Proceeding of The Third Annual International Competition on Scientific Writing (ACSciting)
Volume 3 No 2026, E-ISSN 3048-0167

Information Systems to Support An Inclusive Digital Society

[1]Zaky Mirzaimtiyaz Alamgir, [2]Umar, [3]Nada Nadhifah

[1,2,3]Faculty of Science and Informatics, Universitas Pertiba

*Corresponding Author:

zakymirza0305@gmail.com

Abstract

The rapid growth of digital technologies has accelerated the development of digital societies, yet inclusivity remains a significant challenge. This study aims to explore how information systems can support an inclusive digital society by accommodating diverse user needs and capabilities. A qualitative approach was employed through in-depth interviews, observation, and document analysis involving users with varying levels of digital literacy. The findings reveal that digital inclusion is not solely determined by system availability, but by the ability of systems to support user diversity, provide inclusive interaction design, and be complemented by social support mechanisms. The study identifies that many users experience hidden exclusion, where systems are accessible but difficult to understand or use effectively. Furthermore, digital inclusion is found to be a layered process consisting of access, understanding, usage, and benefit stages. This research proposes a conceptual model linking user diversity, inclusive system design, and support ecosystems to the achievement of inclusive digital society outcomes. The findings contribute to a human-centered perspective on digital transformation, emphasizing inclusivity as a key determinant of sustainable digital development.

Keywords: *digital inclusion, information systems, inclusive design, user diversity, digital society*

1. INTRODUCTION

The rapid growth of digital technologies has accelerated the emergence of digital societies, where information systems mediate how people access services, communicate, and participate in social and economic activities. Governments and organizations increasingly rely on digital platforms to deliver services efficiently and at scale. However, the expansion of digital systems does not automatically ensure that all members of society can access and benefit from these services.

An inclusive digital society is characterized not only by the availability of digital infrastructure, but also by the ability of individuals with diverse backgrounds, abilities, and levels of digital literacy to meaningfully engage with digital systems. In practice, many information systems are designed based on assumptions about a "typical user," often overlooking variations in age, education, cognitive ability, and prior digital experience. As a result, certain groups, such as older adults or individuals with limited digital skills, face difficulties in understanding and using digital platforms, even when access is technically available (Mergel et al., 2019).

This condition leads to what can be described as hidden exclusion, where systems are accessible in principle but remain unusable in practice for specific user groups. Unlike

traditional forms of digital divide that focus on access to devices or internet connectivity, hidden exclusion highlights challenges related to usability, comprehension, and interaction. Therefore, digital inclusion must be understood as a broader concept that encompasses not only access but also the ability to understand, use, and benefit from digital systems.

Previous studies on information systems have primarily focused on system performance, efficiency, and user adoption. The DeLone and McLean IS Success Model emphasizes system quality, information quality, and service quality as determinants of success. Similarly, the Technology Acceptance Model explains that perceived usefulness and ease of use influence user adoption. While these models provide important insights, they largely assume a relatively homogeneous user base and do not fully account for diverse user capabilities and contextual differences.

From a human-centered perspective, digital inclusion is a layered process that involves several stages: access, understanding, usage, and benefit. Users may successfully reach a system (access), but fail to comprehend its functions (understanding), or struggle to complete tasks (usage), which ultimately prevents them from gaining meaningful outcomes (benefit). This layered perspective highlights that inclusion is not a binary condition, but a continuum shaped by user-system interaction.

Furthermore, achieving digital inclusion requires more than system design alone. It depends on the presence of a support ecosystem, including social assistance, institutional support, and learning opportunities. Users often rely on family members, community networks, or service staff to navigate digital platforms, indicating that inclusion is a socially mediated process rather than an individual capability.

Despite the growing recognition of digital inclusion, there is limited research that explores how information systems can be designed and implemented to accommodate user diversity in real-world contexts, particularly at the local level. Most existing studies rely on quantitative metrics and overlook the experiential dimensions of system use. This study addresses this gap by adopting a qualitative approach to examine how information systems support or hinder inclusion within a digital society.

Specifically, this research focuses on three key dimensions: user diversity accommodation, inclusive interaction design, and support ecosystems. By analyzing these dimensions, the study aims to provide a human centered understanding of digital inclusion and propose a conceptual framework that links system design, user capability, and social support to inclusive digital outcomes.

2. METHOD

This study employs a qualitative research approach with a human-centered case study design to examine how information systems support an inclusive digital society. The approach is chosen to capture the lived experiences of diverse users and to understand how different user characteristics influence interaction with digital systems.

Research Design

The study adopts an exploratory case study design focusing on the use of digital public service platforms in Pangkalpinang City. This design enables an in-depth examination of how information system accommodate user diversity and how inclusion experienced in real-world.

A human-centered perspective is applied, emphasizing:

- User diversity (age, education, digital literacy)
- Interaction experience (ease of understanding and use)
- Social context (support from family, community, and institutions

Data Collection

Data were collected using three complementary techniques to ensure triangulation:

In-depth Interviews

Semi-structured interviews were conducted to explore user experiences across different levels of digital capability. Questions focused on access, understanding, usage, and perceived benefits of digital systems.

Observation

Direct observation was carried out to examine how users interact with digital platforms in practice. This includes:

- Navigation behavior
- Difficulties encountered during system use
- Dependence on assistance

Document Analysis

Relevant documents such as system guidelines, user manuals, and policy reports were analyzed to understand the intended design and implementation of digital systems.

Informants Selection

Informants were selected using purposive sampling to ensure diversity of perspectives. The selection criteria include variation in:

- Age (young users vs. older adults)
- Digital literacy level (high vs. low)
- Experience with digital services

The participants include:

- General users of digital public services
- Individuals with limited digital skills
- Public service staff and system administrators

A total of 6–10 informants were involved to capture a wide range of user experiences

Analytical Framework

This study adopts a layered inclusion framework to guide data analysis, consisting of four stages:

- Access → Ability to reach and open the system
- Understanding → Ability to comprehend system functions and instructions
- Usage → Ability to operate the system effectively

- Benefit → Ability to gain meaningful outcomes from system use

This framework allows the study to identify at which stage users experience barriers to inclusion

Scope and Limitations

This study focuses on the human-centered aspects of digital inclusion within local digital public services. The findings are context-specific and may not be directly generalizable. However, the insights provide valuable implications for designing inclusive information systems in similar contexts.

3. RESULTS AND DISCUSSION

This study reveals that the effectiveness of information systems in supporting an inclusive digital society depends on how well systems accommodate diverse user needs and enable meaningful interaction. Based on thematic analysis, four interrelated themes emerge: hidden exclusion, inclusive interaction pathways, assisted usage, and layered inclusion outcomes. These findings are derived from triangulated data sources, including interviews, observations, and document analysis.

Hidden Exclusion in Digital Systems

One of the most critical findings is the presence of hidden exclusion, where users technically have access to digital systems but are unable to use them effectively. This phenomenon is not immediately visible in system usage statistics but becomes evident through user experiences.

“I can open the system, but I don’t know what to do next.” (Informant 4)

“I tried to use it, but I was afraid of making mistakes.” (Informant 6)

Observation shows that many users struggle at early interaction stages, such as:

- Understanding menu structures
- Interpreting instructions
- Completing multi-step processes

This indicates that access does not guarantee inclusion. While systems are available, they are not always usable across different user groups.

Unlike traditional digital divide concepts, hidden exclusion highlights cognitive and experiential barriers, not just physical access limitations.

Inclusive Interaction Pathways

The second key finding emphasizes the importance of interaction pathways, referring to how users move through a system to complete tasks.

“If the steps were simpler, more people could use it easily.” (Informant 2)

Observation reveals two contrasting patterns:

- Linear interaction pathways (step-by-step guidance) → easier for low-literacy users
- Complex navigation pathways → only manageable for experienced users

Inclusive systems tend to:

- Provide guided steps
- Use simple language
- Include visual cues (icons, prompts)

This suggests that inclusivity depends on how systems guide user behavior, not just how features are designed.

From a theoretical perspective, this extends beyond the Technology Acceptance Model, as ease of use must be complemented by ease of understanding and navigation flow.

Assisted Usage and Support Ecosystem

Another important finding is that many users rely on external assistance to use digital systems. This indicates that inclusion is not purely individual but socially mediated.

"I usually ask my child to help me use the system." (Informant 5)

"People come to the office just to ask how to use the online system." (Informant 7)

Observation confirms the existence of informal and formal support mechanisms:

- Family assistance
- Community support
- Help desks or service staff

Table 1. Support Mechanisms for Digital Inclusion

Support Type	Source	Function
Informal Support	Family/community	Helps users navigate systems
Institutional Support	Staff/help desk	Provides guidance and assistance
Self-learning	Trial and error	Builds gradual understanding

Source: Research Data (2026)

These findings demonstrate that digital inclusion is co-produced, involving both systems and social environments.

Layered Inclusion Outcomes

The study identifies digital inclusion as a multi-stage process, where users may succeed at some stages but fail at others.

Table 2. Layered Inclusion Process

Stage	Description	Common Barrier
Access	Ability to reach the system	Device/internet limitations
Understanding	Ability to comprehend system	Complex instructions

Usage	Ability to operate system	Navigation difficulty
Benefit	Ability to gain outcomes	Incomplete task execution

Source: Adapted from Research Findings (2026)

Many users reach the access stage, but fewer reach the benefit stage, indicating partial inclusion.

"I can log in, but I still don't understand how to complete the process." (Informant 3)

This layered perspective shows that inclusion must be evaluated beyond access metrics.

Integrated Human-Centered Model

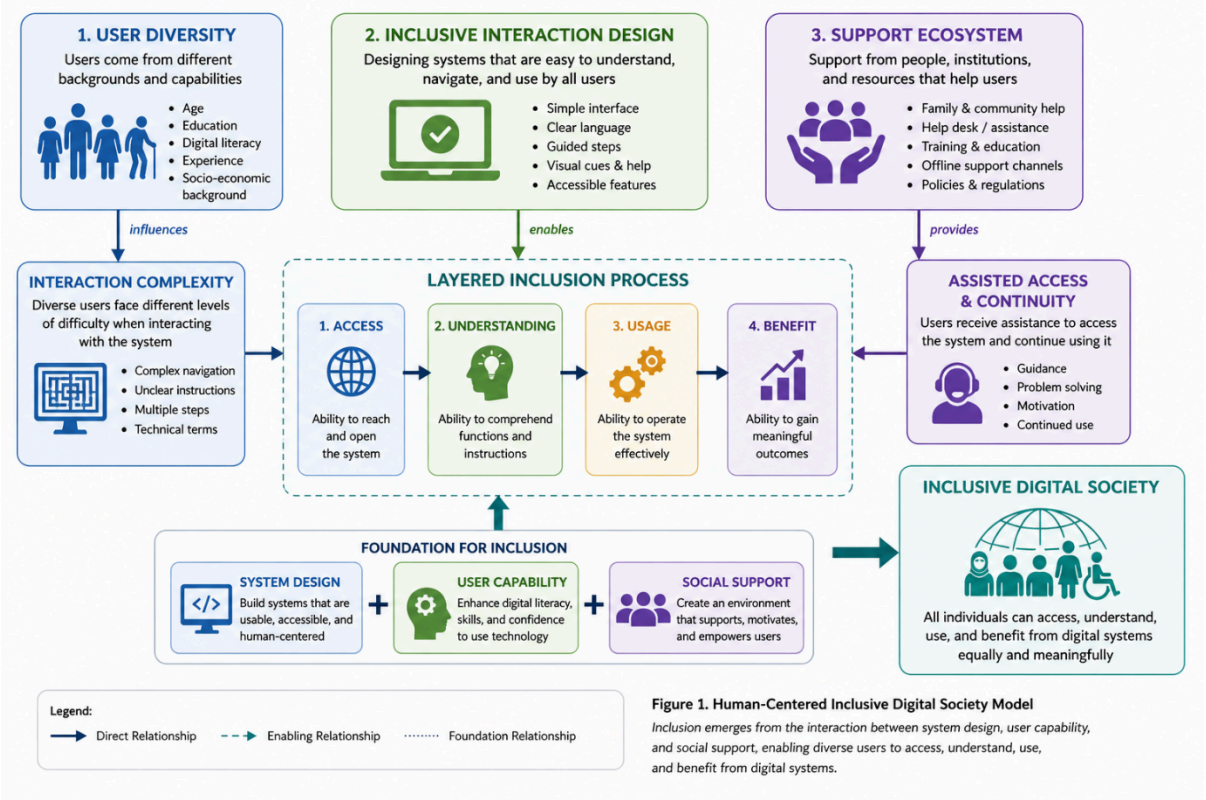

Figure 1. Human-Centered Inclusive Digital Society Model

The findings suggest the following relationships:

- User Diversity → Interaction Complexity
- Inclusive Interaction Design → Understanding & Usage
- Support Ecosystem → Assisted Access & Continuity
- Combined Effect → Inclusive Digital Society

This model highlights that inclusion emerges from the interaction between:

- System design
- User capability

- Social support

Critical Discussion and Contribution

The findings challenge the dominant assumption that digital transformation automatically leads to inclusivity. Most existing studies emphasize system adoption and performance, often overlooking user diversity and lived experiences.

This study shows that:

- Inclusion is not achieved through access alone
- Systems can unintentionally exclude users through design complexity
- Social support plays a crucial role in enabling system use

Unlike prior research, this study introduces:

- Hidden exclusion as a key concept
- Layered inclusion framework for evaluating digital access
- Support ecosystem perspective in system utilization

These contributions provide a human-centered understanding of digital transformation, particularly relevant for local contexts where user capabilities vary significantly

4. CONCLUSION

This study confirms that the role of information systems in supporting an inclusive digital society extends beyond technological deployment. Inclusion is shaped by how systems accommodate user diversity, enable meaningful interaction, and are supported by social and institutional mechanisms. The findings demonstrate that digital inclusion is not a binary outcome but a layered process involving access, understanding, usage, and benefit.

From a policy perspective, the results highlight several critical implications. First, governments must shift from a technology-centric approach to a human-centered digital strategy that prioritizes inclusivity in system design. This includes simplifying interfaces, using clear language, and embedding guided interaction features to accommodate users with varying levels of digital literacy. Second, digital inclusion policies must address not only infrastructure gaps but also capability gaps, through continuous digital literacy programs and targeted support for vulnerable groups. Third, the study emphasizes the importance of integrated support ecosystems, where digital services are complemented by offline assistance, community support, and institutional responsiveness. Without these elements, digital systems risk creating hidden exclusion despite being widely accessible.

Furthermore, this study underscores the need for adaptive governance frameworks that continuously evaluate and improve digital systems based on user experience. Policymakers should establish feedback-driven mechanisms, ensuring that digital platforms evolve in response to real user needs rather than static technical standards.

In conclusion, achieving an inclusive digital society requires the alignment of system design, user capability, and social support. Digital transformation must be evaluated not only by efficiency gains but by its ability to deliver equitable and meaningful outcomes for all users. Without deliberate efforts to embed inclusivity, digital systems may unintentionally

reinforce existing inequalities. Therefore, the future of digital transformation lies in its capacity to place humans at the center, ensuring that no user is excluded from the benefits of a digital society.

ACKNOWLEDGMENTS

The author would like to express sincere gratitude to Universitas Pertiba for providing academic support and research facilities. The author also extends appreciation to all informants, including community members, public service officers, and system administrators, who generously shared their experiences and insights. Their valuable contributions made it possible to gain a deeper understanding of how information systems support an inclusive digital society. Special thanks are also given to colleagues and peers who provided constructive feedback throughout the research process.

References

Vial, G. (2019). Understanding digital transformation: A review and a research agenda. Journal of Strategic Information Systems, 28(2), 118–144. https://doi.org/10.1016/j.jsis.2019.01.003

Mergel, I., Edelmann, N., & Haug, N. (2019). Defining digital transformation: Results from expert interviews. Government Information Quarterly, 36(4), 101385. https://doi.org/10.1016/j.giq.2019.06.002

Verhoef, P. C., Broekhuizen, T., Bart, Y., Bhattacharya, A., Dong, J. Q., Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. Journal of Business Research, 122, 889–901. https://doi.org/10.1016/j.jbusres.2019.09.022

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Walton, P., & Williams, M. D. (2021). Artificial intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. International Journal of Information Management, 57, 101994. https://doi.org/10.1016/j.ijinfomgt.2019.08.002

Alvarenga, A., Matos, F., Godina, R., & Matias, J. C. O. (2020). Digital transformation and knowledge management in the public sector. Government Information Quarterly, 37(3), 101498. https://doi.org/10.1016/j.giq.2020.101498

Heeks, R., & Shekhar, S. (2019). Datafication, development and marginalised communities: The case of digital inclusion. Information Systems Journal, 29(6), 1232–1253. https://doi.org/10.1111/isj.12238

van Dijk, J. (2020). The digital divide. Polity Press.