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How Digital Self-Efficacy Reduces Social Isolation and Enhances Self-Esteem Among Older Adults in Emerging Economies: Evidence from PLS-SEM

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Abstract: This research focuses on the role of social media self-efficacy in shaping social media usage and its relationship with the psychological impact on older adults. Most studies have treated social media use as a homogeneous activity. Using digital aging theory as a framework, this study conceptualizes the usage of informational social media as a specialized behavioral mechanism and investigates its impacts through digital self-efficacy, perceived social isolation, and self-esteem. This study collected survey data from 300 older adults and employed Partial Least Squares Structural Equation Modeling (PLS-SEM) to develop and test a structural model with comprehensive direct and indirect relationships. This study found social media self-efficacy has a positive impact on the informational use of social media ($\beta = 0.562$). Informational use, in turn, significantly reduces perceived social isolation ($\beta = -0.291$) and enhances self-esteem ($\beta = 0.41$). Additionally, social media self-efficacy directly impacts the perception of social isolation ($\beta = -0.27$) and self-esteem ($\beta = 0.34$), and therefore has a partial mediation effect. The structural model provides a moderate explanatory power and strong predictive relevance for key psychological outcomes. The study furthers digital aging theory by separating and documenting a pathway that has been largely overlooked by researchers that analyses digital self-efficacy and psychological resilience, and applies it to older adults. The findings have important policy implications, suggesting that promoting information-focused digital competencies among older adults can reduce social exclusion and improve quality of life, particularly in developing and emerging economies.

Keywords: Self-Efficacy on Social Media; Social Media Informational Usage; Social Isolation; Self-Esteem; Elderly; PLS-SEM.

Type: Research paper

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1. Introduction:

As digital technologies continue to evolve, modes of communication have undergone significant transformation, with social media emerging as a dominant platform for interaction and information exchange. Although social media technologies are relatively new compared to the communication tools traditionally used by older adults, their adoption within this age cohort has increased steadily in recent years. This growing engagement has been associated with enhanced access to information, improved social relationships, and greater opportunities for participation in social and civic life (Nye & Vega, 2019). Consequently, the growing use of social media among older adults has garnered increasing attention within the social sciences, particularly in light of the social challenges and policy concerns associated with population aging.

A key determinant of older adults use of digital technologies is self-efficacy, which referes to persons confidence in their capacity to successfully perform specific tasks (Bandura, 1986). Prior studies have consistently shown that higher levels of technology-related self-efficacy increase the likelihood of technology adoption, effective use, and the attainment of positive outcomes (Compeau & Higgins, 1995; Venkatesh et al., 2012). In older adults, self-efficacy becomes more critical due to the age-related cognitive and physical barriers, as well as the experience of a technology, which may inhibit technology use and diminish self-efficacy (Czaja et al., 2006). Within this context, social media, and particularly when used for informational purposes, has become a relevant behaviour for older adults. Informational social media use, such as accessing health-related information, government services, news, and community resources, has been shown to enhance autonomy, support decision-making, and increase perceptions of technology usefulness, thereby facilitating active and independent aging (Chen & Schulz, 2016; Leist, 2013). Furthermore, social media helps older adults keep active and autonomous living systems by fostering social awareness.

Social media use is strongly associated with psychological effects, such as perceived social isolation and self-esteem, in addition to its practical advantages. Over the past four decades, social isolation, conceptualized as a form of relational deprivation, has gained attention as a major area of concern for public health, especially for older adults, due to its detrimental consequences on various mental

and physical health indicators (Holt- Lunstad et al., 2015). Studies have illustrated the beneficial effects of digital communication technologies on perceived social isolation through the provision of access to a range of information, social support, and community engagement (Quan- Haase et al., 2018; Chen & Schulz, 2016). Moreover, the digital inclusion paradox highlights that effective technology use may reduce self-esteem disparities by fostering social confidence, relevance, and a sense of belonging among older adults. (Du et al., 2020; Rui, 2022).

Despite these advances, existing literature largely examines social media use, self-efficacy, and psychological well-being in a fragmented manner. Limited empirical attention has been devoted to understanding how social media self-efficacy influences informational social media use, and how these relationships jointly shape psychological outcomes such as social isolation and self-esteem, particularly in developing and emerging economies. Furthermore, few studies employ advanced analytical approaches such as Partial Least Squares Structural Equation Modeling (PLS-SEM), which enables the concurrent analysis of com complex relationships and the assessment of predictive validity. Addressing these gaps is essential for advancing understanding of how digital engagement can promote inclusivity and psychosocial well-being in later life.

Accordingly, this study differentiates itself from prior research by explicitly modeling the pathways linking social media self-efficacy, informational social media use, perceived social isolation, and self-esteem among older adults. By doing this, it adds something new to the idea of digital aging and gives policymakers in developing and emerging economies empirically supported insights to improve the quality of life and digital inclusion of older populations.

1.1. Purpose of the Study

The principal objective of the study is to test the relationship of social media self-efficacy and the perceived social isolation and self-esteem of older adults, and to evaluate the way social media self-efficacy predicts the informational use of social media. The study departs from self-efficacy theory (Bandura, 1986) and literature on digital ageing to analyse the various ways digital self-efficacy enhances psychological well-being, outlining the mechanisms as direct as well as indirect.

Employing Partial Least Squares Structural Equation Modelling (PLS-SEM), this study aims to create and evaluate a predictive model that outlines the relationships among social media self-efficacy, informational use, and well-being outcomes. With regard to informational use, the study seeks to understand how purposeful digital engagement, as opposed to mere access or use, mitigates social isolation and enhances self-esteem among older adults.

In regard to social value, this study advances the discourse surrounding digital inclusion and healthy ageing by demonstrating that digital self-efficacy and

informational engagement promote psychological wellbeing among older adults. As a result, this evidence may motivate policymakers, health care providers, and social stakeholders to implement age-appropriate digital literacy and information-based social media programmes. In doing this, the study aims to achieve broader social policy objectives, such as reducing social isolation, improving mental well-being, and the active engagement of older people in a digital society.

The current study focuses on developing/emerging economies, where older adults encounter specific problems due to insufficient digital access and digital age/skill barriers, which makes the study of social media self-efficacy even more pertinent.

2. Review of Literature

2.1. Social Media Use and Older Adults

An increasing amount of research shows that older adults use social media and the internet more frequently, which is consistent with larger trends in digital inclusion. Hunsaker and Hargittai (2018) noted that individual-level skills and competencies, in addition to technological availability, influence older adults' engagement in digital settings. According to their findings, older adults primarily use social media for interpersonal communication and information-seeking, especially when it comes to civic services, health-related information, and community involvement. These usage trends highlight social media's usefulness as a tool for managing daily life in later adulthood.

Social media use has been demonstrated to facilitate older adults' online and offline social integration in addition to individual information acquisition. According to Quan-Haase, Mo and Wellman (2018), digital platforms promote civic engagement and social participation by facilitating long-lasting social relationships. These forms of engagement are particularly significant for older adults, for whom opportunities for face-to-face interaction may reduce due to retirement, mobility constraints, or health-related limitations. As a result, social media serves as a crucial tool for preserving social ties and involvement in later life.

Significantly, studies indicate that psychological variables influence older adults' technology use more than just their demographics. In view of Czaja et al. (2006), Confidence and perceived competence were found to be important predictors of technology engagement, highlighting the fact that people's perceptions of their own skills have a significant impact on the degree and kind of their digital participation. This viewpoint emphasizes how important self-related ideas, such self-efficacy, are in understanding differences in older adults' use of social media. Together, these results show that social media use in later life is

intricately linked to psychological views of control and capability rather than just being a consequence of age or availability.

2.2. Social Media Self-Efficacy

According to social cognitive theory, self-efficacy plays a key role in determining an individual's motivation, behavior, and the psychological effects of their actions Bandura (1986)[1]. Self-efficacy has been extensively linked to users' acceptance, efficient use, and long-term engagement with digital systems in technology-related contexts. Building on this viewpoint, Compeau and Higgins (1995) proposed the idea of computer self-efficacy, establishing self-efficacy as a crucial predictor of technology use and providing empirical evidence of its beneficial impact on technology-related behaviors.

The importance of self-efficacy increases with age. According to Czaja et al. (2006), technology-related self-efficacy is a major factor in determining older adults' anxiety connected to technology, as well as a strong predictor of their readiness to use digital technologies. These results imply that personal competence views have a greater impact on technological involvement than demographic characteristics alone. Extending this line of investigation to social media environments, Leist (2013) found that older persons are more likely to utilize social media for goal-directed activities like information-seeking than for passive or entertainment-based purposes. This tendency was more noticeable among people who were more confident in their capacity to utilize social media platforms, indicating that social media self-efficacy is a significant factor in determining the extent and quality of social media use in later life.

Informational social media use refers to the deliberate use of social media platforms by older adults to obtain news, health-related information, public services, and community resources (Leist, 2013). Self-efficacy is a very important antecedent since informational use, as contrast to entertainment-oriented use, usually necessitates more cognitive work and a higher level of digital ability. Previous studies show that independent access to such information promotes active engagement in everyday life, improves decision-making ability, and strengthens older adults' sense of independence.

Informational interaction through digital platforms has also been connected to significant psychological impacts from the standpoint of social informatics. According to Chen & Schulz (2016), older adults who are socially isolated often use the internet to find social and health-related services, which helps them feel less alone. Similarly, Xie (2011) discovered that older adults' online information-seeking behavior promotes independence, self-determination, and problem-solving skills, especially when making decisions pertaining to their health. When taken as a whole, these results highlight the importance of using social media for informational purposes as a social and health-related resource in later age.

Since perceived social isolation is linked to higher rates of disease and mortality, it is a major public health concern, especially for older adults (Holt-Lunstad et al., 2015). Social isolation in later life is frequently triggered by age-related life transitions, such as retirement, decreased mobility, and the loss of social connections. As a result, researchers have looked more closely at how digital technologies can reduce social isolation. Research indicates that having access to online social networks and educational materials can lessen feelings of loneliness by raising awareness of social engagement options and existing support networks (Quan-Haase et al., 2018; Chen & Schulz, 2016). Crucially, these advantages seem to rely on how social media is utilized, with information-oriented interaction having a particularly significant impact on promoting psychological health and connectivity.

2.3. Self-Esteem and Digital Engagement

Digital technology use has been increasingly associated with positive psychological outcomes, particularly self-esteem, which reflects an individual's overall evaluation of self-worth. According to earlier studies, successful and meaningful use of digital technology can improve psychological well-being by promoting emotions of autonomy, competence, and personal significance (Du et al., 2020). In this way, technology use that helps people accomplish important goals, as opposed to passive or incidental engagement, is essential for boosting self-esteem.

Higher levels of self-esteem and life satisfaction have been demonstrated to be positively correlated with older individuals' confidence in using digital technology (Rui, 2022). Digital self-efficacy enables older adults to adapt more effectively to an increasingly digitalized environment, thereby reinforcing perceptions of capability and social relevance. Such adaptive capacity is particularly important in later life, where age-related changes and reduced social roles may otherwise threaten self-esteem.

Social media engagement, when characterized by purposeful and information-oriented use, provides older adults with opportunities to access knowledge, participate in decision-making, and maintain a sense of autonomy. Digital self-efficacy contributes to an increased adaptive capacity in a digital world as well as a greater sense of importance. Hence, social media self-efficacy and mindful technological engagement significantly correlate with self-esteem in the older population.

2.4. Recent Empirical Studies

The significance of theorizing social media self-efficacy and informational social media use in the context of older adults' well-being is increasingly supported by recent empirical studies. An increasing amount of research indicates that the psychological effects of social media use are influenced by the type and intent of use in addition to usage frequency. Cotten (2022)

summarized the literature on social media use and well-being in older adults and emphasized the distinct impacts of using a single versus multiple social media platform on outcomes like mental health and loneliness, highlighting the need to go beyond uniform conceptions of social media use.

Empirical research also shows a strong correlation between users' perceived competence and self-efficacy and their use of informational social media. Niu et al. (2021) found strong correlations between health-related social media use, health literacy, and online self-efficacy, indicating that people's abilities and intentionality influence information-oriented social media involvement. In a similar vein. Kim (2021) showed that older persons who had previously used digital services, such as music streaming platforms, are more likely to develop higher levels of digital self-efficacy, which in turn enhances their likelihood of engaging in subsequent digital information-seeking behaviors.

More recent studies have concentrated on improving how older adults' digital competence and social media self-efficacy are measured and conceptualized. Marzan et al. (2024) highlighted the significance of context-sensitive evaluation techniques by examining self-perceived digital competencies and their implications for evaluating social media self-efficacy. According to Jia's (2024) empirical investigation of the links between social media use, social support, self-efficacy and loneliness, self-efficacy and perceived support are important pathways through which social media use affects mental health outcomes. Similarly, Cho (2024) investigated the relationship between digital literacy and self-efficacy in later life, providing policy-focused insights to support successful digital inclusion among older adults.

All of these recent studies (2021–2024) come to the same conclusion: social media self-efficacy is an essential prerequisite for informational social media use, and this use is significantly linked to psychological outcomes, such as decreased social isolation and increased self-esteem. However, this corpus of work also highlights persistent limits in measurement, context, and analysis, especially when it comes to combining various characteristics into a unified explanatory framework and examining their predictive correlations. Addressing these gaps, the present study proposes and empirically tests a comprehensive structural model that looks at the direct and indirect effects of social media self-efficacy and informational social media use on older adults' perceptions of social isolation and self-esteem in developing and emerging economies

3. Research Gap

Although the body of literature on social media use and older adults' psychological well-being has grown recently, there are still a number of significant gaps. First, a large portion of the research that is currently available views social

media use as a homogeneous activity, failing to sufficiently distinguish between different usage goals including social, informational, or entertainment-oriented involvement. This lack of differentiation limits understanding of how specific forms of social media use may differentially influence psychological outcomes in later life.

Second, social media self-efficacy as a separate construct has received relatively little attention, even though self-efficacy has been widely acknowledged as a crucial precondition for the adoption and efficient use of new technologies. Specifically, there is still a dearth of empirical research on the connection between older adults' information-oriented social media use and their social media self-efficacy. This gap is notable given the cognitive effort and digital skills required for informational engagement, which are likely to be strongly influenced by self-efficacy beliefs.

Third, previous research has mostly focused on social media use in isolation from psychological effects like self-esteem and perceived social isolation. Because of this, little is known about the behavioral mechanisms by which social media self-efficacy and particular types of social media use interact to affect psychological well-being in later life. In particular, there hasn't been enough empirical research done on the mediating function of informational social media use.

Fourth, there is relatively little study on older persons in developing and emerging countries, and the empirical evidence base is strongly biased toward established Western environments. This is a major drawback because these settings are marked by larger gaps in digital access, lower levels of digital literacy, and distinct age-related challenges that could influence digital engagement and its outcomes.

Finally, relatively few studies have used Partial Least Squares Structural Equation Modeling (PLS-SEM) to emphasize predictive significance while simultaneously examining complex direct and indirect relationships. Addressing these gaps, the current study creates and evaluates a thorough structural model using PLS-SEM to investigate the direct and indirect impacts of social media self-efficacy on self-esteem and perceived social isolation through informative social media use. By doing this, the study adds new theoretical, methodological, and contextual insights to the literature on digital aging.

4. Contribution to Research

Social media self-efficacy affects older adults' psychological well-being through the informational use of social media, and study adds to the body of knowledge in this area. With the use of a PLS-SEM in the context of a developing/emerging economy, the study contributes to the field of digital ageing

and provides research-based contributions to policy and practice for the promotion of social and psychological integration of ageing populations.

The rapid advancement of technology and an ageing population have resulted in increased interest in the potential implications of social media use by older adults and the psychological impact of such media engagement. Existing studies, however, have focused on social media use and impact too broadly and have insufficiently examined social media behavioural confidence and its outcomes. To address the gaps, this study explores social media self-efficacy and its impact on constructive social media utilisation and, in turn, on social media-related social isolation and social media-related self-esteem in older adults.

5. Study Objectives:

1. To analyse the influence of social media self-efficacy on the informational use of social media by older adults.
2. To determine the relationship of social media informational use with isolation among older adults.
3. To assess the impact of the informational use of social media on older adults' self-esteem.
4. To study the direct relationship between social media self-efficacy and loneliness.
5. To examine the direct relationship between social media self-efficacy and self-esteem.

6. Hypotheses and conceptual model

Proposed model: Social Media Self-Efficacy → Informational Use → (Loneliness, Self-Esteem). Also tested are direct paths from Self-Efficacy to Loneliness and Self-Esteem. Informational Use is proposed to be a mediator.

Hypothesis 1: Self-efficacy theory suggests that the behavioural choices, effort, and persistence individuals demonstrate towards a task are influenced by self-perception and beliefs regarding their capability to perform a task (Bandura, 1986). In the framework of digital technologies, individuals who have higher levels of self-efficacy towards technology are more likely to adopt a digital platform, customise and use it towards goal accomplishment (Compeau & Higgins, 1995). Among older individuals, social media self-efficacy contributes to the alleviation of age-related barriers such as limited prior exposure, technology anxiety, and perceived complexity surrounding digital interfaces (Czaja et al., 2006).

Studies suggest that older adults who exhibit higher levels of social media self-efficacy are more likely to engage in informational use; that is, they are more

likely to seek news, health information, and public service information (Chen & Schulz, 2016; Leist, 2013). Informational use requires access to social media as well as the ability to search, assess, and interpret digital information, which are proposed to be self-efficacy linked attributes. Hence, it is suggested that older adults' social media self-efficacy will increase their informational use on social media.

H1: Social media self-efficacy has an effect on the informational use of social media among older adults.

Hypothesis 2: Social isolation is the subjective experience of lacking social connections and feeling alone within social contexts. Social isolation is considered a prevalent problem among older adults because it increases the risks of several adverse mental and physical health outcomes (Holt-Lunstad et al., 2015). Social media and digital communication are designed to ease information-related social isolation by providing pertinent information, social support, and collaborative community engagement (Quan-Haase et al., 2018).

The informational use of social media is a resource older adults can use to learn about community social activities, health practices, and available community health services, thereby increasing their community engagement and social awareness (Chen & Schulz, 2016). Older adults who use various social media platforms to search for information have lower social isolation compared to older adults who use social media passively or do not use it at all, indicating that social media use can mitigate the risks of social isolation (Leist, 2013). This leads to the expectation that the informational use of social media can lower the risks of social isolation.

H2: Informational use of social media negatively affects the perceived social isolation of older adults.

Hypothesis 3: Self-esteem is a determinant of self-worth and self-evaluative self-perceptions of competence. Within later life, self-esteem is shaped by self-governance, social activity, and environmental adaptability (Du et al., 2020). Engagement with digital technologies succeeds in bolstering older adults' self-perceptions of relevance and competence, and self-esteem.

Informational social media use is posited to independently afford older adults the means to access a variety of knowledge, influence their health decisions, and maintain social awareness, thus enabling a sense of personal control and self-efficacy (Rui, 2022). The literature supports the claim that digital engagement (in contrast to digital passivity) is positively correlated with self-esteem and psychological well-being when the engagement is purposeful and goal-driven (Du

et al., 2020). Therefore, among older adults, self-esteem is expected to be positively impacted by social media.

H3: Self-esteem is positively impacted by the use of social media.

Hypothesis 4: Self-efficacy exerts influence over subsequent psychological well-being. Those with a greater degree of self-efficacy experience less stress, anxiety, and social withdrawal (Bandura, 1986). In the case of older adults, the self-efficacy applicable to social media use can potentially help alleviate social communication participatory disconnection invisibility.

Digital self-efficacy has been empirically associated with decreased perceived isolation and increased social engagement of older users (Czaja et al., 2006; Quan-Haase et al., 2018). Therefore, social media self-efficacy should demonstrate a direct inverse relationship with social isolation.

H4: Older adults' social media self-efficacy has a negative direct effect on perceived social isolation.

Hypothesis 5: Confidence positively impacts self-efficacy as successfully completing a task contributes to an individual's self-worth and competence (Bandura, 1986). In older adults, fostering self-confidence in social media use can alleviate negative age stereotypes and feelings of obsolescence, therefore enhancing self-esteem.

Older adults who view themselves as active participants in the digital environment tend to present higher self-esteem and psychological well-being indicators (Du et al., 2020; Rui, 2022). Hence, social media self-efficacy should also affect self-esteem directly, in addition to the indirect effect via informational usage.

H5: Among older adults, social media self-efficacy directly and positively impacts self-esteem.

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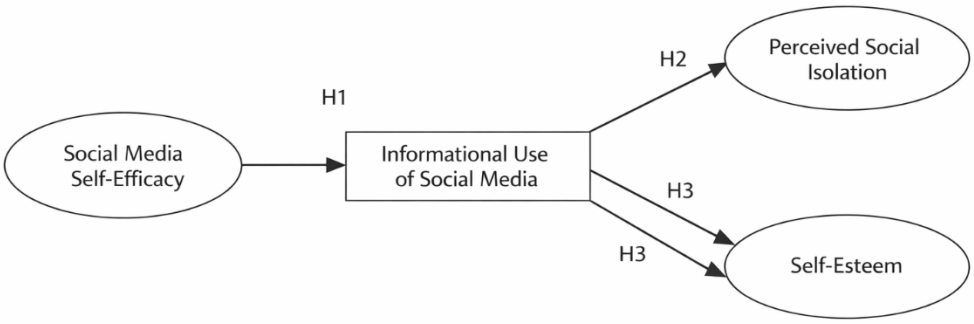

Figure 1. Conceptual framework

The proposed relationships among the study constructs are illustrated in the conceptual framework presented in Figure 1.

7. Research Methodology

This study adopts quantitative research to determine the relationships Social-Media Self-Efficacy, Informational Use of Social-Media, Perceived Social Isolation, and Self-Esteem among a sample of adults aged 60 years and above, utilising a survey research method, which is the best technique to measure technologies through the lens of attitudes, perceptions and patterns of behaviour, digital technology use, and technology integration. Relationships were studied using PLS-SEM, which is the preferred approach for modelling complex relationships among latent variables, for predictive modelling and theory building.

Informational social media use is particularly relevant for policy and intervention design, given the unique challenges older adults encounter in developing and emerging economies, including the intersections of social and digital divides, and age bias

7.1. Methodological Justification for Using PLS-SEM

PLS-SEM was employed in this study due to its suitability for prediction-oriented research and its ability to model complex relationships among latent constructs. The main goal of this study is to predict and explain differences in older adults' self-esteem, perceived social isolation, and usage of informative social media. In this context, PLS-SEM is particularly appropriate, as it is designed to maximize explained variance (R^2) and assess predictive relationships within structural models.

PLS-SEM accommodates latent variables assessed by various indicators and enables the simultaneous estimation of several connected dependence connections, including direct and mediated effects. Unlike covariance-based SEM, PLS-SEM does not require multivariate normality, making it well suited for social science research that relies on self-reported behavioural data, which often deviate from normal distribution assumptions.

The use of PLS-SEM is further justified by the study's moderate sample size (n = 300) and the specification of reflective measurement models, both of which align with recommended conditions for PLS-SEM application. In addition to assessing path coefficients and explained variance, PLS-SEM facilitates the evaluation of effect sizes (f^2) and predictive relevance (Q^2), enabling a more comprehensive assessment of the practical and predictive significance of the proposed relationships.

Overall, PLS-SEM is well aligned with the study's analytical objectives and research framework, by offering a strong methodological approach for investigating the predictive mechanisms connecting social media self-efficacy, informational social media use, perceived social isolation, and self-esteem among older adults.

7.2. Sample Size

The target population of the study is older adults aged 60 and older living in urban and semi-urban areas. This population is of interest because of their increased use of digital technology, and the social media technology integration obstacles they often encounter.

Non-probability sampling of focus groups has targeted volunteer groups working with older adults including senior citizen associations, community centres, civic non-governmental organisations, and social groups. About 300 responses were collated which was sufficient for a minimum viable sample size for PLS-SEM. This sample size also satisfies the 10 times rule, and sufficient statistical power was maintained to estimate the hypothesised structural model of the study.

7.3. Collection of Data

All the constructs were measured using validated scales which were adapted to the social media context. All the items were measured using a five-point Likert scale (1- Strongly Disagree to 5 - Strongly Agree).

Respondents were completing a paper-based or online survey for which some tutorial assistance will be provided to those participants bound with low literacy. The survey was voluntary and provided anonymously. Ethical issues addressed included informed consent, privacy and participants' right to withdraw.

This study facilitates the digital ageing theory and evidence-based policy innovation by establishing the primary role of informational social media use as a behavioural conduit through which digital self-efficacy and psychological well-being are related.

7.4. Measurement Instruments

The following constructs were measured using scales validated within the social media context:

1. **Social Media Self-Efficacy**: Social media self-efficacy was measured using established technology self-efficacy scales. The scales assess the respondents' confidence in their ability to use different social media platforms in searching for information, content evaluation, and navigation. Adapted from Compeau and Higgins (1995) and Hocevar et al. (2014).
2. **Informational Use**: Informational use was measured using items capturing the extent to which respondents used social media platforms to obtain news, health information, updates on public services, and community-related materials. Items measuring frequency and purpose of information seeking on social media.
3. **Perceived Isolation**: The social isolation was measured using the UCLA Loneliness Scale, which has been shortened and adapted to capture the subjective social disconnectedness. Higher scores were interpreted to mean the respondents were more socially isolated.
4. **Self-Esteem**: it measures using items from the Rosenberg Self-Esteem Scale. The scale measures the respondents' overall self-worth and self-acceptance.

7.5. Data Analysis Techniques

The data were analysed using SmartPLS 4. The analysis was carried out using a two-step strategy suggested for PLS-SEM. Descriptive statistics.

The study design incorporated all required ethical safeguards. Participation was voluntary, and all respondents provided their informed consent. Anonymity was guaranteed, and respondents were apprised of their right to withdraw at any point during the study. No data of a personal nature was collected.

7.6. Measurement Model Evaluation

The constructs reliability and validity were confirmed by the measurement model evaluation, and the structural model testing was carried out. To evaluate indicator reliability, The analysis began by analysing the outer loadings of each of the observed variables, noting that the values exceeded the acceptable threshold of 0.70, allowing me to confirm that every indicator was correctly aligned with its corresponding latent construct. Then, we computed internal consistency reliability with the help of Cronbach's Alpha, Composite Reliability, and rho_A, all of which exceeded the cutoff value accepted by the field of 0.70 and signified

the measurement items had a strong reliability. To assess convergent validity, we calculated the Average Variance Extracted (AVE), which showed that all the constructs had AVE values that exceeded 0.50, indicating that the constructs accounted for more than half of the variance of the corresponding indicators. Finally, we evaluated the discriminant validity using the Fornell–Larcker criterion, and the Heterotrait–Monotrait, (HTMT) ratio. In regard to these values, we was pleased to note that the square roots of AVE exceeded the inter construct correlations, and that all HTMT values were below the accepted conservative threshold of 0.85, which confirmed that the constructs were distinct.

7.7. Evaluation of Structural Modelling

The hypothesised association among the variables was tested via the structural model evaluated using a bootstrapping method with 300 resamples. The model predictions are represented with the path coefficients denoted as (β). The coefficients were evaluated with corresponding t-values and p-values, while (R^2) evaluated the model's predictive capability and (f^2) and (Q^2) evaluated the effect size. Lastly, the model's global goodness of fit was appraised via the SRMR, NFI, and RMS_theta measures.

7.8. Limitations and Future Research Directions

There are a few notable limitations of this study that need to be addressed. To begin, the cross-sectional design of the research restricts the relationships that can be established between social media self-efficacy and information use and the psychological effects that follow. Longitudinal and experimental designs would allow for drawing conclusions that capture the changes in digital behaviour and the well-being of individuals over time.

The use of self-reported measures that are susceptible to common method bias and social desirability has also been noted. Although there were some procedural changes made to address this concern, future studies could implement the use of objective social media self-report data and add a qualitative component to the social media self-report data to improve the measurements and reduce the social desirability bias. These may be viewed as a contextual limitation, which may not be appropriate to use in studies that extend beyond a single culture and a single nation.

Future scholarship may build on the current model through the integration of additional categories of social media activities, including those focused on social engagement and entertainment, and through the consideration of moderator variables, including subgroups by age, digital literacy, and health. Additionally, cross-country studies would be particularly useful for understanding how different contexts influence the association between digital self-efficacy and psychological well-being in older adults.

8. Data Analysis and Results

8.1. Descriptive analysis

The primary aim was to compute the descriptive analysis for each variable under study to understand the distribution of responses among the 300 sampled older adults. Mean and standard deviation and range analysis were undertaken to evaluate the dispersion of responses of the factors of interest within the dataset to ascertain the validity of deploying the dataset within the PLS-SEM framework. There was a balanced dispersion of responses across the factors validating the use of the dataset within a PLS-SEM framework.

Moderately high levels of social media self-efficacy and its informational use were self-reported among respondents; high self-esteem was observed, and social isolation was perceived as being lower. The degree of variability across participants ranged differently, a factor that's crucial when considering the possibility of valid estimations of the structural relationships within the model.

Table 1: Presents descriptive statistics for the study constructs.

Construct	Number of Items	Mean	Standard Deviation	Minimum	Maximum
Social Media Self-Efficacy (SMSE)	5	3.78	0.68	1.80	5.00
Informational Use (IU)	5	3.65	0.72	1.60	5.00
Perceived Social Isolation (PSI)	5	2.74	0.81	1.00	5.00
Self-Esteem (SE)	5	3.82	0.64	2.00	5.00
Construct	**Number of Items**	**Mean**	**Standard Deviation**	**Minimum**	**Maximum**

Table 1 indicates that the self-efficacy mean of 3.78 suggests that the older adults in the study are likely to be self-confident social media users to a moderate to high degree. At the same time, the 3.65 mean value for informational use suggests that social media users in the study are likely to be informational consumers for news, health, and community updates.

The mean score of M = 2.74 and SD = 0.81 for perceived social isolation of respondents indicates social isolation was lower to moderate. Also, self-esteem scored a mean of 3.82 and SD = 0.64, indicating self-evaluations were positive. The standard deviation values confirm the data are satisfactory for PLS-SEM.

Preceding the primary examination, the dataset in question underwent intensive screening and preparation to secure the accuracy and consistency necessary to fit the expectations of structural equation modelling. Missing values were accounted for within the dataset, yet the missing responses were considered less than ideal to the extent that the mean substitution and/or expectation–

maximisation techniques were introduced to the missing values. Assessment of normality indicated that the data met the skewness and kurtosis values that were within the acceptable ranges for social science data, given that strict normality is not a requirement for PLS-SEM. At the conclusion of the data screening, it was determined that the dataset was sufficiently robust to meet the technical assumptions for rigorous and valid analysis in SmartPLS.

8.2. Assessment of the Measurement Model

Table 2. The was assessed in consideration of establishing the indicator consistency, the internal consistency reliability, the convergent validity, and the discriminant validity. All measurement indicators demonstrated loadings exceeding the 0.70 threshold, thus indicating that the indicator reliability was sustained. The reliability ascertained in this case should not be above 0.95. It should also not be 0.0 and should be relatively toward the 0.0 end of the scale. All of the measures of the variables and measures of reliability and measures of validity meet the desired thresholds.

Table 2: Reliability and Convergent Validity

Construct	Cronbach's Alpha.	Composite Reliability.	rho_A.	AVE
Social media Self-Efficacy, (SMSE)	0.89	0.92	0.90	0.66
Informational Use (IU)	0.86	0.90	0.87	0.64
Perceived Social Isolation (PSI)	0.88	0.91	0.89	0.68
Self-Esteem (SE)	0.87	0.92	0.88	0.69

8.3. Discriminant Validity

All HTMT values of Heterotrait-Monotrait Ratio (HTMT) of 0.85 and lower should be accepted.

Table3: HTMT Discriminant Validity Matrix

Constructs	SMSE	IU	PSI	SE
SMSE	—			
IU	0.62	—		
PSI	0.48	0.55	—	
SE	0.51	0.59	0.44	—

Table 3: This is very useful as far as different distinct variables in the system and the different variables in the system and have been evaluated within

the PLS-SEM, and provide all the variables that have been evaluated and all the variables are all under the 0.85 thresholds of the homogeneity of the variables. Thus, this shows all the constructs and all variables of the system under different conditions of ellipse or different conditions of the variables. Thus, all the constructs and variables are significantly not capturing all the same information.

Specifically, the HTMT values between social media self-efficacy and informational use (0.62), perceived social isolation (0.48), and self-esteem (0.51) are well within acceptable thresholds, leading to the conclusion that digital self-efficacy is distinctly separate from the more behavioural and psychological elements. In the same manner, the HTMT values between informational use and perceived social isolation (0.55) and self-esteem (0.59) suggest there is sufficient distance between the informational behavioural and wellbeing constructs. Further evidence to support that the perceived social isolation and self-esteem (0.44) are not intertwined is the strength of the HTMT value, as both of these psychological constructs are, though interconnected, separate aspects of wellbeing.

With regards to respect of the HTMT indices, the results indicate adequate discriminant validity, showing that the constructs in the model are not overlapping and multicollinearity is not an issue. This adds additional support to the measurement model being valid and serves as a basis for examining the relationships in the model.

8.4. Structural Model Assessment

Table4: The assessment of the structural model was conducted with the bootstrapping method with 5,000 resamples. To evaluate the predicted relationships, the path coefficients, t-values, and p-values were analysed. The findings suggest social media self-efficacy positively influences informational use, as indicated by the results for H1. H2 and H3 were also substantiated as informational use negatively impacted perceived social isolation. Additionally, findings indicate an increase in self-esteem. Furthermore, social media self-efficacy directly influenced perceived social isolation and self-esteem, confirming H4 and H5.

Table 4: Structural Path Coefficients

Hypothesis	Path	β	t-value	p-value	Result
H1	SMSE → IU	0.562	9.87	< 0.001	Supported
H2	IU → PSI	-0.291	3.21	0.001	Supported
H3	IU → SE	0.41	4.56	< 0.001	Supported
H4	SMSE → PSI	−0.27	2.89	0.004	Supported
H5	SMSE → SE	0.34	3.98	< 0.001	Supported

8.5. Coefficient of Determination (R^2)

The R^2 values suggests that all endogenous constructs exhibit a moderate level of explanatory strength.

Table 5: R^2 and Q^2 Values

Endogenous Construct	R^2	Q^2
Informational Use	0.54	0.32
Perceived Social Isolation	0.39	0.28
Self-Esteem	0.47	0.39

R^2 values indicate moderate explanatory power; Q^2 values above zero confirm predictive relevance.

Table 5: The R-square (= R^2) values tell us that the suggested PLS-SEM model possesses moderate explanatory power for every one of the endogenous constructs (y-variables). For social media self-efficacy, this model explains 54% of the variance in informational use, demonstrating the significant role of digital self-efficacy on older adults' information-seeking behaviour on social media. The model explains 39% of the variance in perceived social isolation, which indicates that social media self-efficacy and informational use together explain a considerable amount of the variance in older adults' subjective feelings of social isolation. The model explains 47% of the variance in the psychological construct self-esteem, indicating even higher explanatory power on psychological well-being.

The Stone–Geisser Q^2 statistic on predictive relevance on the constructs of social isolation, social use, informational social use, and self-esteem (Q^2 = 0.32, 0.28, and 0.39) shows positive values, indicating that the constructs in the model have predictive relevance. The proposed model, with this predictive relevance, together with the R^2 values' variance in the outcome of social isolation, social self-efficacy, and self-esteem, responds to the question of the adequacy of the model with plausible results. The findings from the PLS-SEM analysis demonstrate strong reliability and stability.

8.6. Effect Size (f^2)

Table 6: Effect size analysis showed that social media self-efficacy had a medium effect on the use of the information, while information use had small to medium effect on the psychosocial outcomes.

Table 6: Effect Size

Relationship	f^2	Effect Size
SMSE → IU	0.51	High
IU → PSI	0.14	Small
IU → SE	0.32	Medium
SMSE → PSI	0.25	Medium
SMSE → SE	0.26	Medium

8.7. Model Fit (SmartPLS)

Model fit was assessed through the indices suggested by SmartPLS. The results overall suggest acceptable model fit.

Table 7: Model Fit

Index	Recommended Threshold	Obtained Value
SRMR	< 0.08	0.056
NFI	> 0.90	0.92
RMS_theta	< 0.12	0.104

Table 7: The overall adequacy of the model was assessed based on the recommendations of SmartPLS emplying the Standardised Root Mean Square Residual (SRMR), Normed Fit Index (NFI), and RMS_theta as evaluation criteria. The SRMR value is 0.056, which is significantly more than the acceptable value of 0.08, which means that the degree of disparity between the empirical and model-generated correlation matrices is high, thus, resulting in a good model fit. The NFI value is 0.92, which is also higher than the minimum value of 0.90, and it means that the model is a better fit than the null model. The NFI value is also 0.92, which is also higher than the minimum value of 0.90, and it means that the model is a better fit than the null model, thus, the RMS_theta value is 0.104, which is also lower than the acceptable value of 0.12. Therefore, the outer model correlation residuals are within a reasonable range. These fit indices, jointly considered, provide evidence that the proposed model using PLS-SEM is robust, and fits to an acceptable degree, thereby making it a valid model for explaining the interrelationships of the constructs in the research study.

9. Conclusion

This study has demonstrated that social media self-efficacy has a significant impact, both directly and indirectly, through the informational use of social media, on the psychological well-being of older adults. The findings indicate that digital self-efficacy is insufficient by itself to reduce perceived social isolation or increase self-esteem, and that it must be accompanied by purposeful digital engagement. Informational use operates as a key mechanism through which older adults increase their psychosocial well-being through the use of social media.

In using a PLS-SEM approach, the study builds on existing research by integrating the analysis of multiple predictors and complex relationship pathways with evidence of predictive relevance, advancing the understanding of the construct of digital self-efficacy in later life. The findings contribute to the literature on digital aging by disputing the notion that the use of social media is beneficial and by highlighting the value of quality engagement as opposed to the quantity of access and use.

The findings highlight the need for practical digital inclusion policies in developing and emerging economies that promote social media self-efficacy and informational self-management skills among older adults. Interventions designed to improve older adults' confidence in social media, evaluative information seeking, and purposeful online engagement may lower social isolation and enhance self-esteem, psychosocial resilience, and active aging.

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11. Ethics Statement

The study involved human participants and was carried out in compliance with established ethical guidelines. Informed consent was obtained from all participants prior to data collection, and anonymity and confidentiality were strictly maintained.

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