2014).

Integrating different theories helps clarify the relationship between social networks, social capital, and sustainable development initiatives, underlining the role of access points and gender. Social capital theory postulates that social media promotes network building and trust, two vital elements of enabling sustainable development initiatives. Social cognitive theory demonstrates

how interaction on social media is formed by observational learning and self-efficacy, supported by access patterns and gender. Structuration theory asserts that social media enable and constrain user interactions, with access points and gender affecting user experiences. Social network theory shows that network features determine the flow of information and resources, while relational cohesion theory holds that repeated interactions build trust and commitment, which are important components for sustainable development initiatives. These theories assert that social media influences sustainable development initiatives through social capital with access points and gender as the moderators.

Social Media, Social Capital and Sustainable Development Initiative

Research evidence shows that SM network sites have positively related, impacted and influenced sustainable development in various research contexts (Rahman et al., 2023; De, 2025; Mohammed & Fiadzawoo, 2023; Okpa et al., 2025). Divided into various platforms, including social networking sites (such as Facebook and LinkedIn), media sharing sites (such as YouTube and Instagram), blogging network sites (e.g., blogs, WordPress) and bookkeeping sites (such as Pinterest and social communities), which create connections and opportunities. These networks are associated with SDI such as collaboration, entrepreneurial activities, skills acquisition and developing collaborative communities. This relationship can best be comprehended through relational cohesion theory (Lawler & Yoon, 1996) explains how repeated positive interactions generate emotional attachment, trust, and commitment, strengthening group cohesion and fostering sustained collaborative behavior.

Social network theory emphasizes the importance of social networks and that collaboration provides resources for the flow of resources and the motivation of others (Borgatti et al., 2009). These theories provide a strong analytical framework for examining how SM promotes sustainable development among people and societies. Social Network Theory, on the other hand, underlines the significance of structure and quality of associations in driving social outcomes. SM platforms such as YouTube and TikTok allow individuals to create and share instructional content that supports the diffusion of knowledge. According to this theory, individuals in fitted, well-connected communities are more likely to access information and support (Wasserman & Faust, 1994). In this context, a user who shares agribusiness instruction or digital skills can build a larger network, thus increasing the diffusion of innovations. Chowa et al. (2022) found that young people in developing countries increasingly rely on such platforms to acquire job-related skills, especially in a lifelong learning context. Consistent with Wenger's (1998) concept of communities of practice, information-sharing networks improve learning through observation and repetition and link people across a wide range of disciplines.

Social network theory suggests that individuals and organizations function within a web of interconnected relationships, enabling the exchange of information and resources, while Relational Cohesion theory highlights how consistent and emotionally rewarding interactions build trust, group identity, and long-term commitment. Different types of SM platforms contribute to the formation of SC in different ways: social networking sites support bonding capital through relationship maintenance; media sharing platforms enhance emotional intimacy and identity expression; bookmarking platforms facilitate capital bonding through knowledge exchange; and professional networks promote capital bonding through institutional engagement. Collectively, these platforms serve as strategic tools for fostering SC in the digital age, and the cultivation of cohesive communities, empowering individuals, and connecting people with influential networks

to strengthen the foundations of socially connected, inclusive, and development-oriented societies.

Research shows that active users of professional networking sites report feeling greater SC due to exposure to a diverse range of individuals and opinions (Ellison, Vitak, & Gray, 2014). Social advocacy campaigns and entrepreneurial content often lead to partnerships, funding or policy action. According to Iwegbue and Kediehor (2025), youth-led initiatives can gain institutional support through creative digital engagement. Alghamdi and Plunkett (2021) used a mixed method to examine the impact of SNSA use on the SC of Saudi postgraduate students, using a multidimensional framework that comprised “life satisfaction, social trust, civic participation, and political engagement.” The findings indicate that students perceived SNSAs to have a generally moderate to positive impact across all dimensions of SC. Correlational analyses indicated moderate to strong positive relationships across components. While no significant gender differences emerged in life satisfaction and social trust, women reported greater engagement with SNSAs for political purposes, while men reported greater use for civic participation. Similarly, Ahmed et al. (2021) examined how SM use drives SDI through civic engagement, with SC acting as a mediator. Using a cross-sectional survey of 350 university students in Lahore and PLS-SEM analysis, the study found that SM significantly increases SC, which subsequently enhances civic engagement, and confirmed that SC mediates the link between online interaction and sustainability-related participation. Kaigo (2012) showed that Twitter facilitated the rapid formation of bridging SC during the 2011 Japanese earthquake, enabling coordination of relief activities. Ellison et al. (2007) similarly found that Facebook strengthens weak social ties, forming networks that enable collective action. Further research confirms that SM-generated SC predicts civic activism, pro-environmental behaviors, and even entrepreneurial intention (Gil de Zúñiga et al., 2012; Pérez-Fernández et al., 2021; Wan & Du, 2022; Li, 2020). These studies demonstrate that SM platforms build SM that transforms online interactions into tangible community actions and sustainable development outcomes. Based on the evidence presented above, this study proposed the following hypotheses:

H1: SM and SDI are significantly related.

H2: A significant relationship exists between the social media network site and SC

Social Capital and Sustainable Development Initiative

Over the last two decades, researchers have identified a link between SC and individuals' quality of life (Christian et al., 2020). It facilitates the exchange of knowledge and innovation, thereby equipping communities to adopt sustainable practices and adapt to environmental and economic challenges (Kangro & Lepik, 2025). Strong social networks build resilience, uphold equity through the inclusion of marginalized groups, and strengthen social cohesion.

In a related study, Addai et al. (2024) explored the significant role of SC in agricultural diversification and its implications for sustainable development. It addresses a gap in literature through examination of core elements of SC and their influence on agricultural diversity. With data from 600 rural families and 60 in-depth interviews with stakeholders in Ghana's Upper West and Ashanti regions, the research identified socioeconomic factors such as farm size, remittances, household composition, and education level as vital determinants shaping various forms of SC. These findings revealed the significance of SC in rural livelihoods through diverse agricultural strategies. Further empirical evidence from Hui et al. (2020) highlighted how communal learning

circles in low-income communities enabled the development of digital competencies through bonding capital. This form of SC facilitated the exchange of practical knowledge and fostered psychological resilience, which is crucial for learning, skill application, and local capacity building.

Similarly, Tengapoe et al. (2024) identified SC as essential for inclusive development among rural farmers in Sub-Saharan Africa. With 284 smallholder farmers in Ghana's Upper West Region, the study found that family networks act as bonding SC, farmer-based organizations as bridging capital, and access to extension services as linking capital. Socioeconomic and demographic factors significantly affect farmers' access to these networks, with SC enhancing rural livelihoods through better resource acquisition. Furthermore, Pandu Primadata et al. (2023) explored SC's role during the COVID-19 pandemic in Banyumas Regency's rural villages. Their findings showed that villages with strong social networks and community trust sustained higher levels of SC, whereas others suffered declines in trust, weakening their networks. Okafor et al. (2023) argued that diverse memberships in agricultural cooperatives in Nigeria boost productivity and cohesion through shared knowledge and SC, facilitating skills development, credit access, and market integration for economic sustainability. Fotovvat et al. (2014) studied SC's role in sustainable development in Salmas, Iran, noting that social cohesion and participation positively correlate with security and development, although social trust had a negligible impact. Lastly, Nalikan et al. (2025) investigated community empowerment initiatives in Lamongan Regency using a SC-based framework. Bonding and bridging SC positively influence empowerment, social cohesion, economic resilience, and service access, despite challenges from limited private sector engagement and weak cross-sector collaboration. From social entrepreneurship perspective, Shabbir and Batool (2025) investigates the role of SC and relationships in the success and sustainability of social entrepreneurship within community development. Using data from 16 questionnaires and 254 surveys in Oman, the study examined how these dimensions support sustainable business development and promote community development. The study found that trust, communication, and sharing principles help entrepreneurs' access resources, while sustainable business development moderates the impact of SC on community outcomes. Scholarly evidence indicate that SC in its dimensions are vital to the growth and sustainability of SDI. Based on these details, this study proposed that:

H3: Social capital has a significant relationship with the sustainable development initiative

Social Media Access Point, Social Media Network Site, Social Capital and Sustainable Development Initiative

The point of access to SM, from personal mobile devices, online library websites, or both, can affect how SM use leads to involvement in sustainable development. Library-based access points offer organized and carefully selected information spaces that facilitate meaningful engagement and the pursuit of trustworthy information (Aharony, 2012; Ghosh et al., 2024). On the other hand, accessing SM through a mobile device or personal device provides flexibility, facilitates constant communication, and enables instant collaboration (Ahmed et al., 2021). According to Ellison et al. (2007) and Gil de Zúñiga, et al. (2012), users who use both channels gain more exposure and wider social networks, which boosts SC and increases engagement in civic and developmental activities. Users who utilize both channels benefit from greater exposure and wider social networks, increase SC and enhance participation in civic and developmental activities (Ellison et al., 2007; Gil de Zúñiga et al., 2012). Therefore, the point of access acts as a

moderating factor, shaping the depth of interaction, the credibility of information consumed, and the strength of social connections, thus influencing the degree to which SM use and SC contribute to SDI. Therefore, these hypotheses are proposed:

H4: Access point significantly moderates the link between SM and SDI

H5: Access point significantly moderates the link between SC and sustainable development initiative

Gender, Social Media Network Site, Social Capital and Sustainable Development Initiative

Gender is perceived to play a significant moderating role in how SM use and SC translate into SDI. Studies show that women tend to use these platforms for emotional connection, social interaction, and community building (Noguti et al., 2019), while men typically use them for information seeking, professional networking, and practical purposes (Krasnova et al., 2017). Because SDI requires collaborative participation, information sharing, and continual engagement, these gender-differentiated media use patterns can either strengthen or weaken the extent to which SM interactions lead to meaningful participation in SDI. Gender also influences how SC is developed and mobilized. Women tend to form strong bonds that enhance emotional support and cohesion, while men typically develop weaker, bridging bonds that connect them to diverse resources and opportunities (Reyes et al., 2022; Makridis & Wu, 2020). These differences affect how relationships translate to collective actions and resource mobilization. Thus, gender moderates both the influence of social networks on participation in SDI and the relationship between SC and such initiatives, as it determines how individuals build networks, interpret social interactions, and translate relational resources into community-centered outcomes. The above prepositions necessitated the following hypotheses:

H6: Gender significantly moderates the relationship between SM network sites and SDI.

H7: Gender significantly moderates the relationship between SC and SDI.

The conceptual model is presented in Figure 1.

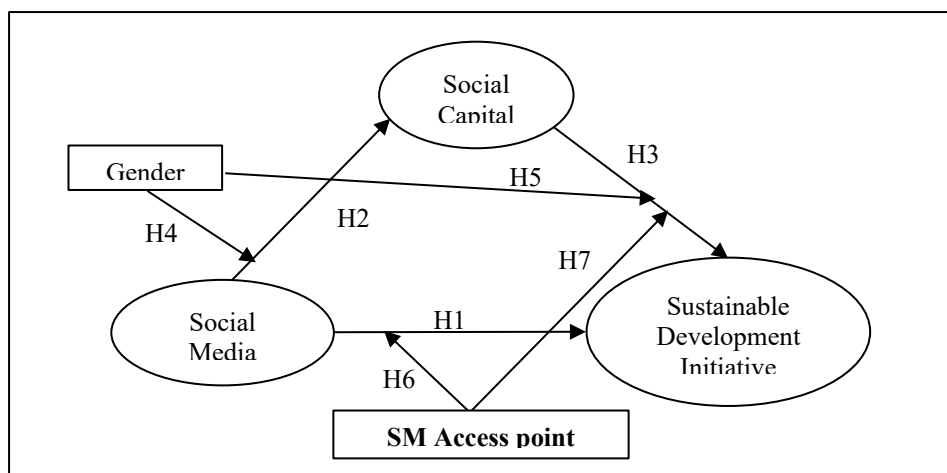


Figure 1: Research Model

METHODOLOGY

A quantitative descriptive correlational research design was used to investigate the relationships among SM network site use and SC (independent variables), and SDI (dependent variable) among library users in northern Nigeria. In addition, SM access point and gender were modelled as moderating variables. The study used multi-stage mixed sampling methods of probability and non-probability techniques to select 431 respondents from public and private university libraries in the northern region of Nigeria. Initially, the population was stratified into university and public library users to enhance representativeness (Cochran, 1977). The random sample size was determined using the Roasoft Sample Size Calculator (Roasoft, 2024), which employed proportional sampling for distribution among the strata (Krejcie & Morgan, 1970). Data collection occurred through an online questionnaire via Google Forms, using WhatsApp for convenience and voluntary participation, a methodology commonly employed in social science research for statistical accuracy (Onwuegbuzie & Collins, 2015). Data were collected using a structured questionnaire consisting of two sections: Section A captured demographic data (age, gender, and SM access point), while Section B measured SM network site use, SC, and SDI using a seven-point Likert scale from (1 = strongly disagree, 7 = strongly agree). To ensure the reliability of the instrument, a pilot test was conducted with 100 library users; the Cronbach's alpha yielded a cumulative reliability coefficient of 0.857, which is an acceptable threshold according to the standard rule of thumb. The final instrument was administered via Google Forms and distributed across Facebook, WhatsApp, and email to enhance accessibility and response rate. Descriptive statistics of frequency count and percentage scores were used to test respondents' demographic characteristics, while the hypotheses test and analysis of structural relationships were performed through structural equation modelling (SEM) with SmartPLS version 4. First, a confirmatory factor analysis (CFA) was conducted to ensure the reliability and validity of the measurement model, while a bootstrapping technique with 5000 samples at a 0.05 significance level was conducted to observe the level of relationship in the structural model.

FINDING

Demographic Information

Table 1: Demographic Information

Demographic Information	Descriptions	Frequency	Percentage
Gender	Male	289	67.1
Gender	Female	142	32.9
Libraries	Bingham Uni. Lib	121	28.1
	Baze Uni. Lib. Abuja	164	38.1
	Al-Qalam Uni. Lib. Katsina	15	3.5
	Kano State Public Lib., Kano	89	20.6
	Plateau State Public Lib., Jos	24	5.6
	Bauchi State Public Lib. Bauchi	18	4.2
SM Access points	In the Library (website)	42	9.8
SM Access points	Outside lib. (Mobile apps.)	142	32.9
SM Access points	Both	247	57.3
Total		341	100

The demographic distribution of respondents shown in Table 1 reveals that the majority were male (67.1%), while females comprised 32.9% of the sample. This suggests that male users are more represented among library patrons engaged in academic or developmental activities supported by SM. Regarding institutional affiliation, participants were drawn from six libraries across northern Nigeria. The highest percentage came from the Baze University Library, Abuja (38.1%), followed by the Bingham University Library, Nasarawa (28.1%), while the University of Al-Qalam University Library, Katsina, accounted for 3.5%. Public libraries also contributed significantly, notably the Kano State Public Library (20.6%), the Plateau State Public Library, and the Bauchi State Public Library, which made up smaller portions of the sample (5.6% and 4.2%, respectively). This distribution demonstrates a balanced representation across both university and state public libraries. Analysis of SM access points indicates that most participants (57.3%) access SM through the library's web interfaces and external mobile applications, highlighting a hybrid usage pattern. Additionally, 32.9% of participants accessed SM primarily through mobile applications outside the library environment, while 9.8% accessed it exclusively through the library's website. This predominance of dual access points suggests that library users combine institutional resources with personal digital tools. This underlines the pervasive and flexible use of SM for information gathering, collaboration, and participation in development activities.

Measurement Model

The measurement model analysis in Figure 2 reveals that SM networks and SC, as well as SDI, are reliably assessable, as demonstrated by the high factor loadings that support convergent validity (Hair et al., 2019) (Table 5.1). The results indicate a strong positive correlation between SM network use and SC ($\beta = 0.753$), confirming the role of SM networks in interaction, trust, and collaborative relationships among users (Ellison, Steinfield, and Lampe, 2007; Putnam, 2000). It further has a significant direct influence on SDI ($\beta = 0.677$), consistent with studies indicating that digital platforms promote knowledge sharing and community participation in development activities (Mefalopulos and Kamlongera, 2010). Furthermore, SC positively influences SDI ($\beta = 0.690$) to prove that communities with greater trust and shared standards participate more actively in development efforts (Wolcock & Narayan, 2000; Coleman, 2003). The model exhibits significant explanatory power ($R^2 = 0.585$ for SC; $R^2 = 0.573$ for SDI), which suggests that SM networks and SC contribute significantly to the variance in sustainability outcomes.

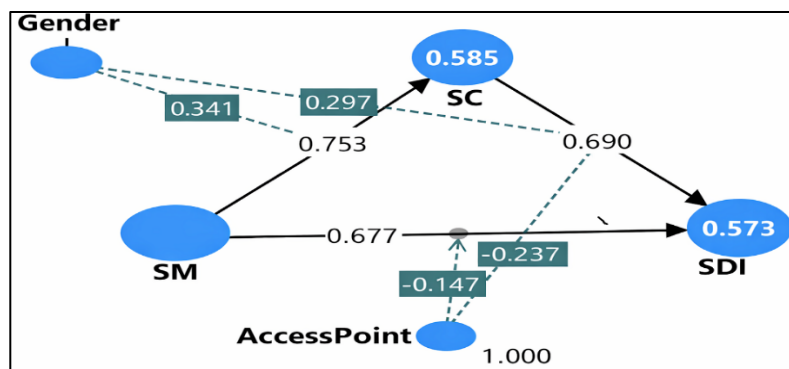


Figure 2: Measurement Model

All factor loads meet the acceptable reliability threshold of ≥ 0.60 , ranging from 0.660 to 0.765 across the three constructs, indicating sufficient index reliability (Hair et al., 2019). Although loads above 0.70 are ideal, indices between 0.60 and 0.70 are considered acceptable when the configuration reliability is strong (Hair et al., 2017). Internal consistency was confirmed, with Cronbach's alpha values for SC (0.882), SDI (0.900), and SM (0.920) exceeding the recommended level of 0.70 (Nunnally & Bernstein, 1994). The composite reliability (CR) values are also high, between 0.905 and 0.921, which is higher than the minimum of 0.70. This means that the structures are measured consistently (Fornell & Larcker, 1981). The convergence is further validated by the AVE values for SC (0.514), SDI (0.501), and SM (0.510), all of which are above the threshold ≥ 0.50 , suggesting that each structure explains more than half of the variance of its respective index (Fornell & Larcker, 1981). Overall, these results confirm the reliability and convergent validity of the measurement model as shown in Table 2, supporting its suitability for further structural analysis as indicated in structural model in Figure 3.

Table 2: Factor Loading, Construct Reliability, and Validity

Factors	Items	Loading	CA (α)	CR	AVE
SC			0.882	0.905	0.514
	SC10	0.697			
	SC11	0.743			
	SC12	0.708			
	SC2	0.747			
	SC3	0.751			
	SC4	0.709			
	SC6	0.695			
	SC7	0.703			
SDI	SC9	0.696			
			0.900	0.917	0.501
	SDI13	0.686			
	SDI14	0.736			
	SDI15	0.724			
	SDI16	0.697			
	SDI3	0.743			
	SDI4	0.724			
	SDI5	0.703			
	SDI6	0.662			
	SDI7	0.726			
	SDI8	0.721			
	SDI9	0.660			
SM			0.920	0.921	0.51
	SM1	0.687			
	SM10	0.730			
	SM11	0.698			
	SM12	0.725			
	SM13	0.744			
	SM14	0.720			
	SM15	0.706			
	SM2	0.765			
	SM3	0.695			
	SM5	0.686			

	SM6	0.727			
	SM7	0.711			
	SM9	0.681			

Structural Model

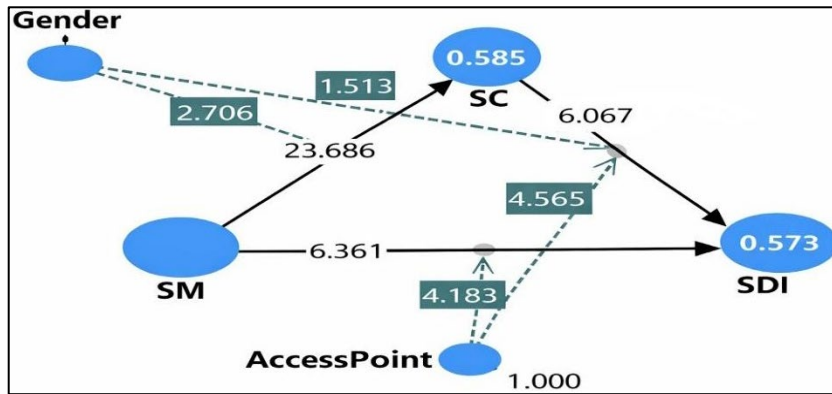


Figure 3: Structural Model

Table 3: Summary of the Results

Hypotheses		β	<i>t</i> -statistics	<i>P</i> -values	Decision
H1	SM $\rightarrow$ SDI	0.392	6.361	0.000	Accepted
H2	SM $\rightarrow$ SC	0.838	23.686	0.000	Accepted
H3	SC $\rightarrow$ SDI	0.424	6.067	0.000	Accepted
H4	Gender x SM $\rightarrow$ SC	-0.254	2.706	0.007	Accepted
H5	Gender x SC $\rightarrow$ SDI	-0.167	1.513	0.13	Rejected
H6	AccessPoint x SM $\rightarrow$ SDI	0.220	4.183	0.000	Accepted
H7	AccessPoint x SC $\rightarrow$ SDI	-0.235	4.565	0.000	Accepted

Table 3 summarizes the results of the structural model, including path coefficients (β), *t* statistics, and *p* values for seven hypotheses about the relationships between SMnetwork use (SM), SC, and SDI. The results indicate that SM significantly relates to both SDI ($\beta = 0.392$, $p < 0.001$) and SC ($\beta = 0.838$, $p < 0.001$), suggesting that high SM engagement enhances SC and encourages participation in SDI. In addition, SC exhibits a significant relationship with SDI ($\beta = 0.424$, $p < 0.001$). Furthermore, gender significantly moderates the SM and SC relationship ($\beta = -0.254$, $p = 0.007$) but did not significantly moderate the SC and SDI relationship ($\beta = -0.167$, $p = 0.13$), meaning that established SC translates to sustainable efforts regardless of gender. SM access points also show notable moderating effects on both SM-SDI ($\beta = 0.22$, $p < 0.001$) and SC-SDI ($\beta = -0.235$, $p < 0.001$) paths. The input effectively conveys its message, but it could be slightly refined for clarity and coherence. Points of access, such as libraries or mobile apps, facilitate the transition from SM use and SC to engagement in sustainable development. The structural model highlights the significance of SM engagement and SC while uncovering demographic and contextual factors that affect the strength of these relationships.

DISCUSSION

This study examined the relationship between SM, SC, and SDI among library users in northern Nigeria. The structural model results indicate that SM use is strongly related to both SC and SDI with strong statistical inference. This indicates that social media network sites are very significant in social capital which in turn influences sustainable development initiatives. This is consistent with (Rahman et al., 2023; De, 2025) which confirmed the utility of SM in SC and sustainable development initiatives building. Online interaction enhances cohesion (Lawler & Yoon, 1996), while online social capital is capable to engender SDIs activities (Putnam, 2000; Bourdieu, 1986). The positive relation of SM and SDI (H1) and SC (H2) is consistent with previous studies, which affirmed that interactive platforms encourage knowledge sharing, collaboration, and community engagement (De, 2025; Mohammed & Viadzau, 2023). Researchers have confirmed that SM enhances users' awareness of development content and motivates individuals to work collectively (Okpa et al., 2025). Similarly, SM fosters the formation of online networks and weak connections (Ellison et al., 2007), enabling individuals to accumulate SC through shared information, reciprocity, and trust (Ahmed et al., 2021; Gil de Zúñiga et al., 2012; Pérez-Fernández et al., 2021; Wan & Du, 2022; Li, 2020). This validates H1 and H2, confirming that greater interaction with SM platforms increases SC and participation in sustainability-related activities. These results are backed up by Social Network Theory which states that, value derived from these networks depends on the strength and structure of social ties (Granovetter, 1973; Putnam, 2000).

Social Capital proved to be very significant for SDI (H3), this increases the interactive mechanism of this variable. The result justifies the efficacy of social capital according to (Putnam, 2000; Bourdieu, 1986) that trust, cohesion and relationship can strengthen individuals and community for sustainable actions. This finding reflects previous findings that SC facilitates collaboration, resource sharing, and community problem-solving (Christian et al., 2020; Kangro & Lepik, 2025; Addai et al., 2024). Studies also indicate that social trust and network density translate into higher civic engagement in development projects (Hui et al., 2020; Tengapoe et al., 2024; Okafor et al., 2023; Pandu Primadata et al., 2023), underlining the fact that SC is an essential indicator of SDI outcomes.

Moderation analyses revealed that gender significantly moderated the relationship between SM and SC (H4). This corroborates previous studies' findings that gender-based differences in digital expression, online networking goals, and interaction patterns exist (Aharony, 2012; Ghosh et al., 2024). However, gender failed to moderate the link between SC and SDI (H5), which is consistent with Ahmed et al. (2021) and Gil de Zúñiga et al. (2012), that SC enables collective behavior regardless of demographic characteristics. Further, access points to SM significantly moderated the relationships between SM and SDI as well as SC and SDI (H6 and H7). This agrees with Social Network Theory's position that consistent relationships facilitate the flow of information and resources through networks. This demonstrates that the access environment, whether through library digital infrastructure or personal devices, influences how users translate online engagement into real-world development outcomes. Previous studies show that the access context affects engagement levels, depth of information processing, and collaborative behavior (Noguti et al., 2019; Krasnova et al., 2017). Access through institutional platforms such as libraries promotes intentional use for academic or developmental purposes (Reyes et al., 2022; Makridis & Wu, 2020), supporting the conclusion that the access point shapes the power of engagement in SDI design.

CONCLUSION

This study confirms that SM network sites play a critical role in building SC and driving SDI among library users. SM use directly enhances SC and SDI, while SC itself significantly explains participation in community development projects. Access point determined how digital networking and accumulated SC translate into sustainable development action, and gender affects how SM builds SC. By incorporating demographic and contextual moderators into a framework of SM, SC, and sustainability, the findings expand on existing research and provide fresh perspectives pertinent to developing nations where gender inequality and digital access constitute a challenge to sustainability efforts.

IMPLICATIONS OF THE STUDY

Theoretical Implications

This study contributes to the theory by integrating social network theory and relational cohesion theory as the basis for the estimated relationship. SM, SC and SDI are significantly correlated. The study expands the scope of current models of digital interaction and SC within the context of developing countries. Furthermore, the gender- and access point-moderating effects offer new theoretical insights into how demographic and contextual variables shape the relationship between SM, SC, and social development initiatives. With emphasis that SC generation is not consistent but rather is contingent upon how and where people access SM, this study improves the theories on digital involvement.

Practical Implications

The study offers practical guidance for libraries, development experts, NGOs, and community organizations seeking to leverage SM for sustainable development. Libraries and community centers can develop digital programs, such as webinars, practice forums, and interactive learning spaces, to enhance collaborative actions among patrons. The impact of access points highlights that providing dedicated digital interaction spaces and reliable internet connectivity can promote meaningful participation. To promote equitable participation and reduce gender gaps, online activities should be tailored to the specific usage patterns of each gender.

Policy Implications

The study provides policymakers with helpful guidance, especially in settings where access to internet facilities is still limited. Policies like community Wi-Fi hotspots, library ICT infrastructure, and data cost subsidies that increase public digital access could boost the impact of SM-driven development initiatives. Libraries can also become hubs for innovative technology and civic engagement by being incorporated into municipal and national sustainability strategies. To facilitate SC, community empowerment, and sustainable development outcomes, policymakers should implement policies that support fair access to SM and electronic devices.

Limitations and Suggestions for Further Research

This study acknowledges limitations due to its dependence on cross-sectional data and its focus on specific library and community contexts, which may affect the utility of the findings. Therefore, future research should take a longitudinal approach, examine different national and

cultural contexts, and explore additional contextual factors to improve understanding of the role of SM in sustainable development programs.

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