DIGITAL APPLICATIONS FOR COMMUNITY EMPOWERMENT: ANALYSIS OF OPPORTUNITIES AND CHALLENGES IN ULU BELU DISTRICT, TANGGAMUS REGENCY

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Abstract

In the era of digital technology, inclusive communication is important so that the empowerment process can reach all levels of society, including marginalized groups that are often overlooked due to the digital divide. This research aims to analyze the implementation of digital applications in community empowerment in the villages of Ulubelu District, Tanggamus Regency, focusing on the challenges, opportunities, and obstacles faced. This research uses a qualitative approach with a case study design and data obtained through in-depth interviews, participatory observation, and document analysis. Data mining was conducted with community leaders, village government, and local people. The results showed that infrastructure barriers, such as inaccessible roads and lack of internet signal, are the main obstacles in optimizing

the use of digital applications, such as the Village Information System (SID), SIKS-NG, and other development planning applications. Villages such as Sinar Banten, Rejosari, Ulu Semong, and Petay Kayu face issues related to the accessibility of digital technology and information. In addition, a lack of digital literacy among the community, especially the elderly, and limited training for village officials exacerbate the situation. However, digital applications also have the potential to support transparency, efficiency, and access to information in community empowerment programs with improved technology infrastructure and inclusive digital literacy training. This study reveals the importance of collaboration between the government, village apparatus, and communities in designing sustainable digitalization strategies. This research enriches the literature related to digitalization in rural areas and provides practical recommendations to overcome barriers to technology implementation. The results are expected to serve as a reference for policymakers and practitioners to develop a more inclusive approach in supporting digital-based community empowerment in remote areas.

Keywords: Community Digital Apps; Community Empowerment; Digital Literacy; Inclusive Communication.

Abstrak

Di era teknologi digital, komunikasi inklusif menjadi penting agar proses pemberdayaan dapat menjangkau seluruh lapisan masyarakat, termasuk kelompok-kelompok marginal yang sering kali terabaikan karena kesenjangan digital. Penelitian ini bertujuan untuk menganalisis implementasi aplikasi digital dalam pemberdayaan masyarakat di desa-desa Kecamatan Ulubelu, Kabupaten Tanggamus, dengan fokus pada tantangan, peluang, dan hambatan yang dihadapi. Penelitian ini menggunakan pendekatan kualitatif dengan desain studi kasus, data diperoleh melalui wawancara mendalam, observasi partisipatif, dan analisis dokumen. Penggalian data dilakukan dengan pemimpin komunitas, pemerintah desa, dan masyarakat lokal. Hasil penelitian menunjukkan bahwa hambatan infrastruktur, seperti jalan yang sulit diakses dan minimnya sinyal internet, menjadi kendala utama dalam optimalisasi penggunaan aplikasi digital, seperti Sistem Informasi Desa (SID), SIKS-NG, dan aplikasi perencanaan pembangunan lainnya. Desa-desa seperti Sinar Banten, Rejosari, Ulu Semong, dan Petay Kayu menghadapi masalah terkait aksesibilitas teknologi dan informasi digital. Selain itu, kurangnya literasi digital di kalangan masyarakat, terutama kelompok usia lanjut, dan keterbatasan pelatihan bagi aparatur desa memperburuk situasi. Meski demikian, aplikasi digital juga berpotensi mendukung transparansi, efisiensi, dan akses informasi dalam program pemberdayaan masyarakat. dengan peningkatan infrastruktur teknologi dan pelatihan literasi digital yang inklusif. Studi ini mengungkapkan pentingnya kolaborasi antara pemerintah, aparatur desa, dan masyarakat dalam merancang strategi digitalisasi yang berkelanjutan. Penelitian ini memperkaya literatur terkait digitalisasi di wilayah pedesaan dan memberikan rekomendasi praktis untuk mengatasi hambatan implementasi teknologi. Hasilnya diharapkan dapat menjadi rujukan bagi pembuat kebijakan dan praktisi untuk mengembangkan pendekatan yang lebih inklusif dalam mendukung pemberdayaan masyarakat berbasis digital di wilayah terpencil.

Kata Kunci: Aplikasi Digital; Pemberdayaan Masyarakat; Literasi Digital; Komunikasi Inklusif.

INTRODUCTION

The lives of modern communities increasingly rely on communication as an essential factor in various aspects of life, a phenomenon driven by globalization and facilitated by rapid advancements in digital technology.[1] Sustainable community empowerment is supported by inclusive communication that emphasizes the active and participatory involvement of all individuals, regardless of their social, economic, and cultural backgrounds.[2] This process enables individuals and communities to acquire skills, knowledge, and power to control and enhance their lives sustainably.[3] However, achieving sustainable empowerment often faces challenges in ensuring every voice is heard and every need met, particularly in diverse communities.[4]

The progress of information and communication technology has transformed social relationships and interactions, offering new opportunities for community empowerment through various digital platforms.[5] These technologies encompass instruments and applications that support fast, widespread, and efficient communication. Despite its immense potential, digital technology often poses accessibility challenges for certain groups, such as rural communities, the elderly, or vulnerable populations, creating a digital divide that exacerbates social and economic disparities.[6] Sustainable community empowerment involves more than providing tools or resources; it requires creating an environment where all individuals feel included and have equal opportunities to participate in every empowerment process.[7] Inclusive communication becomes a fundamental principle to ensure all voices are heard, and all perspectives considered.

Digital transformation has emerged as a key element in supporting community development, including in rural areas.[8] Digital applications, such as the Village Information System (Sistem Informasi Desa, SID), the New Generation Integrated Social Welfare System (Sistem Informasi Kesejahteraan Sosial Next Generation, SIKS-NG), and other

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[1]Listiana Sri Mulatsih and others, "Pemberdayaan Masyarakat Dalam Mewujudkan Desa Edukasi Digital Di Era Teknologi" [Empowering Communities to Create Digital Education Villages in the Technological Era], *Community Development Journal*, 4.4 (2023), pp. 7113–20.

[2]Mathers, A. R., Thwaites, K., Simkins, I. M., & Mallett, R. (2024). Développement humain, handicap et changement social [Human development, disability, and social change beyond participation: The practical application of an empowerment process to bring about environmental and social change]. *Journal of Social Sciences*, 19(4) (2024), 2452–2473.

[3]K. I. Maton, "Empowering Community Settings: Agents of Individual Development, Community Betterment, and Positive Social Change," *American Journal of Community Psychology*, 41 (2008), pp. 4–21.

[4]Willya Achmad, "The Role of Policies Made by the Government Towards Empowering Local Communities," *International Journal of Science and Society*, 6.2 (2024), pp. 158–65, doi: 10.54783/ijsoc.v6i2.1120.

[5]Leila Mona Ganiem and others, "Society in the Digital Era: Adaptation, Change, and Response to Communication Technology," *Journal International Dakwah and Communication*, 4.1 (2024), pp. 123–35, doi: 10.55849/jidc.v4i1.639.

[6]J. J. Green, "Rural Development in the Digital Age: Exploring Information and Communication Technology through Social Inclusion," *Rural Sociology*, 2024.

[7]Fadhillah Insani, Isnaini Harahap, and Rahmi Syahriza, "Analisis Pemberdayaan Ekonomi Masyarakat Pesisir Di Desa Perlis Kecamatan Brandan Barat Kabupaten Langkat" [Analysis of Economic Empowerment of Coastal Communities in Perlis Village, Brandan Barat District, Langkat Regency], *Ganaya*, 7.3 (2024), pp. 153–63, doi: 10.37329/GANAYA.V7I3.3338.

[8]Alfiana, A., Mulatsih, L. S., Kakaly, S., Rais, R., Husnita, L., & Asfahani, A. (2023). Pemberdayaan masyarakat dalam mewujudkan desa edukasi digital di era teknologi [Community empowerment in realizing digital education villages in the technology era]. *Community Development Journal: Jurnal Pengabdian Masyarakat*, 4(4) (2023), 7113–7120.

platforms, are designed to streamline administrative processes, improve access to information, and promote more effective and efficient community empowerment.[9] However, the implementation of these technologies often encounters various challenges, especially in rural areas with limited infrastructure, human resources, and digital literacy.[10] Ulu Belu District, Tanggamus Regency, as a region with significant community empowerment potential, faces similar obstacles, although it holds substantial opportunities to optimize the benefits of digital technology.[11]

Despite significant progress in communication facilitated by digital technology, the implementation of inclusive communication to achieve sustainable community empowerment still faces numerous challenges.[12] A primary issue is the lack of understanding of how inclusive communication can be effectively integrated into empowerment strategies in the digital era. Consequently, while there is potential to expand community involvement, the use of digital technology also introduces a digital divide, excluding rural communities, minorities, the elderly, and vulnerable groups from the process.[13] This can hinder community empowerment efforts and exacerbate social inequality. Furthermore, the rapid changes in digital communication platforms create complex interactions and relationships, where understanding and adapting to these technologies become significant challenges. This issue is compounded by unequal access to digital technology, leading to disparities between those who can access information and those who cannot.[14]

The following table illustrates the relationship between digital technology, inclusion opportunities, and exclusion barriers, along with references:

Table 1.
The Relationship Between Digital Technology, Inclusion Opportunities, and Exclusion Barriers.

Aspect	Description	Example	Reference
Digital Technology	Provision of infrastructure,	SID, SIKS-NG applications, and social	F. R. Baskoro, et.al., 2023[15] ; D.

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[9]A. Wiranti, N. E., & Frinaldi, "Meningkatkan Efisiensi Pelayanan Publik Dengan Teknologi Di Era Digital" [Improving Public Service Efficiency with Technology in the Digital Era], *JIM: Jurnal Ilmiah Mahasiswa Pendidikan Sejarah*, 8(2), (2023), pp. 748-754.

[10]Mwinyi Hassan, "Challenges and Opportunities of Implementing Education Technology in Rural and Underserved Areas of Tanzania, Assessing the Sustainability and Educational Impact of Such Initiatives," *African Journal of Education and Practice*, 2024, doi: 10.47604/ajep.3031.

[11]BPS, "Kecamatan Ulu Belu Dalam Angka 2024" [Ulu Belu District in Figures 2024], *Badan Pusat Statistik Kabupaten Tanggamus*, 2024.

[12]Lance Allen Liotta, "Digitalization and Social Inclusion: Bridging the Digital Divide in Underprivileged Communities," *Global International Journal of Innovative Research*, 1.1 (2023), pp. 7–14, doi: 10.59613/global.v1i1.2.

[13]Anuyah, O., Badillo-Urquiola, K., & Metoyer, R. (n.d.). Engaging the discourse of empowerment for marginalized communities through research and design participation. I, 2023, 1–7.

[14]Sadyrtdinov, R., Eremeeva, E., & Varlamova, J. (2023). The digital inequality in the light of the sustainable development goals: Case of the COVID-19 pandemic. In *International Multidisciplinary Scientific GeoConference: SGEM*, 23(5.1) 2023, 469–476.

[15]F. R. Baskoro, D. A., Maipita, I., Fitrawaty, F., & Dongoran, "Digitalisasi Sistem Informasi Dan Administrasi Desa Sebagai Upaya Menuju Desa Cerdas Di Desa Kolam, Percut Sei Tuan, Deli Serdang, Sumatera Utara" [Digitalization of Information Systems and Village Administration as an Effort Towards

	applications, and IT-based services	aid platforms for data transparency	Andriyansah, 2022[16]
Inclusion Opportunities	Community participation in utilizing technology for empowerment	Digital literacy training for village officials and communities	A. Praseptiawan, M., et.al., 2021[17] ;Y. S. Pitrianti, 2023[18]
Exclusion Barriers	Factors causing unequal access and use of technology	Internet access inequality, device limitations, low digital literacy	J. R. Astuti, S. I., et.al., 2022[19]
Technology & Inclusion Relationship	Technology as a means of increasing community participation	Community-based applications for village planning and deliberation	A. Ariadi, 2019[20]
Technology & Exclusion Relationship	Technology as a cause of inequality if not supported by equitable access	Uneven internet infrastructure in remote areas	Y. D. Hadiyat, 2014[21]; Vilakati, et.al., 2021[22]
Inclusion & Exclusion Relationship	Digital inclusion efforts to overcome social exclusion	Empowerment programs based on applications for marginalized groups	Z. Zaifuddin, 2022[23]

Smart Villages in Kolam Village, Percut Sei Tuan, Deli Serdang, North Sumatra], *Dinamisia: Jurnal Pengabdian Kepada Masyarakat*, 7(3), (2023), pp. 624-635.

[16]D. Andriyansah, "Efektivitas Penerapan E-Government Melalui Sistem Informasi Kesejahteraan Sosial Next Generation (Siks-Ng) Sebagai Aplikasi Pengolah Data Kemiskinan Di Desa Lamajang Kecamatan Pangalengan Kabupaten Bandung" [Effectiveness of E-Government Implementation Through the Next Generation Social Welfare Information System (Siks-Ng) as an Application for Poverty Data Processing in Lamajang Village, Pangalengan District, Bandung Regency], *JISIPOL| Jurnal Ilmu Sosial Dan Ilmu Politik*, 6(3), (2022).

[17]A. Praseptiawan, M., Nugroho, E. D., & Iqbal, "Pelatihan Sistem Informasi Desa Untuk Meningkatkan Kemampuan Literasi Digital Perangkat Desa Taman Sari" [Village Information System Training to Improve Digital Literacy Skills of Taman Sari Village Staff], *ABDIMAS: Jurnal Pengabdian Masyarakat*, 4(1), (2021), pp. 521-528.

[18]Y. S. Pitrianti, S., Sampetoding, E. A., Purba, A. A., & Pongtambing, "Literasi Digital Pada Masyarakat Desa" [Digital Literacy in Rural Communities], In *Prosiding Seminar Nasional Teknologi Dan Sistem Informasi*, (Vol. 3, N, 2023), pp. 43-49.

[19]JJ. R. Astuti, S. I., & Binu, "Memberdayakan Komunitas Lokal Dalam Gerakan Literasi Digital" [Empowering Local Communities in the Digital Literacy Movement], *Jurnal Riset Jurnalistik Dan Media Digital*, 2(2), (2022), pp. 77-90.

[20]A. Ariadi, "Perencanaan Pembangunan Desa" [Village Development Planning], *Meraja Journal*, 2(2), (2019), pp. 135-147.

[21]Y. D. Hadiyat, "Kesenjangan Digital Di Indonesia (Studi Kasus Di Kabupaten Wakatobi)" [Digital Divide in Indonesia (Case Study in Wakatobi Regency)], *Jurnal Pekommas*, 17(2), (2014), pp. 81-90.

[22]Thembelihle, D., & Vilakati, S, "Remote and Rural Connectivity: Infrastructure and Resource Sharing Principles," *Wireless Communications and Mobile Computing*, 2021, pp. 1-12, doi: 10.1155/2021/6065119.

[23]Z. Zaifuddin, "Pemberdayaan Masyarakat Melalui Online Marketing: Penguatan Ekonomi Masyarakat Desa Berbasis Digital" [Community Empowerment Through Online Marketing: Strengthening the Rural Economy through Digital-Based Empowerment], *Jurnal Pemberdayaan Masyarakat*, 10(1), (2022), pp. 31-40.

This table depicts how digital technology, inclusion, and exclusion interact and how this research delves into these aspects.

Inclusive communication forms the cornerstone of fostering active engagement across all societal levels in empowerment programs. This theory underscores the necessity of building communication that equally involves all stakeholders, removing structural, social, and cultural barriers that often hinder participation. In the context of digital applications in villages, inclusive communication serves as a relevant framework to ensure equitable access and usability of these technologies, even for groups with limited digital literacy. This theoretical approach supports a dialogic method for building trust, enhancing understanding, and creating sustainable solutions collaboratively.[24]

The diffusion of innovations theory by Everett M. Rogers provides a robust framework for understanding the adoption of new technologies in communities. This theory identifies five main factors influencing innovation adoption: relative advantage, compatibility, complexity, trialability, and observability.[25] In this study, the theory is used to analyze the extent to which digital applications such as SID and SIKS-NG can be adopted and utilized by communities in Ulu Belu District. Geographic constraints, infrastructure limitations, and low digital literacy are key variables examined to understand the dynamics of technology adoption in the area.

Social capital, as explained by Pierre Bourdieu, plays a vital role in successful community empowerment. Social capital involves networks, norms, and trust that enable cooperation among individuals and groups within a community.[26] In this context, social capital theory is relevant for analyzing how social networks and relationships in Ulu Belu villages affect the success of digital application implementation. Strong social capital can accelerate technology adoption through collaboration between village officials and residents, whereas weak social capital may hinder the process.

The empowerment theory introduced by Rappaport provides a theoretical foundation for understanding the process of enhancing individual and community capacity to manage resources and make decisions impacting their lives.[27] In this research, empowerment theory is pertinent for analyzing how digital applications can effectively enhance information access, administrative transparency, and community participation in village development planning. Essentially, this theory elucidates how digital technology can facilitate broader social change by strengthening community capacity.

Previous studies demonstrate the vital role of digital applications such as SID and SIKS-NG in supporting village community empowerment. According to Sulistyowati, F., et al.,[28] SID applications have improved village administrative efficiency and information

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[24]Massacesi Raffaella, "Applied Arts and Communication Design for Inclusion," *Springer International Publishing*, 2021, pp. 324-331, doi: 10.1007/978-3-030-80829-7_40.

[25]Mailin, M., Rambe, G., Ar-Ridho, A., & Candra, C. Teori media/teori difusi inovasi [Media theory/innovation diffusion theory]. *Jurnal Guru Kita*, 6(2) 2022, 168–168.

[26]R. Fathy, "Modal Sosial: Konsep, Inklusivitas Dan Pemberdayaan Masyarakat" [Social Capital: Concept, Inclusiveness, and Community Empowerment], *Jurnal Pemikiran Sosiologi*, 6(1), (2019), pp. 1-17.

[27]D. S. Standsyah, R. E., & Ramadhan, "Community Economic Empowerment for the Creation of Self-Sufficient Villages," *Help: Journal of Community Service*, 1(2), (2024), pp. 148-156, doi: 10.62569/hjcs.v1i2.63.

[28]Sulistyowati, F., Tyas, H. S., Dibyorini, M. C. R., & Puspitosari, C. Pemanfaatan sistem informasi desa (SID) untuk mewujudkan smart village di Kalurahan Panggungharjo DIY [Utilization of the village information system (SID) to create a smart village in Panggungharjo Village, Bantul, Yogyakarta]. *Jurnal IPTEKKOM Jurnal Ilmu Pengetahuan & Teknologi Informasi*, 23(2) 2021, 213–226.

transparency. However, low digital literacy and insufficient technical training remain obstacles to their utilization. Similarly, R. Prisanda, E., and Febrina[29] found that the success of digital technology implementation in villages heavily relies on human resource capacity, infrastructure availability, and local government policy support. On the other hand, some studies highlight more specific challenges in areas with limited access, as revealed by R. Prisanda, E., and Febrina,[30] who discovered that although digital applications can accelerate development efforts, limitations in internet connectivity and lack of community involvement are primary barriers to creating significant impacts on community empowerment.

Literature reviews suggest that inclusive communication and digital technology play critical roles in community empowerment. However, their implementation faces barriers that hinder effectiveness, particularly the digital divide in rural contexts. Literature on inclusive communication, as discussed by Isam, Faik et al.,[31] P. Freire,[32] and P. Agustana,[33] emphasizes the importance of active participation of marginalized communities in development processes. However, the focus is often on education and poverty alleviation, with limited attention to using digital technology for fostering inclusive communication. Similarly, research on digital technology, as elaborated by Patcha et al.,[34] and Green, John,[35] highlights the potential of digitalization to open economic and social inclusion opportunities. However, these studies generally focus on macro-level impacts, lacking an in-depth exploration of technology's role in fostering inclusive communication at the local community level. Meanwhile, studies on digital applications for empowerment, such as SID, SIKS-NG, and social aid platforms by Sulistyowati, F.;[36] R. Dwiarto;[37] Ratnasari, I., et

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[29]R. Prisanda, E., & Febrina, "Penerapan Teknologi Informasi Dan Komunikasi Berbasis Aplikasi SISPEDAL Dalam Rangka Mewujudkan Good Village Governance" [Implementation of Information and Communication Technology through the SISPEDAL Application to Achieve Good Village Governance], *Journal of Governance Innovation*, 3(2), (2021), pp. 155-171.

[30]T. S. Rajagukguk, "Pengabdian Mendigitalkan Desa: Meningkatkan Keterampilan Digital Masyarakat Melalui Pelatihan Komputer Dan Internet (Pada UMKM Di Desa Tuktuk Siadong, Kabupaten Samosir)" [Service in Digitizing Villages: Improving Digital Skills of Communities through Computer and Internet Training (on SMEs in Tuktuk Siadong Village, Samosir Regency)], *Jurnal Pengabdian Masyarakat*, 1(1), (2024), pp. 212-228.

[31]Isam, F., Sengupta, A., & Deng, Y. Inclusion by design: Requirements elicitation with digitally marginalized communities. *Management Information Systems Quarterly*, 2024. https://doi.org/10.25300/misq/2023/17225

[32]P. Freire, *The Oppressed* [translated by Herder and Herder], 2000.

[33]P. Agustana, "Pentingnya Pemberdayaan Masyarakat Sebagai Strategi Dalam Pembangunan Sosial" [The Importance of Community Empowerment as a Strategy in Social Development], *Locus*, 12(1), (2020), pp. 60-69.

[34]Patcha, B. R., Rao, B., Meegada, V., & Reddy, S. (2024). Navigating globalization and digitalization. In *Advances in Computer and Electrical Engineering Book Series*, 2024 (pp. 358–382). https://doi.org/10.4018/979-8-3693-4111-7.ch015

[35]Green, John J., "Rural Development in the Digital Age: Exploring Information and Communication Technology through Social Inclusion," *Rural Sociology*, 2024, doi: 10.1111/ruso.12542.

[36]F. Sulistyowati, "Sistem Informasi Desa Dalam Mendorong Pemberdayaan Masyarakat Di Masa Pandemi Covid-19" [Village Information System in Encouraging Community Empowerment During the Covid-19 Pandemic], *Komunikasi, Media Dan Pemberdayaan Masyarakat*, 2020.

[37]R. Dwiarto, "Inovasi Penyaluran Jaminan Sosial Tepat Sasaran Melalui Kebijakan Pengelolaan Anggaran Data Terpadu Kesejahteraan Sosial (DTKS) Dan Pemanfaatan Aplikasi 'Cek Bansos'" [Innovation in Targeted Social Assistance Distribution Through the Integrated Social Welfare Data (DTKS) Budget

al.,[38] showcase the strengths of these technologies in managing socio-economic data more effectively.

Distinct from prior research, which primarily focuses on areas with better infrastructure access, this study examines the implementation of digital applications in Ulu Belu District, Tanggamus Regency, which faces significant geographical, infrastructural, and digital access challenges. Furthermore, this research not only evaluates the technical benefits and barriers of digital applications like SID and SIKS-NG but also integrates inclusive communication as a theoretical framework to understand how digital applications can be adapted in the context of sustainable community empowerment.

Located in a geographically challenging region, Ulu Belu District in Tanggamus Regency spans an area of 348.04 km² comprising 16 villages: Datarajan, Gunungtiga, Karangrejo, Pagaralam Ulubelu, Muaradua Ulubelu, Ngarip, Penantian Ulubelu, Gunungsari, Sirnagalih, Ulu Semong, Rejosari, Sukamaju, Tanjung Baru, Sinar Banten, Air Abang, and Petay Kayu. As a predominantly agrarian region, Ulu Belu holds great potential for supporting community empowerment through the sustainable management of local resources. However, the region is also known for its limited infrastructure and access to digital information technology. Challenging road conditions, the lack of stable internet connectivity, and low digital literacy among residents are major obstacles in optimizing the use of technology to support village development.[39]

Despite these challenges, the presence of digital applications such as SID, SIKS-NG, and other platforms designed for community empowerment offers significant opportunities for Ulu Belu to overcome these barriers. This study's importance lies in its effort to deeply understand how digital applications can support village community empowerment in Ulu Belu District, focusing on both opportunities and challenges. By understanding the local context and specific challenges faced by village communities in this area, the research aims to provide crucial contributions to formulating inclusive communication strategies and policies necessary to ensure digital applications can serve as effective instruments in promoting sustainable community empowerment in the digital era.

The urgency of this research lies in addressing the literature gap on the application of digital technology in remote areas, especially in Sumatra. It also offers a new perspective by emphasizing the importance of an inclusive communication-based approach to overcome structural and social barriers. The findings of this study are expected to provide practical contributions to the development of policies, training programs, and more inclusive digital infrastructure in rural areas with similar characteristics.

METHOD

This study employs a qualitative approach with a case study design.[40] The choice of a case study method is based on the need to deeply understand the phenomenon of digital

Management Policy and Utilization of the 'Cek Bansos' Application], In *Prosiding Seminar Nasional Unimus*, Vol. 6.

[38]Ratnasari, I., Ramadan, E., Nurlatifah, I., Ginanjar, S. E., & Santa, R. Penerapan e-government melalui sistem informasi kesejahteraan sosial next generation (SIKS-NG) untuk pengajuan DTKS [Implementation of e-government through the next generation social welfare information system (SIKS-NG) for DTKS applications]. *Jurnal Sosial Teknologi*, 4(2) 2024, 109–115.

[39]BPS. *Kecamatan Ulu Belu dalam angka 2024* [Ulu Belu Subdistrict in Numbers 2024]. Badan Pusat Statistik Kabupaten Tanggamus, 2024.

[40]M. Rahardjo, "Studi Kasus Dalam Penelitian Kualitatif: Konsep Dan Prosedurnya" [Case Study in Qualitative Research: Concepts and Procedures], UIN Malang, 2017.

application implementation in empowering communities in the villages of Ulubelu Subdistrict, Tanggamus Regency. A case study is considered an appropriate approach because it provides flexibility to explore the complex interactions between digital technology, opportunities for inclusion, and barriers to exclusion within a specific context.[41] The study area, covering 16 villages in the Ulubelu subdistrict with a total area of 348.04 km² and challenging geographical characteristics, reflects various common challenges faced by remote areas in Indonesia, such as disparities in technology access, limited infrastructure, and low digital literacy.[42] Therefore, selecting this location provides a rich setting to understand the opportunities and challenges in implementing digital empowerment applications, such as Village Information System (SID), SIKS-NG, and social assistance checking platforms.

The data collection techniques in this study include in-depth interviews, participatory observation, and documentation. Interviews were conducted with village heads, village operators, and other village officials directly involved in data management and community empowerment processes to comprehensively understand how these applications are used in empowerment processes and the challenges encountered in the field. Additionally, representatives of the local community, deemed capable of representing the general population's perspectives, were also interviewed to understand their experiences and perceptions regarding the utilization of digital technology in empowerment programs. The interview questions were designed in a semi-structured manner to provide flexibility in exploring issues that emerged during the interviews. Participatory observation was used to document the operational dynamics of digital application utilization in the village environment, interactions between village officials and the community, as well as the infrastructure conditions that either support or hinder the implementation of digital applications. Documentation data was collected from application usage reports, village demographic data, and local policies related to digitization.

The selection of informants was conducted using purposive sampling to ensure their direct relevance to the research issues. Informants were selected based on their strategic roles in the implementation of digital applications in the villages of Ulubelu Subdistrict. The informants include:
    a. Village heads as policymakers and administrative leaders of the village.
    b. Village operators as the primary users of digital technology.
    c. Other village officials involved in operational and digital-based services.
    d. Local community representatives to understand their experiences and perceptions regarding the utilization of digital technology in empowerment programs.

The number of informants interviewed varied between 4-5 people per village, totaling approximately 70-80 informants from 16 villages in Ulubelu Subdistrict. This number was chosen to capture a diversity of perspectives and ensure that the data obtained reflects the dynamics across the entire study area. This technique provides sufficient focus on contextual details while ensuring adequate data diversity for analysis.

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[41]Assyakurrohim, D., Ikhram, D., Sirodj, R. A., & Afgani, M. W. Metode studi kasus dalam penelitian kualitatif [Case study methods in qualitative research]. *Jurnal Pendidikan Sains Dan Komputer*, 3(01) 2023, 1–9.

[42]BPS. *Kecamatan Ulu Belu dalam angka 2024* [Ulu Belu Subdistrict in Numbers 2024]. Badan Pusat Statistik Kabupaten Tanggamus, 2024.

The data collected were analyzed using thematic analysis techniques, following the steps of open coding, categorization, and theme identification to uncover patterns, conceptual relationships, and main themes that explain the effectiveness and challenges of utilizing digital applications in supporting inclusive communication and sustainable community empowerment.[43] Triangulation techniques were employed to ensure the validity of the data obtained through various sources and methods. Triangulation was conducted in three dimensions: source triangulation, data collection techniques, and time triangulation. Source triangulation was performed by comparing information obtained from various key informants, such as village heads, village operators, other relevant officials, and local community representatives, to ensure data consistency regarding the implementation of digital applications. Meanwhile, technique triangulation combined in-depth interviews, participatory observation, and document analysis to validate the data. Furthermore, time triangulation was applied by collecting data at different times to capture temporal dynamics and ensure the results were not influenced by specific situational factors.[44]

From an ethical perspective, this study adheres to the principles of qualitative research, including informed consent, data confidentiality, fairness, transparency, and the avoidance of conflicts of interest. Before conducting interviews or observations, each informant was provided with a detailed explanation of the study's objectives and benefits, and their consent was obtained to ensure voluntary participation. Informants' identities were kept confidential by anonymizing names or other sensitive data if necessary. Researchers also applied the principle of fairness by providing equal opportunities for each informant to share their views to avoid bias in data collection. The entire research process was conducted transparently, and the results will be communicated to the relevant parties as a form of accountability. By integrating triangulation and these ethical principles, this study not only produces valid findings but also upholds the integrity of the research process and respects the parties involved.[45]

FINDINGS AND DISCUSSION

Ulubelu District, located in Tanggamus Regency, Lampung Province, comprises 16 villages covering an area of 348.04 km². These villages include Datarajan, Gunungtiga, Karangrejo, Pagaralam Ulubelu, Muaradua Ulubelu, Ngarip, Penantian Ulubelu, Gunungsari, Sirnagalih, Ulu Semong, Rejosari, Sukamaju, Tanjung Baru, Sinar Banten, Air Abang, and Petay Kayu. Most of these villages are situated in hilly areas with limited accessibility. The connecting roads between villages are often dirt or gravel roads, making travel challenging, especially during the rainy season. This geographical condition isolates some villages, such as Ulu Semong, Petay Kayu, and Sinar Banten, from basic services, including transportation, education, and healthcare.[46]

[43]Adelliani, N., Sucirahayu, C. A., & Zanjabila, A. R. *Analisis Tematik Pada Penelitian Kualitatif* [Thematic Analysis in Qualitative Research]. Penerbit Salemba, 2023.

[44]Saadah, M., Prasetiyo, Y. C., & Rahmayati, G. T. Strategi dalam menjaga keabsahan data pada penelitian kualitatif [Strategies for maintaining data validity in qualitative research]. *Al'Adad: Jurnal Tadris Matematika*, 1(2) 2022, 54–64.

[45]M. S. Abdussamad, H. Z., & Sik, *Metode Penelitian Kualitatif* [Qualitative Research Methods], CV. Syakir Media Press, 2021.

[46]BPS. *Kecamatan Ulu Belu dalam angka 2024* [Ulu Belu Subdistrict in Numbers 2024]. Badan Pusat Statistik Kabupaten Tanggamus, 2024.

In addition to physical infrastructure challenges, access to information and communication technology remains a major obstacle. Only a few villages have adequate internet connectivity, while remote villages generally lack stable telecommunications signals. This condition affects the ability of village officials and communities to leverage digital technology for administrative activities and community empowerment. On the other hand, Ulubelu District has significant natural resource potential, particularly in agriculture and plantations, with main commodities such as robusta coffee and cocoa. However, limited infrastructure and technological access hinder the optimization of these resources for the overall welfare of the community. Therefore, the development of physical and digital infrastructure is urgently needed to support transformation and empowerment in the region.

The study results indicate that implementing digital applications for community empowerment in the villages of Ulubelu District, Tanggamus Regency, faces significant challenges. Infrastructure barriers, such as poorly maintained roads and limited network signal access, are major challenges in applying digital applications for community empowerment in several villages. Villages such as Sinar Banten, Rejosari, Ulu Semong, and Petay Kayu face significant accessibility issues due to connecting roads still being dirt tracks, which are prone to damage, especially during the rainy season. This condition not only hinders mobility but also isolates villages from broader service access, including technology and digital information.

Moreover, the lack of adequate signals in these villages worsens the situation. Village operators and local communities face difficulties accessing important applications such as SIKS-NG, SID, and other village development planning applications. Consequently, data collection, processing, and reporting are not optimal, hampering the effectiveness of community empowerment programs that should be digitally facilitated.

This study reveals that utilizing digital applications such as the Village Information System (SID), SIKS-NG, Cek Bansos, village financial applications, and village planning applications in the villages of Ulubelu District, Tanggamus Regency, still faces significant challenges in supporting inclusive communication and community empowerment. In-depth interviews with community leaders, village operators, and village officials reveal that while these applications have the potential to expedite information access and facilitate social welfare data management, a lack of socialization and inadequate signal conditions remain major obstacles to optimal implementation. Additionally, interviews with local communities reveal a significant digital literacy gap. Most residents, particularly older age groups, feel incapable of utilizing digital technology to support their economic or social activities. Only a few representatives, such as young leaders and small business owners, can optimally leverage digital technology to access information or new business opportunities. However, they report that training and mentoring related to digital applications from village authorities are still very limited, preventing these technologies' benefits from being widely realized.

Field participatory observations indicate that some village officials are not adequately trained in using applications, resulting in inefficiencies in administration and empowerment processes. At the same time, communities remain uninformed about the potential benefits of these applications for their lives. Moreover, limited internet access in some villages hampers efforts to maximize digital applications. Official village documents also indicate that reports on the use of these applications often serve as formalities and do not accurately reflect field conditions. This challenge is exacerbated by a lack of

collaboration among stakeholders at the village level in designing strategies to overcome digitalization barriers.

Nevertheless, this study also identifies several opportunities. Informants mention that with improved digital literacy training and technological infrastructure, digital applications have significant potential to support transparency and efficiency in community empowerment programs. Thus, despite the dominant implementation challenges, the opportunities to optimize digital applications for community empowerment can still be realized through more inclusive and collaborative approaches.

Below is a table outlining the current usage, opportunities, and challenges of digital applications in the villages of Ulubelu District, Tanggamus Regency:

Table 2.
Outlining The Current Usage, Opportunities, and Challenges of Digital Applications In The Villages of Ulubelu District, Tanggamus Regency.

Digital Application	Current Usage	Opportunities	Challenges
SIKS-NG	Used for social welfare and aid recipient data collection; primarily accessed by village operators.	Facilitates accurate and transparent social aid data; enables integration with national programs	Limited digital literacy among operators and communities; unequal internet network infrastructure.
Cek Bansos	Limited use by the community for checking social aid status.	Help verify aid entitlements directly; increases community oversight.	Limited technical understanding among communities; lack of widespread technological devices.
Village Financial Application	Used for village financial recording and reporting but often implemented suboptimally.	Enhances transparency and accountability in village budget management.	Lack of training for village staff; insufficient skilled human resources in digital fields.
Village Planning Application	Used for village development planning and data management in limited capacity.	Supports more effective and efficient data-based planning; expedites reporting and evaluation processes.	Limited internet access in remote villages; low coordination among village officials.
Village Information System (SID)	Used for storing population data, development information, and village reports; utilization remains minimal.	Supports integrated village data management; facilitates data driven development planning.	Low understanding of application functions by village officials; lack of community socialization.

This table highlights that while digital applications hold significant potential for supporting community empowerment, effective implementation is hindered by infrastructure limitations, digital literacy gaps, and human resource constraints. Efforts to address these obstacles through training, infrastructure provision, and cross-sector collaboration are essential to maximizing the opportunities available.

The research findings demonstrate that inclusive communication plays a crucial role in sustainable empowerment in the digital era while also facing substantial challenges. Interviews reveal that access to digital platforms and involvement in empowerment initiatives are strongly influenced by demographic factors such as age, educational background, and geographical location. Analysis shows that groups with limited access to digital technology tend to have lower engagement in empowerment processes, supporting previous findings on digital exclusion that can exacerbate social inequality.[47] Meanwhile, qualitative data from observations reveal that inclusive communication on social media platforms can enhance participation and engagement, especially when approaches are adaptive to the specific needs of marginalized groups. These findings align with the view that context-sensitive and individual-oriented communication can broaden inclusivity.[48]

This study demonstrates that the application of inclusive communication in the digital era plays a crucial role in sustainable empowerment, yet it also faces various challenges. The interpretation of the findings within the context of inclusive communication theory and empowerment shows that varying access to digital technology directly influences community participation in empowerment programs. Observational findings reveal that groups with limited digital access tend to have lower levels of engagement in empowerment initiatives. This aligns with the digital divide theory, which emphasizes that disparities in technological access can exacerbate social inequality.[49] Additionally, in-depth interviews indicate that adaptive and sensitive communication strategies tailored to the specific needs of marginalized groups can enhance their participation. This supports participatory communication theory, which underscores the importance of inclusive and context-responsive communication design to facilitate empowerment.[50]

Thus, the findings confirm that while digital technology offers significant opportunities for inclusivity, the success of implementing inclusive communication strategies heavily depends on removing access barriers and adapting strategies to the needs of marginalized groups. This interpretation provides valuable insights for developing more holistic and effective communication approaches in the context of sustainable empowerment.

From an empowerment perspective, inclusive communication can be seen as a means to engage everyone, regardless of their economic, social, or cultural status. Inclusive communication theory is rooted in the concept that every individual has an equal right to

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[47]N. Selwyn, "Reconsidering Political and Popular Understandings of the Digital Divide," *New Media & Society*, 6(3), (2004), pp. 341–62.

[48]T. Pless, N., & Maak, "Building an Inclusive Diversity Culture: Principles, Processes and Practice," *Journal of Business Ethics*, 54, 2004, pp. 129–47.

[49]E. Hargittai, "Digital Na(t)ives? Variation in Internet Skills and Uses among Members of the 'Net Generation'," *Sociological Inquiry*, 80(1), (2010), pp. 92–113.

[50]D. McQuail, "The Future of Communication Studies: A Contribution to the Debate," *Media and Communication Studies Interventions and Intersections*, 27, 2010.

voice their opinions and participate in decision-making processes affecting their lives.[51] This aligns with the principles of open dialogue or democratic and participatory deliberations grounded in the values of a diverse modern society. In communication studies, this inclusivity is viewed as a prerequisite for achieving true empowerment, where individuals and communities are not merely recipients of policies but also active agents of change.[52]

Inclusive communication becomes increasingly relevant in the digital era, where information and communication technologies (ICT) have the potential to bridge existing social gaps. Digital media and participation theories highlight that digital platforms can provide broader and more democratic access to societal discussions and decision-making processes.[53] However, these theories also acknowledge emerging challenges, such as digital exclusion, where certain groups lack adequate access to these technologies. Without equitable access to information and communication, some sections of society remain on the fringes of development. Therefore, it is essential to integrate the principles of inclusive communication with digital strategies that consider the diversity of access and technological capabilities within communities.[54]

Furthermore, community empowerment theory combined with inclusive communication theory emphasizes that empowerment is not solely about enhancing individual capacities but also about transforming broader social structures.[55] In this context, inclusive communication is seen as a tool that not only facilitates participation but also transforms existing power relations, creating spaces for equitable and inclusive dialogue where every voice is valued and considered. Consequently, in sustainable empowerment efforts in the digital era, inclusive communication must be integrated into every stage of the process—from planning to implementation—to ensure that all members of society, especially the most vulnerable, can actively contribute and benefit from sustainable development.[56]

This study contributes to the development of inclusive communication theory and offers broad practical implications. From a theoretical perspective, this research expands understanding of how inclusive communication can be effectively integrated within digital contexts. The findings indicate that adapting communication strategies based on local contexts and the specific needs of marginalized groups not only strengthens digital participation theory but also introduces new dimensions to inclusive communication theory, which previously focused less on the variability of technological access. This leads to a revision and expansion of existing theoretical frameworks, incorporating new dynamics in the relationship between digital access and community participation.[57]

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[51]Fathy, 2019.

[52]Oľga Orgoňová, "The Concept of Inclusive Communication Style on the Way to Inclusive Stylistics," *Doi: 10.2478/Jazcas-2024-0007*, 2023.

[53]Phytanza, D. T. P., Nur, R. A., Hasyim, M. P., & Rahmi, S. Pendidikan Inklusif: Konsep, Implementasi, dan Tujuan [Inclusive Education: Concept, Implementation, and Goals]. CV Rey Media Grafika, 2022.

[54]M. Deseriis, "Rethinking the Digital Democratic Affordance and Its Impact on Political Representation: Toward a New Framework," *New Media & Society*, 23(8), (2021), pp. 2452-2473.

[55]J. Friedmann, *Empowerment: The Politics of Alternative Development*, ed. by John Wiley & Sons, 1992.

[56]Prasad, Kiran, "Communication of Inclusive Innovation for Sustainable Development in India," *Doi: 10.1007/978-981-10-7104-1_12*, 2018.

[57]M. Castells, *Networks of Outrage and Hope: Social Movements in the Internet Age*, ed. by John Wiley & Sons, 2015.

In practice, the findings highlight the importance of designing empowerment programs that address technological access inequalities and adapt to the specific needs of marginalized groups. Practical recommendations include implementing more inclusive and responsive communication strategies, such as providing technology training and developing user-friendly digital platforms. These implications emphasize the need to enhance engagement and participation from various community groups in empowerment programs by removing existing barriers.[58] Thus, this study not only enriches existing theories but also offers practical guidance for practitioners and policymakers to design more effective and inclusive initiatives that ultimately support sustainable empowerment in the digital era.

This study has several limitations that should be noted. First, the research scope is limited to villages in the Ulu Belu sub-district, Tanggamus Regency, so the findings may not fully represent conditions in other villages with different social, economic, and digital infrastructure characteristics. Second, the qualitative approach with a case study design allows for an in-depth understanding of the phenomenon under investigation, but the resulting findings are contextual and cannot be widely generalized.[59] Additionally, time and resource constraints limited the number of informants involved, which could affect the diversity of perspectives obtained. Limited internet access in some villages also posed challenges in observing the direct use of digital applications in the community's daily activities. These limitations are expected to be addressed in future research by expanding the geographical scope, increasing the number of informants, and utilizing mixed methods to generate richer and more generalizable data. Employing methods that combine quantitative and qualitative approaches more comprehensively can provide a deeper understanding of the dynamics of inclusive communication in various contexts.[60]

The findings of this study have significant social and ethical implications in the context of using digital technology for inclusive communication. Socially, the results emphasize the importance of reducing technological access inequality to ensure that all community groups can fully participate in empowerment initiatives. If unaddressed, access inequality can exacerbate social marginalization, making it critical for inclusive communication strategies to address and mitigate these barriers.[61] By designing programs that consider the needs and limitations of marginalized groups, technology can be leveraged as a more equitable and effective empowerment tool.

Moreover, ethical considerations include ensuring fair access, making sure digital technology is not only available but also accessible and usable equitably across all societal strata. Consequently, this study calls on stakeholders to design and implement technological solutions with social and ethical impacts in mind to ensure that the use of digital technology in inclusive communication truly supports sustainable empowerment.[62]

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[58]D. A. Purwani, *Pemberdayaan Era Digital* [Empowerment in the Digital Era], *Bursa Ilmu*, 2021.

[59]S. K. Donatus, "Pendekatan Kuantitatif Dan Kualitatif Dalam Penelitian Ilmu Sosial: Titik Kesamaan Dan Perbedaan" [Quantitative and Qualitative Approaches in Social Science Research: Similarities and Differences], *Studia Philosophica et Theologica*, 16(2), (2016), pp. 197-210.

[60]J. W. Creswell, *A Concise Introduction to Mixed Methods Research*, SAGE publications, 2021.

[61]M. Warschauer, "Dissecting the 'Digital Divide': A Case Study in Egypt," *The Information Society*, 19(4), (2003), pp. 297–304.

[62]P. M. Solovei, *Reaching a Wider Audience: Strategies for Empowerment and Inclusivity*, ed. by Springer Publishing, 2022.

CONCLUSION

The findings of this study affirm that the implementation of digital applications for community empowerment in the villages of Ulubelu Subdistrict, Tanggamus Regency, still faces significant challenges, particularly related to infrastructure constraints, limited network signal access, and digital literacy gaps. Difficult road infrastructure and weak signal availability in villages such as Sinar Banten, Rejosari, Ulu Semong, and Petay Kayu hinder the optimization of digital applications like SID (Village Information System), SIKS-NG (Next-Generation Social Welfare Information System), and village development planning applications. Moreover, the lack of technical training for village officials and the community has slowed the adoption of technology at the local level.

On the other hand, this study also identifies the substantial potential of digital applications to enhance transparency, efficiency, and information accessibility when supported by digital literacy training and improvements in technological infrastructure. An inclusive approach involving all stakeholders, including local communities, village officials, and regional governments, is essential to address these challenges.

Thus, this research not only provides an in-depth understanding of the challenges and opportunities in implementing digital applications in rural areas but also offers strategic recommendations to advance technology-based community empowerment in remote regions. These findings are expected to serve as a reference for policymakers and practitioners in designing more effective interventions to support digitalization and community empowerment in the future.

Recommendations for future research include expanding the analysis to examine variables that influence the success of digital application implementation in community empowerment in rural areas. Subsequent studies could delve deeper into the relationship between community digital literacy levels and technology adoption, as well as its impact on improving economic and social well-being.

Additionally, there is a need to explore the influence of institutional support, such as regional government policies and the role of the private sector, in providing more inclusive digital infrastructure. Other relevant variables include the sustainability of digital training programs, assessing the effectiveness of continuous training methods for diverse age groups and educational backgrounds.

Future research could also investigate multi-stakeholder collaboration approaches, involving governments, private entities, academia, and local communities, to create digital solutions that are more adaptive to the specific needs of rural communities. Hence, follow-up studies are expected to provide more holistic and strategic insights to support inclusive digital transformation in rural areas.

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