



Beyond Digital Access: Communicative Embeddedness and Women's Empowerment in Village Information Systems in Rural Indonesia

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Abstract

The expansion of Village Information Systems (Sistem Informasi Desa/SID) is expected to improve access to public information and participation, yet digital availability does not necessarily translate into women's communicative agency. This study examines how communicative and institutional arrangements surrounding SID shape women's ability to convert digital access into meaningful participation in village governance. A qualitative multiple-case study was conducted in Randegan and Sudagaran Villages, Banyumas Regency, Indonesia, involving twenty informants. Data were generated through semi-structured interviews, one focus group discussion, non-participant observation, and document and platform analysis. The findings reveal that women were digitally and civically active but remained weakly connected to SID. Limited institutional outreach, the administrative framing of SID, weak feedback mechanisms, and poor integration with women's trusted communication networks constrained the conversion of digital resources into governance agency. The study identifies a communicative embeddedness gap and conceptualizes communicative embeddedness as a relational condition linking digital resources, everyday communication networks, institutional recognition, and responsiveness. Ultimately, inclusive digital governance requires more than technological access; it requires communication systems through which women's knowledge and voice can meaningfully influence institutional processes.

A. Introduction

Digital government is expanding worldwide, but its expansion conceals a troubling contradiction: greater technological access does not necessarily produce greater political voice, institutional recognition, or participation (David & Phillips, 2022; Rahayu et al., 2021). Across 193 United Nations Member States, advances in digital government continue alongside persistent inequalities in connectivity, capabilities, and institutional readiness (UN DESA, 2024). The contradiction becomes sharper for women: in low- and middle-income countries, women remained 15% less likely than men to use mobile internet in 2023, while structural inequalities continue to restrict autonomous and meaningful digital participation (GSMA, 2025; World Bank Group, 2025; Gray et al., 2016; Suwana & Lily, 2017). Thus, the central problem of contemporary digital governance is no longer simply whether citizens can reach digital infrastructure, but whether that infrastructure enables historically marginalized groups to exercise voice and influence public decisions (David & Phillips, 2022; Wahyudi & Kurniasih, 2021).

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This gap is particularly consequential for women in the Global South. Inequalities in income and education, unpaid care responsibilities, restricted mobility, limited control over household resources, online safety concerns, and gender norms further constrain autonomous technology use (World Bank Group, 2025). Research on the gender digital divide increasingly demonstrates that exclusion is produced not only by unequal devices or connectivity but also by social relations, institutional arrangements, digital literacy, and the conditions under which technology is actually used (David & Phillips, 2022; Gray et al., 2016; Rahayu et al., 2021; Suwana & Lily, 2017).

Digital gender inequality is thus relational and institutional: owning a device or using social media does not necessarily enable engagement with formal governance (David & Phillips, 2022; Farooq, 2025).

Indonesia's village digitalization illustrates this problem. Women sustain household production, agriculture, community welfare, health, education, and local enterprise (Wula & Anggraini, 2022; Muchtar, 2025), while their representation in formal decision-making and digital governance remains limited (Deru et al., 2023). The Village Information System (Sistem Informasi Desa/ SID) manages and disseminates population data, administrative information, development programs, budgets, services, and planning documents to improve efficiency, accuracy, transparency, and citizen participation (Sihotang, 2024; Zulfah et al., 2024). However, women's engagement with SID and related services is constrained by unequal access to devices and connectivity, uneven digital literacy, gendered assumptions about technology, and gaps in gender-responsive implementation (Amalia et al., 2023; Rodiyah & Bolanitan, 2023; Sagala et al., 2022). The paradox is that women may already participate actively in digital and community life while remaining peripheral to the digital infrastructure designed to connect citizens with village governance.

Existing SID research primarily examines administrative efficiency, data accuracy, service delivery, transparency, infrastructure, and the development or utilization of digital village systems (Agustin et al., 2021; Mukhsin, 2020; Nuryanti et al., 2019; Sulistyowati et al., 2021). Gender-focused studies document structural and sociocultural barriers to access and participation (Rahayu et al., 2021; Rodiyah & Bolanitan, 2023), while other studies emphasize women's digital literacy and the empowering potential of digital technologies (Susanti et al., 2022; Suwana & Lily, 2017; Wahyudi & Kurniasih, 2021). Yet these two bodies of scholarship largely remain disconnected: SID studies tend to privilege systems and administration, whereas women's digital-inclusion studies tend to foreground access, literacy, and individual capabilities.

This separation produces a critical research gap. Existing studies explain why women may lack access, skills, or opportunities, but they do not adequately explain why women who already possess digital capabilities and participate through WhatsApp, social media, community organizations, and local economic networks may still remain disconnected from formal digital governance. More specifically, the literature gives limited attention to how women's everyday communication networks intersect with—or remain institutionally separated from—SID, and how this relationship determines whether digital resources

become recognized voice and influence in village decision-making. The unresolved issue is therefore not merely digital access, but the institutional conversion of everyday digital participation into governance agency.

This study addresses that gap through communicative embeddedness, defined as the extent to which digital public infrastructure connects with users' social networks, trusted channels, routines, information priorities, and institutionally recognized opportunities for voice. Embeddedness involves both circulating official information through women's familiar communicative spaces and incorporating their responses into consultation, planning, and decision-making. It therefore requires accessible feedback mechanisms, recognition of women as legitimate contributors, and institutional responsiveness to their knowledge and claims. The concept consequently shifts analysis from platform availability toward the relational architecture connecting technology, communication practices, and institutional response.

This concept builds on Kabeer's account of empowerment as acquiring the ability to make strategic life choices previously denied. Her framework links resources, which enable choice; agency, the capacity to define goals and act; and achievements, the resulting outcomes (Kabeer, 2018). In SID, resources include devices, connectivity, time, skills, relevant information, and supportive networks. Agency involves interpreting information, voicing concerns, contributing to planning, and influencing agendas; achievements include recognition, responsive services, improved well-being, and more equitable decisions. Communicative embeddedness is proposed as a relational condition that enables the conversion of digital resources into governance agency and, potentially, empowerment achievements. Accordingly, the theoretical problem is not simply whether resources exist, but what communicative and institutional conditions allow resources to be converted into agency.

This study's novelty lies in conceptualizing the disconnection between women's active everyday digital practices and their limited participation in formal village digital governance as a communicative embeddedness gap. The study examines women's groups and village officials in Randegan and Sudagaran, Banyumas Regency, Central Java, where SID has been introduced but women's engagement remains limited. It asks how the communicative and institutional arrangements surrounding SID shape women's ability to convert digital access into communicative agency in village governance. Specifically, it examines how women access, interpret, and circulate village information; what prevents their communication networks from connecting with SID and formal decision-making;

and under what conditions SID can support meaningful participation through integration with everyday communication practices.

Accordingly, this study examines how the communicative and institutional arrangements surrounding Village Information Systems shape women's ability to convert digital access into communicative agency in village governance. Specifically, it investigates how women access, interpret, and circulate village information; what factors prevent their everyday communication networks from connecting with SID and formal decision-making; and under what conditions SID can support meaningful participation through closer integration with women's established communication practices.

B. Method

This study used a qualitative multiple-case design to examine how Village Information Systems (*Sistem Informasi Desa*/SID) function as public-communication channels and shape women's information access, participation, and agency in village governance. Fieldwork was conducted from March to October 2024 in Randegan and Sudagaran, Banyumas Regency, Central Java. An interpretive qualitative approach captured participants' experiences, communication practices, and institutional interactions rather than statistical prevalence or causal effects (Creswell, 2013; Yin, 2018). The two villages were treated as analytically related cases to identify shared and context-specific connections between formal SID channels and women's everyday communication networks.

Randegan and Sudagaran were purposively selected because both had implemented SID and had active women's social and economic organizations, including SMEs, Women Farmers Groups (KWT), *Posyandu* cadres, and PKK groups. Twenty adult informants were purposively recruited based on their experience with community participation, village communication, or SID management. Selection considered age, organizational role, digital literacy, device access, and familiarity with SID. Prior SID use was not required, as reliance on alternative communication channels was relevant to understanding communicative disconnection. The characteristics of the informants are presented in Table 1.

Table 1. Characteristics of Informants

Informant Group	Number of Informants	Age Range	Sex	Research Site
Small and Medium Enterprises (SMEs)	3	49–50	Female	Randegan and Sudagaran
Women Farmers Groups (KWT)	2	50–55	Female	Randegan and Sudagaran

Informant Group	Number of Informants	Age Range	Sex	Research Site
Family Welfare Empowerment (PKK)	7	50–56	Female	Randegan and Sudagaran
<i>Posyandu</i> Cadres	7	43–55	Female	Randegan
Village Official responsible for SID management and information dissemination	1	45	Male	Randegan
Total	20	43–56	19 Female; 1 Male	Randegan and Sudagaran

Source: Field Data Outcome (Banyumas, Central Java, Indonesia) – Raw data is not published to ensure confidentiality of informants (2024)

Data were generated through semi-structured interviews, one FGD with twelve women, non-participant observation, and document and platform analysis. Interviews explored participants' access to village information and SID, communication with officials, and opportunities for participation. Five women served as key informants based on their experience and leadership in PKK, SMEs, and KWT. Interviews lasted 45–90 minutes, were conducted in Indonesian, Javanese, or both, and were audio-recorded and transcribed verbatim with consent. The FGD lasted approximately two hours and examined shared communication practices, understandings of SID, barriers to engagement, and expectations of the system.

Non-participant observations were conducted during village meetings and community activities for two to three hours per day over seven days, totaling approximately 14–21 hours. Observations focused on information circulation, digital and offline channels, participation patterns, institutional responses, and women's navigation of formal and informal communicative settings. Village reports, SID pages, village websites, planning and service documents, and publicly accessible social-media materials were also examined to compare institutional communication with participants' accounts.

Data were analyzed comparatively across the two cases using Kabeer's resources–agency–achievements framework and communicative embeddedness as sensitizing concepts. Analysis focused on digital resources, everyday communication networks, trusted channels, opportunities for voice, and institutional responsiveness. Findings were triangulated across interviews, the FGD, observations, documents, and digital materials. Participation was voluntary; participants were informed about the study before data collection, and consent was obtained prior to audio recording. Informants' identities were protected, and raw data were not publicly disclosed to maintain confidentiality.

C. Results and Discussion

Interview and observational data revealed a striking contrast in Randegan Village: women's limited use of SID coexisted with their active involvement in village development. Although most participants had heard of SID and generally understood it as a source of village information, only a small minority reported accessing it directly. Several participants could neither identify SID's functions nor locate the official village website, indicating that awareness of the platform did not necessarily translate into practical use. Instead, women routinely obtained information about village programs and activities through WhatsApp groups, community meetings, and physical banners. These channels were more familiar and more closely integrated into their everyday communication.

Interviews and observations also documented women's sustained participation in health programs, social initiatives, community meetings, and local economic groups. This evidence confirms that low SID utilization did not reflect an absence of civic engagement. Rather, it revealed a platform-specific participation gap: women were actively involved in village affairs, but their participation and information-seeking practices largely occurred outside the formal SID platform. This contrast provides the empirical starting point for understanding the disconnect between women's everyday communicative practices and formal village digital governance.

1. Results

Evidence from interviews, the FGD, non-participant observations, and document and platform analysis revealed a consistent cross-case pattern: women were active in community and digital communication, yet their engagement with SID remained limited. Across Randegan and Sudagaran, the findings clustered around five interrelated themes: digital activity without institutional connection, the administrative framing of SID, misalignment with women's everyday communication networks, gendered boundaries of participation, and the incomplete conversion of digital resources into communicative agency. These patterns directly address how women access and circulate village information, why their communication networks remain weakly connected to SID, and what conditions constrain meaningful participation in digital village governance.

Table 2. Cross-Case Summary of Key Findings

Main Theme	Randegan	Sudagaran	Empirical Pattern
Digital engagement	Active use of WhatsApp, social media, digital forms,	Active use of messaging applications and digital	Women were digitally active despite limited SID

Main Theme	Randegan	Sudagaran	Empirical Pattern
	and content production	tools for community and economic activities	use
SID utilization	Rarely accessed directly; not integrated into routine organizational communication	Limited use despite perceived potential for economic and health information	SID remained peripheral to everyday communication
Institutional orientation	SID perceived primarily as an administrative tool	Similar perception, with limited practical guidance and outreach	SID functioned more as an administrative than participatory platform
Communication networks	WhatsApp, meetings, coordinators, and noticeboards dominated information circulation	Interpersonal communication, messaging applications, and organizational networks remained central	Everyday communication networks were weakly connected to SID
Participation barriers	Weak feedback mechanisms, limited integration, and gendered expectations	Uncertainty about access, functions, and practical use	Digital resources did not automatically become communicative agency

a. Digitally Active but Institutionally Disconnected

Across the two villages, women's limited use of SID did not reflect a general absence of digital engagement. Participants described using mobile phones, messaging applications, social media, and government-provided applications in their organizational, economic, and community activities. However, these existing digital practices rarely connected with SID or with formal opportunities to contribute to village decision-making. Interview accounts matched observations of women's routine participation in digitally supported community activities, suggesting that limited SID use could not be explained simply by technological disengagement. The central pattern was therefore not a simple digital divide between users and non-users, but a separation between women's active everyday communication networks and the village's formal digital-information infrastructure.

This pattern was especially visible in Randegan. Women were actively involved in maternal and child health services, elderly-care initiatives, PKK activities, women's farming groups, and other government-supported programs. Within these activities, participants reported recording program data, submitting reports, entering beneficiary information, and circulating announcements through Android-based applications and WhatsApp groups. These reported and observed practices demonstrate functional familiarity with mobile devices, digital forms, and online communication rather than an absence of basic digital capability, as illustrated in Figure 1.



Figure 1. Women's Digital Practices and Interest in SID Utilization
Source: Researchers' Documentation (2024)

Despite these capabilities, interview and observational evidence indicated that women rarely accessed SID for information about village programs, public services, or governance. Information was more commonly obtained through WhatsApp groups, face-to-face community meetings, organizational coordinators, and physical noticeboards. These channels were familiar, immediate, and connected to women's existing activities. SID, by contrast, was not routinely incorporated into the communication practices of PKK, KWT, health cadres, or women running local businesses. The contrast between frequent use of alternative channels and limited direct SID use was repeatedly evident across the data sources.

Randegan's local reputation as a "YouTuber Village" further illustrates this disconnection. Field observations and participant accounts indicated that residents, including women, produced digital content and managed social-media channels that attracted audiences beyond the village. Their capacity to create, publish, and circulate online content complicates an explanation based solely on deficient digital skills. Digital competence was present within the community, but it was concentrated in platforms and practices that residents perceived as useful, familiar, or economically and socially rewarding. These capabilities were visible in everyday digital practices but were not systematically connected to SID, communication with village institutions, or formal planning processes.

The pattern in Sudagaran was similar, although women articulated more explicit expectations regarding SID's potential uses. Women involved in SMEs, eco-print production, agricultural activities, and KWT viewed SID as a possible channel for

promoting local products, reaching wider markets, and distributing information about economic activities. They also identified a need for integrated information concerning family-planning services, women's health programs, ambulance availability, and BPJS health services. These accounts identify concrete information needs against which participants assessed SID's relevance. Nevertheless, women's actual use of SID remained limited because participants expressed uncertainty about access, available functions, and practical use, while reporting little direct guidance or demonstration.

Comparison between the villages reveals a shared outcome produced through somewhat different local conditions. Randegan demonstrated relatively strong women's SME participation and visible community capacity for digital-content production, yet these resources remained disconnected from SID. In Sudagaran, women identified concrete economic and health-related functions that SID could perform, but uncertainty, limited guidance, and weak access pathways prevented these expectations from becoming practice. Across both cases, organizational participation, local knowledge, and digital experience were present, but no consistent institutional mechanism connected these resources to SID.

b. SID as an Administrative Rather Than Participatory Platform

Women's limited use of SID was also shaped by how the system was presented and understood institutionally. Participants in both villages commonly perceived SID as an administrative instrument for village officials rather than as a public communication platform intended for residents. This perception was reinforced by limited outreach, few practical demonstrations, and the absence of visible mechanisms through which women could submit questions, provide feedback, or influence village agendas. Interview accounts and platform examination similarly provided little evidence that SID was routinely experienced by women as a two-way participatory channel.

Participants reported that information about SID was generally insufficient to explain what the platform contained, why residents might use it, or how it related to their everyday concerns. Exposure to a platform name or website did not necessarily produce an understanding of its functions. Several women indicated that they had not received hands-on assistance in accessing SID or navigating its features, a pattern summarized in Figure 2.



Figure 2. Challenges in Utilizing the Village Information System
Source: Researchers' Documentation (2024)

Without practical encounters that demonstrated its relevance, SID remained institutionally associated with data management and official reporting. Women described village information as something they received through announcements, group coordinators, WhatsApp messages, or meetings. They provided fewer accounts of communicating back through SID or receiving an institutional response through the platform. This asymmetry was also reflected in the examined communication materials, which predominantly positioned residents as recipients rather than visible contributors. SID therefore functioned principally as a one-way information infrastructure rather than as a reciprocal communicative space.

The empirical distinction was therefore between information availability and participatory usability. Women needed not only to know that SID existed but also to see how their information needs, organizational activities, questions, and proposals could enter the system and receive a response. In the absence of those pathways, SID's participatory purpose was not apparent in women's everyday experience.

c. Misalignment with Women's Everyday Communication Networks

A third pattern concerned the weak integration of SID with the channels women used most frequently. WhatsApp groups, community meetings, organizational leaders, and offline noticeboards formed an interconnected communication environment through which village information was interpreted and recirculated. These channels were embedded in established relationships of familiarity and trust. They also allowed information to be clarified through conversation, especially for participants who were less confident navigating websites independently. Observations of community activities

supported interview accounts that information frequently moved through interpersonal and group-based communication rather than through direct SID access.

SID remained peripheral to this environment. Participants did not describe regular practices through which SID content was redistributed to women's organizational groups, linked to social-media channels, discussed in meetings, or explained by trusted intermediaries. Likewise, communication originating in women's groups did not appear to move systematically from those networks into SID or formal village-planning processes. The data therefore showed a two-directional disconnection: official digital information did not consistently enter women's everyday networks, and women's concerns did not consistently travel from those networks into formal digital governance.

Digital skills and access affected this pattern unevenly. Older participants more frequently described difficulty navigating websites or interpreting unfamiliar system features, while women from lower-income households faced constraints involving devices and internet connectivity. Yet these individual and material barriers were only part of the explanation. Even participants familiar with messaging applications, social media, or government applications did not necessarily use SID. Across different levels of digital familiarity, the recurring empirical issue was SID's limited integration with channels already embedded in women's daily communication.

Taken together, these findings identify the empirical condition described in this study as weak communicative embeddedness. In both villages, SID was technically present but weakly connected to women's social networks, trusted channels, organizational activities, and feedback relationships with village institutions. Women therefore participated in digital life while remaining marginal to the digital infrastructure formally associated with village governance.

d. Gendered Boundaries of Participation

Women's engagement with SID was further shaped by gendered understandings of technology, domestic responsibility, and legitimate participation in village affairs. The FGD provided particularly explicit evidence of how institutional perceptions of SID intersected with women's understandings of their social roles. One participant explained:

"Saya pikir SID itu bukan urusan kami. Itu lebih untuk perangkat desa, bukan untuk ibu-ibu seperti kami yang sibuk dengan urusan rumah tangga." (FGD with women participants, 2024). [Translation: "I think SID is not really our concern. It is more for village officials than for women like us who are occupied with household responsibilities."]

This account connects two boundaries. First, SID was perceived as belonging to officials rather than residents. Second, women's domestic responsibilities were invoked as a reason for distance from formal digital governance. The participant did not describe an inability to use all digital technology; rather, she questioned whether SID fell within women's legitimate sphere of concern. The account therefore links platform disengagement to perceptions of institutional ownership and gendered expectations, rather than to digital competence alone. Another informant noted:

"Kalau suami saya bilang tidak usah ikut kegiatan desa, saya tidak berani. Takut salah."
(Interview with a female informant, 2024). [Translation: "If my husband tells me not to participate in village activities, I do not dare to do so. I'm afraid I might do something wrong."]

This testimony demonstrates how permission, confidence, and fear of social consequences may intersect in women's decisions to participate. Because this statement represents an individual account rather than a pattern attributable to all participants, it is treated here as evidence of a possible household-level mechanism rather than as a generalized condition across the two villages. It nevertheless shows how domestic relations may narrow the practical space available for civic engagement.

e. From Digital Resources to Communicative Agency

Taken together, the findings reveal a gap between digital resources and communicative agencies. Women possessed resources in varying combinations: mobile phones, experience with applications, social-media skills, organizational membership, local knowledge, and trusted interpersonal networks. However, these resources did not automatically enable them to obtain relevant information through SID, communicate their concerns to officials, or influence village decision-making. Across interviews, the FGD, observations, and platform-related materials, four recurring constraints interrupted this conversion: limited institutional outreach, the administrative framing of SID, weak feedback mechanisms, and poor integration with women's established communication channels.

The cross-village evidence reinforces this pattern. Randegan contained visible digital-content capabilities and stronger women's SME participation, while women in Sudagaran articulated specific economic and health information needs. Yet neither configuration produced sustained SID engagement. The comparison indicates that neither existing digital capability nor clearly articulated demand was sufficient on its own to generate

participation through SID. The shared limitation was the absence of communicative arrangements linking women's capacities and interests to formal governance.

The principal empirical finding is therefore a persistent separation between women's everyday digital participation and their participation through formal village digital infrastructure. Information circulated actively through WhatsApp, community organizations, interpersonal networks, and offline meetings, while SID remained comparatively peripheral. Meaningful communicative agency was most constrained where information could travel toward women, but their responses, knowledge, and priorities lacked equally visible pathways back into institutional processes.

2. Discussion

Findings from both sites confirm persistent barriers to SID utilization. These include limited digital literacy, particularly among older women, and unequal access to digital infrastructure. Women from lower-income backgrounds struggled to access devices or stable internet connections. However, the central meaning of the findings lies not simply in the persistence of a digital divide, but in the coexistence of substantial everyday digital activity with limited participation in formal digital governance. Women used mobile phones, messaging applications, social media, and digital tools within community and economic activities, yet these resources rarely connected them to SID. This distinction extends studies emphasizing digital literacy and technological access as important conditions for women's empowerment (Rahayu et al., 2021; Susanti et al., 2022; Suwana & Lily, 2017; Wahyudi & Kurniasih, 2021; Saidah et al., 2026) by showing that capability alone does not guarantee institutional participation.

Nevertheless, skill and access deficits alone do not explain women's limited engagement with SID. Institutional practices also shape whether the system becomes accessible and relevant. Inadequate outreach, limited gender-responsive training, and the perception that SID is intended primarily for village officials discourage women from using it as a participatory communication channel. This finding shifts the analytical focus from individual deficiencies toward the relationship between users and institutions. Previous Indonesian SID studies have demonstrated the contribution of village information systems to information provision, administrative efficiency, and smart-village development (Mukhsin, 2020; Nuryanti et al., 2019; Sulistyowati et al., 2021). The present findings add that administrative functionality can coexist with participatory weakness

when institutional arrangements do not provide recognizable pathways for citizen voice, feedback, and response.

Women's limited engagement with SID cannot be explained simply by digital inactivity. Their everyday communication was already embedded in WhatsApp groups, social media, community meetings, and organizational networks that provided familiarity, trust, and opportunities to interpret and recirculate information. SID remained peripheral because it was weakly connected to this communicative ecology. This finding reinforces research showing that inclusive village communication depends on linking institutional information with community communication practices (Nuryanti et al., 2019; Lestari et al., 2026) and that social networks play a critical role in enabling local collective action (Luo et al., 2024). It also extends studies emphasizing SID adoption and information provision (Mukhsin, 2020; Sulistyowati et al., 2021; Muchtar, 2025) by demonstrating that technological availability becomes socially meaningful only when formal platforms intersect with communication channels already embedded in users' everyday lives.

This disconnection is captured through communicative embeddedness, which conceptualizes digital public infrastructure as empowering only when it connects institutional communication with users' trusted networks, routines, and opportunities for voice. Its significance lies in the reciprocal movement of communication: institutional information must reach women through accessible channels, while women's knowledge, concerns, and proposals must also enter institutional deliberation and receive recognizable responses. SID was weak in both directions. Consequently, communicative embeddedness moves beyond conventional understandings of platform adoption by emphasizing the relational conditions that make digital participation institutionally consequential. This interpretation complements research on SID implementation and digital literacy (Rodiyah & Bolanitan, 2023; Zulfah et al., 2024), while demonstrating that effective digital governance requires not only technological access but also sustained institutional responsiveness and integration with community communication practices.

Communicative embeddedness further clarifies how digital resources become empowerment. Within Kabeer's framework, devices, connectivity, skills, information, and social networks constitute resources; the ability to articulate concerns and influence decisions represents agency; and responsive services and improved well-being constitute achievements (Kabeer, 2018; Farooq, 2025). The findings show that resources alone do not automatically produce agency. Digital literacy can strengthen women's capabilities and

opportunities (Rahayu et al., 2021; Suwana & Lily, 2017), yet these capabilities may remain politically marginal without institutional pathways for participation. This study therefore identifies communicative embeddedness as a relational condition that mediates the conversion of digital resources into governance agency. This also supports systems-oriented perspectives on the gender digital divide, which locate exclusion within interacting social and institutional structures rather than individual technological deficits alone (David & Phillips, 2022; Abdullah et al., 2026).

The findings also position SID as a communicative space whose inclusiveness is shaped by institutional design, social recognition, and gendered power relations. Women's perception that SID primarily belongs to village officials illustrates how digital systems acquire implicit boundaries concerning who is expected to participate and whose knowledge is recognized. Gender stereotypes and established social roles influence perceptions of legitimate participation (Ellemers, 2018), while Indonesian studies continue to document constraints on women's involvement in village development and decision-making (Kusumawiranti, 2021; Wula & Anggraini, 2022; Arifin et al., 2026). Similar concerns arise in research on women's role in policy formulation and participatory village planning (Dewi, 2014; Mustanir et al., 2019; Nugroho et al., 2024). Thus, meaningful digital inclusion requires more than providing women with access; it requires institutions to recognize them as legitimate knowledge holders, communicative actors, and participants capable of shaping governance decisions.

This relational interpretation is further strengthened by the comparison between Randegan and Sudagaran. Randegan showed stronger digital-content capability and women's economic participation, while women in Sudagaran articulated concrete expectations for economic, health, and service information. Yet sustained SID participation remained limited in both settings. Studies of SID implementation emphasize digital literacy, system adoption, and effective implementation (Rodiyah & Bolanitan, 2023; Sihotang, 2024; Zulfah et al., 2024). The present findings add that adoption is also relational: formal platforms become meaningful when they intersect with the communication networks and organizational practices through which community life is already coordinated (Nuryanti et al., 2019; Luo et al., 2024; Abdullah et al., 2026).

The principal novelty of this study is identifying a communicative embeddedness gap between women's active everyday digital practices and their marginal participation in formal digital governance. This gap challenges interpretations that equate low SID utilization with low digital competence and instead locates exclusion within interconnected

technological, social, and institutional relations. This interpretation is consistent with the systems-oriented account of the gender digital gap proposed by David and Phillips (2022) and evidence that broader social structures shape gendered digital inequalities (Gray et al., 2016; Rahayu et al., 2021). Thus, expanding connectivity may increase technological inclusion without necessarily redistributing opportunities for voice, recognition, or institutional influence.

Similar tensions appear where local digital-government initiatives attempt to combine service provision with participation. Evidence from local e-service delivery in Bangladesh shows that effective digital services depend on conditions extending beyond the existence of technological infrastructure (Ovi et al., 2023), while assessments of digital government continue to identify persistent disparities in capabilities and institutional readiness (UN DESA, 2024; Lestari et al., 2026). Randegan and Sudagaran clarify a mechanism underlying this broader problem: digital infrastructure may remain socially peripheral when trusted networks, user priorities, and institutional feedback are poorly connected. The transferable insight is therefore not replicating SID itself, but the importance of relational integration among digital systems, community communication, and responsive institutions (David & Phillips, 2022; World Bank Group, 2025; Michael Sylvester Mitchel Vinco et al., 2025).

These findings have implications for village digital governance. Improving SID should extend beyond infrastructure, content provision, or training to connect formal systems with communication channels women already use, including WhatsApp groups, community organizations, meetings, and trusted intermediaries. Equally important are visible feedback pathways through which women's questions, proposals, and local knowledge receive institutional responses. This approach complements digital-literacy interventions (Susanti et al., 2022; Suwana & Lily, 2017; Wahyudi & Kurniasih, 2021) by addressing the institutional conditions of participation. SID performance should therefore be assessed not only through technical availability, but through whether information reaches diverse users, whether users can respond, and whether their contributions inform decision-making.

These dynamics connect gender equality directly with institutional inclusion. SDG 5 emphasizes women's meaningful participation, while SDG 16 calls for inclusive, accountable, and responsive institutions (UNSD, 2025). The findings show that digital access without voice may broaden technical inclusion while leaving participatory

inequalities intact. This is consistent with evidence that gender inclusion in digital environments depends on structural and social conditions beyond connectivity (World Bank Group, 2025) and with research highlighting persistent barriers to women's participation in village development (Kusumawiranti, 2021; Wula & Anggraini, 2022; Marhumah et al., 2025). Digital governance becomes substantively inclusive when women are recognized not merely as recipients of information and services, but as knowledge holders and contributors capable of influencing institutional agendas.

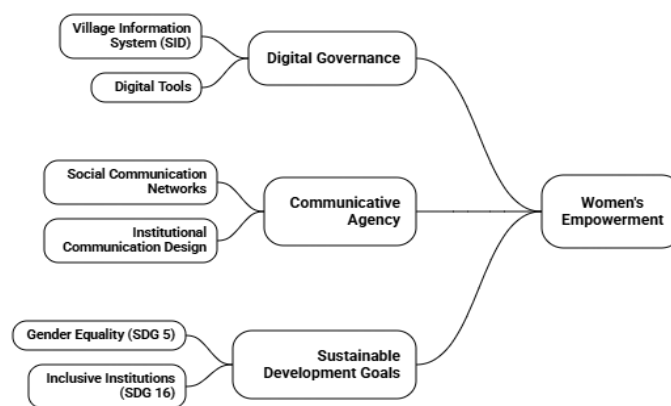


Figure 3. Empowering Rural Women through Digital Inclusion
Source: Processed by the Researchers (2025) using Napkin.AI

Figure 3 synthesizes this argument by positioning women's digital empowerment at the intersection of resources, sociocultural conditions, and institutional arrangements. Rather than representing a linear movement from technological access to empowerment, the model illustrates that resources must pass through communicative and institutional relationships before they can support agency and meaningful outcomes. This interpretation extends Kabeer's (2018) resources–agency–achievements framework by specifying communicative embeddedness as a relational condition affecting the movement from resources to agency. It also brings together evidence on digital literacy, gender norms, social networks, and institutional participation (David & Phillips, 2022; Ellemers, 2018; Luo et al., 2024; Rahayu et al., 2021; Patmawati et al., 2026), thereby providing a conceptual explanation for why technological inclusion may coexist with participatory exclusion.

Despite these contributions, several limitations should be acknowledged. The qualitative multiple-case design involved only two villages and twenty purposively selected

informants, prioritizing contextual depth over statistical representativeness. Differences in digital literacy, technological access, organizational roles, and familiarity with SID may have shaped participants' accounts, while interview and FGD data remain susceptible to recall and social-desirability effects despite triangulation through observation and document analysis. The cross-sectional design also captures SID engagement at a particular stage of implementation and therefore cannot trace changes in communicative agency over time or establish causal relationships.

D. Conclusion

This study critically investigated women's interaction with the Village Information System (SID) as a form of digital public communication in rural Indonesia. The findings demonstrate that women's limited SID engagement does not indicate digital inactivity or weak civic participation. Rather, women actively use digital and interpersonal networks for social, economic, and community purposes, while these communicative resources remain weakly connected to formal village digital governance. The study therefore identifies a communicative embeddedness gap: digital access becomes meaningful for empowerment only when information, trusted networks, women's knowledge, and institutional feedback are connected through reciprocal communication. This extends the understanding of women's digital empowerment from a predominantly access- and skills-based perspective toward a relational and institutional process linking resources, agency, recognition, and influence.

The findings also reposition SID from merely an administrative infrastructure toward a potential space of communicative agency. Its participatory value depends on whether village institutions integrate formal information with communication channels already used by women and provide visible pathways through which their concerns and knowledge can influence institutional processes. Accordingly, inclusive digital governance requires not only technological provision and digital literacy, but also institutional responsiveness, gender-sensitive communication, and recognition of women as legitimate contributors to village decision-making.

Future research should directly address the limitations of this two-village, purposive, cross-sectional design. Longitudinal studies could examine how communicative agencies changes as SID implementation matures, while comparative research across villages with different institutional and technological conditions could test the analytical

transferability of communicative embeddedness. Studies incorporating broader groups of users and non-users, additional institutional actors, and platform-use data could also reduce reliance on self-reported accounts and provide a more complete picture of participation. Ultimately, digital access does not become empowerment until communication becomes institutionally connected, recognized, and responsive.

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Declaration of Competing Interest

The authors declare that there are no conflicts of interest related to the research, authorship, or publication of this article.

Declaration of Generative AI

Artificial intelligence (AI) tools, such as Grammarly, Quillbot, Mendeley, Napkin.AI, and ChatGPT, were employed exclusively to assist with language refinement, grammar enhancement, and phrasing suggestions during the manuscript preparation stage. The entire research process, including study design, data collection, data analysis, and conclusion formulation, was conducted independently and critically reviewed by the authors, without any AI-driven decision-making. All academic judgments and theoretical contributions remain the intellectual responsibility of the research team.

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