

Mapping E-Readiness Dimensions for Digital Village Development: A Systematic Literature and Bibliometric Review

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Abstract. Digital village development is a key strategy for narrowing the digital gap between rural and urban areas, yet research on e-readiness in this context remains fragmented and predominantly shaped by technical perspectives. This study maps e-readiness dimensions, identifies research trends, and uncovers research gaps in digital villages scholarship. A Systematic Literature Review (SLR) following the PRISMA 2020 framework was conducted on 55 articles published between 2020 and 2026, combining thematic synthesis with an author-keyword co-occurrence bibliometric analysis using VOSviewer. Five principal dimensions of e-readiness were identified: infrastructure and technology, human resources and digital literacy, social and cultural factors, governance and policy, and psychological and individual dimensions. The infrastructure and technology dimension remains the most dominant, reflecting a persistent technical bias not yet matched by attention to social, governance, and psychological readiness factors. Bibliometric analysis shows the research theme continues to be dominated by keywords such as digital transformation, digitalization, digital readiness, and smart village, while social aspects, governance, citizen participation, psychological factors, and rural development outcomes remain relatively underexplored. This research offers a multidimensional mapping of e-readiness for digital village development, framed using a socio-technical readiness perspective as a conceptual synthesis that requires further empirical validation.

Keywords: e-readiness, digital village, smart village, systematic literature review, bibliometric analysis.

1. INTRODUCTION

Although governments and international agencies have made substantial financial and political investments in rural digitization over the past decade, failure rates remain high. This outcome is primarily attributed to implementation strategies that treat rural communities as passive replicas of urban areas, adopting digital solutions designed for cities rather than addressing the unique social structures, institutional capabilities, and adoption patterns characteristic of village life [1], [2], [3]. Digital transformation serves as a strategic tool to expand access to services, strengthen local economies, and reduce the development gap between rural and urban regions. Within digital development, rural areas are increasingly viewed not only as recipients of infrastructure but also as active spaces for development that integrate connectivity, digital public services, local economic innovation, and community engagement. Consequently, the concept of the digital village, or smart village, has emerged as a rural development strategy that leverages digital technology to facilitate governance, service delivery, and citizen empowerment [4], [5], [6], [7].

For clarity, the following working definitions, grounded in the reviewed literature, are adopted. E-readiness refers to the overall preparedness of an individual, organization, or region to adopt, use, and benefit from information and communication technology, encompassing infrastructural, human, organizational, and policy aspects [8], [9]. Digital readiness and ICT readiness are considered near synonymous variants of e-readiness, used interchangeably across the reviewed literature and normalized accordingly in the bibliometric analysis (see Section 2.4). The term Smart village refers to a rural development model that emphasizes technology enabled service delivery, sensor or platform based infrastructure, and efficiency oriented governance [1], [7]. In contrast, digital village denotes the broader process of rural digital transformation, including governance, local economy, public service delivery, and community participation [4]–[6]. In this review, digital village and smart village are treated as related but conceptually distinct terms, smart village is used only where the source studies explicitly employ that label, while digital village is used as the umbrella term for the phenomenon under study.

The success of digital transformation is significantly influenced by a region's level of e-readiness, or its internal digital readiness. The literature indicates that e-readiness

encompasses not only the availability of devices and networks but also human resource capacity, governance, institutional support, and users' ability to effectively adopt and utilize digital technology [8], [3], [10]. In rural contexts, e-readiness should therefore be conceptualized as a multidimensional construct that integrates technological, organizational, social, and policy aspects [4], [8], [11].

A number of studies in rural areas show that digital village development cannot rely solely on connectivity. A study of digital inclusion in two villages in Indonesia shows that the dimensions of access and use are developing faster than digital skills and the supporting environment [3]. At the village government level, adoption of a cloud-based village information system is influenced by technology readiness, management support, security, compatibility, and vendor support [10]. Meanwhile, studies on digital participation in rural areas and e-government adoption emphasize the importance of civic engagement, trust, perceived usefulness, perceived ease of use, and accessibility in the acceptance of digital services [11], [12].

However, literature specifically linking e-readiness to digital village development remains scattered across various contexts and, compared with reviews such as Muhtar et al.[1] and Yusof et al. [6], remains comparatively fragmented rather than integrated into a comprehensive synthesis. Some studies still use a smart city or smart region lens to explain the readiness of non-urban areas [9], [13], while others focus on community readiness in general, without specifically mapping the configuration of e-readiness dimensions in digital villages[10]. As a result, discussions of e-readiness in digital villages still tend to be dominated by infrastructure and early technology adoption, while social dimensions, governance, and individual readiness have not been mapped in proportion [8], [12], [13]. This distinction is significant because a smart-city lens presupposes conditions largely absent in village settings, such as dedicated municipal IT personnel, formalized service-delivery channels, and individualistic, transaction-based adoption behavior. In contrast, villages are characterized by collective decision making processes, informal and personalized trust networks, and local governance that operates within significant resource constraints. Applying an urban derived analytical framework without critical evaluation may lead to the misidentification of the key readiness factors that determine the success or failure of digital village initiatives[1], [2].

To address these gaps, the present study maps the dimensions of e-readiness in digital villages through a Systematic Literature Review (SLR) of 55 articles published between 2020 and 2026. The research integrates thematic and bibliometric analyses to identify key dimensions, publication trends, and research gaps in e-readiness and digital village scholarship. The primary contribution is a multidimensional and contextually appropriate mapping of rural digital transformation, which serves as a conceptual foundation for developing a socio-technical readiness model in village settings.

The 2020–2026 period was chosen to encompass the post-pandemic acceleration of rural digitalization programs globally and to ensure inclusion of the most recent literature available as of January 2026. In this context, “digital village development” refers specifically to village level digital transformation initiatives, such as digital village indices, smart village programs, village information systems, and rural e-government platforms. Studies focused on general rural digitalization or smart city readiness were included only if their findings were explicitly transferable to, or directly addressed, the village level context (see inclusion/exclusion criteria in Section 2.2). To situate digital village e-readiness relative to adjacent constructs, Table 1 contrasts smart-city readiness, general rural digital readiness, and digital village e-readiness as conceptualized in the reviewed literature.

Table 1. Comparison of Smart-City Readiness, Rural Digital Readiness, and Digital Village E-Readiness

Aspect	Smart-City Readiness	General Rural Digital Readiness	Digital Village E-Readiness
Primary actor/scale	City/municipal government and dedicated IT units	Regional or provincial-level digital programs	Village government, community, and local institutions
Governance style	Formalized, centralized service-delivery channels	Mixed formal/informal, resource-constrained	Collective, informal, trust-based decision-making [1],[2]
Primary focus	Sensor networks, e-services, urban infrastructure	Broad rural connectivity and access	Village information systems, digital literacy, local participation [5]–[7],[9]

Aspect	Smart-City Readiness	General Rural Digital Readiness	Digital Village E- Readiness
Key limitation when applied to villages	Assumes dedicated IT personnel and individualistic, transaction-based adoption	Often technology- centric, under- specifies governance/social factors	Requires socio- technical framing integrating technical, social, governance, and psychological dimensions

Accordingly, the research questions guiding this study are as follows: (1) What dimensions of e-readiness have been identified in research related to digital villages? (2) How has the conceptual structure and thematic evolution of e-readiness in digital village scholarship developed over time? (3) What research gaps can be identified from the literature regarding e-readiness and digital villages?

The key contributions of this study are summarized as follows:

1. This study provides one of the few integrated mappings of e-readiness dimensions specific to digital villages, combining thematic synthesis with bibliometric (VOSviewer) analysis of 55 studies published between 2020 and 2026. Unlike prior bibliometric reviews of smart or digital villages (e.g., Muhtar et al. [1]; Yusof et al. [9]), it jointly applies thematic coding and keyword co-occurrence analysis.
- 2) The study offers review evidence demonstrating a persistent technical bias in the literature, characterized by a disproportionate emphasis on infrastructure and technology dimensions relative to social, governance, and psychological readiness dimensions.
- 3) The study articulates a structured research gap agenda focused on five e-readiness dimensions, offering concrete directions for future research and establishing a conceptual foundation for a socio-technical readiness model to inform both future empirical research and policy design for sustainable rural digital transformation.

2. METHODS

A Systematic Literature Review (SLR) approach was utilized to identify, evaluate, and synthesize research concerning e-readiness within the context of digital villages. The SLR method was chosen due to its capacity to provide systematic and transparent literature mapping, as well as to facilitate the identification of research trends and gaps in emerging topics. The SLR implementation in this study adheres to the Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA 2020) framework, which encompasses the stages of identification, screening, eligibility, and article inclusion[14]. Bibliometric analysis was performed using VOSviewer, a software package designed to construct and visualize bibliometric networks, including keyword co-occurrence networks [15].

2.1. Search Strategy

The literature search was conducted across several academic databases, including Scopus, ProQuest, IEEE Xplore, ScienceDirect, and Google Scholar. The search was executed in January 2026. Search keywords are compiled using a combination of Boolean operators to obtain articles that are relevant to the research topic. A two-tier keyword strategy was applied in each database: an initial broad search combining readiness-related terms (e.g., "readiness," "e-readiness," "digital readiness," "ICT readiness," "technology readiness") with rural/village-related terms (e.g., "rural," "smart village," "digital village," "village") and implementation-related terms (e.g., "framework," "model," "assessment," "adoption"), followed by a narrower second-tier search restricting the rural/village terms to more specific phrases (e.g., "rural ICT," "rural digital transformation") to improve precision. The search was applied to the title, abstract, and keyword fields across all databases. Search strings used include: ("e-readiness" OR "digital readiness" OR "ICT readiness") AND ("digital village" OR "smart village" OR "rural digitalization"). The search targeted articles published between 2020 and 2026 to capture the most recent research developments on e-readiness and rural digital transformation. The search criteria included only articles written in English to maintain consistency in indexing and citation metadata across the selected international databases. Notably, although Indonesia serves as a key geographic context for digital village development in this review, all 55 included studies were ultimately published in English, including several authored by Indonesian researchers in internationally indexed journals and conference proceedings. All retrieved

articles were exported in RIS and CSV formats via Mendeley Reference Manager to enable efficient reference management and bibliometric analysis. Because bibliographic database indices are continuously updated as new content is indexed, database specific record counts captured at a single point in time are not treated as fixed, independently reproducible figures in this review; accordingly, the aggregate number of records identified across all databases (Section 2.2) is reported as the primary transparency metric, consistent with PRISMA 2020 guidance on reporting the overall identification total.

2.2. Inclusion and Exclusion Criteria

The article selection process applied specific inclusion and exclusion criteria to ensure that the literature aligned with the research objectives. These criteria are detailed in Table 2. Following this initial screening, a quality appraisal was performed on the 55 articles that met the eligibility requirements. Quality assessment was based on two primary criteria. First, priority was given to articles published in peer reviewed journals and indexed conference proceedings, preferably those indexed in Scopus. Second, methodological clarity was required, with each article providing a clear description of its research design, data collection methods, or analytical framework relevant to e-readiness or digital readiness. Articles satisfying both criteria were retained, while those consisting solely of opinion pieces or practitioner reports lacking empirical or systematic foundations were excluded.

Table 2. Inclusion and exclusion criteria

Criteria	Inclusion	Exclusion
Publication type	Journal articles and conference papers	Editorials, book reviews, notes
Language	English	Non-English
Topic	E-readiness and digital village	Unrelated topics
Publication year	2020–2026	Before 2020
Accessibility	Full-text available	Incomplete documents

The selection process commenced with a review of titles and abstracts, which was subsequently followed by full-text screening. Duplicate articles across multiple databases were removed during the initial selection stage. Title and abstract screening, and the subsequent full-text screening, were conducted by the first author; the resulting set of included and excluded articles was then independently re-checked by the second and third authors against the inclusion and exclusion criteria in Table 2, with any discrepancies resolved through discussion until consensus was reached.

2.3. Study Selection Process

The article selection process followed the PRISMA stages, which include identification, screening, eligibility, and inclusion. During the identification stage, 312 articles were retrieved from various academic databases. After removing duplicates, 264 articles remained for screening based on titles and abstracts. Subsequently, 107 articles underwent full-text screening. Ultimately, 55 articles met the inclusion criteria and were incorporated into the study. Because the search was conducted in January 2026, publication counts for 2026 are necessarily incomplete and should not be interpreted as a declining trend.

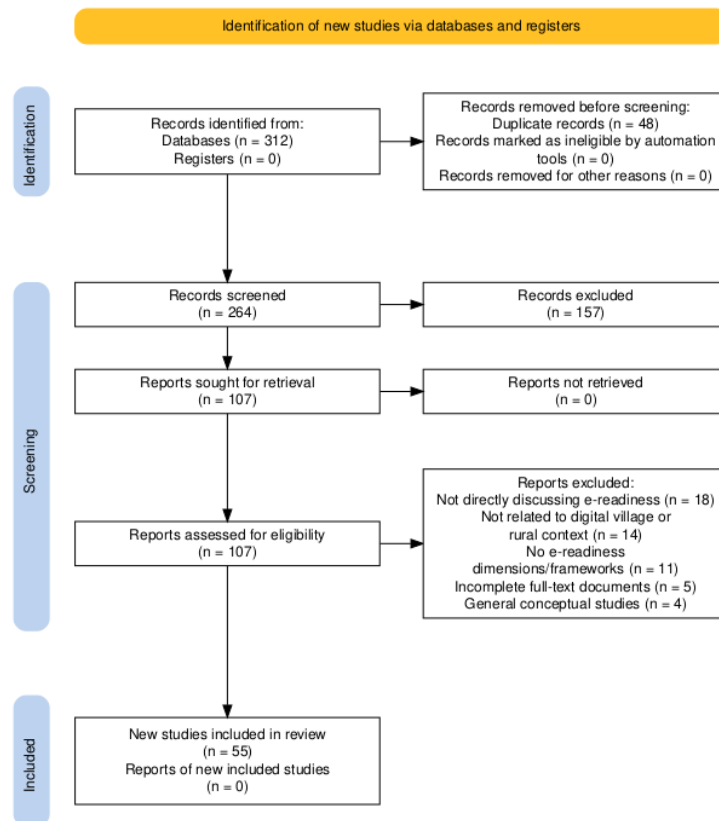


Figure 1. PRISMA Flow diagram

According to the PRISMA diagram in Figure 1, most articles were excluded during the screening stage because they were not relevant to e-readiness and digital village contexts. Additionally, several articles were excluded at the eligibility stage because they did not present digital readiness dimensions or frameworks aligned with the research focus. Reasons and corresponding counts for exclusion at each PRISMA stage including screening exclusions ($n = 157$) and five categories of eligibility stage exclusions (not directly discussing e-readiness, $n = 18$; not related to digital village or rural context, $n = 14$; no e-readiness dimensions/frameworks, $n = 11$; incomplete full-text documents, $n = 5$; general conceptual studies, $n = 4$) are reported in the PRISMA flow diagram (Figure 1).

2.4. Data Analysis

Two analytical approaches were employed: thematic analysis and bibliometric analysis. A thematic analysis was conducted to identify and categorize e-readiness dimensions within the selected articles. The coding process relied on primary themes emerging from the literature, which were then organized into five principal dimensions: (1) infrastructure and technology, (2) human resources and digital literacy, (3) social and cultural, (4) governance and policy, and (5) psychological and individual dimensions. The first author coded each of the 55 included studies through direct examination of the full text, and the resulting classifications were verified by the second and third authors. Any discrepancies were addressed through discussion until consensus was achieved.

Additionally, a bibliometric analysis was conducted using VOSviewer to map relationships among keywords (keyword co-occurrence) and research trends. Bibliographic data exported in RIS format were analyzed using co-occurrence analysis, with author keywords as the unit of analysis. The data cleaning process utilized a thesaurus file to merge terms with similar meanings, such as "e-readiness" and "digital readiness." For example, variant terms such as "digital readiness" and "electronic readiness" were consolidated under the canonical term "e-readiness"; similarly, "smart villages", "digital villages", and "village digitalization" were merged under "smart village" or "digital village"; and abbreviated forms such as "TAM" and "TRI" were mapped to their full conceptual terms "technology acceptance" and "technology readiness" respectively. Additionally, overly broad terms such as "review", "framework", and "model" were suppressed from the network to reduce noise and keep the co-occurrence map focused on substantive topical keywords. This normalization process reduced terminological noise and consolidated

conceptually equivalent keywords into single nodes in the co-occurrence network, improving the accuracy and interpretability of the resulting visualization. The results were presented using a keyword network, which facilitated the identification of dominant themes and relationships among research topics.

2.5. Research Framework

In summary, the research process commenced with literature identification, followed by article selection according to predefined inclusion and exclusion criteria, data extraction, thematic analysis, and bibliometric analysis. Findings from these two approaches informed the mapping of e-readiness dimensions and facilitated the identification of research gaps in digital village studies.

3. RESULTS AND DISCUSSION

3.1. Publication Trends

Recent research on e-readiness and digital villages has advanced considerably. Utilizing the PRISMA approach for literature selection, this study identified 55 articles as the final dataset. These articles include international journals and conference proceedings that focus on rural digital transformation, smart villages, digital readiness, and the implementation of digital technology in rural contexts.

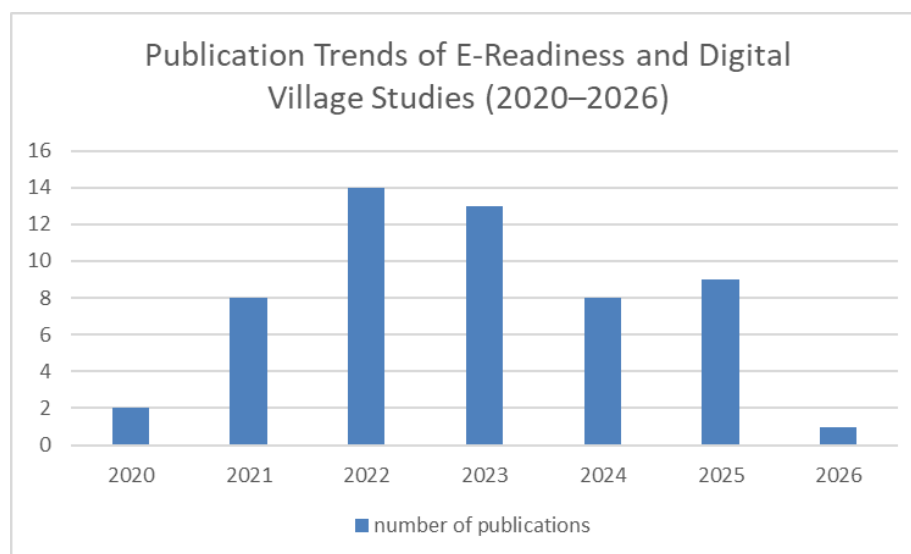


Figure 2. Publication trends of e-readiness and digital village studies from 2020 to 2026

Figure 2 shows that the number of publications on e-readiness and digital villages has increased since 2021. This trend indicates growing scholarly interest in rural digital transformation and the development of digital villages. The expanding research literature also suggests a shift in focus from urban digital transformation to rural contexts, with particular attention to community digital readiness and technology-based village governance. To give a more detailed description of the studies included, Table 3 summarizes their geographic distribution and Table 4 shows their document type/quartile composition.

Table 3. Geographic / Contextual Distribution of the 55 Included Studies

Region / Context	Number of Studies (%)
Indonesia	19 (34.5%)
Other Asia	15 (27.3%)
Global / multi-country	9 (16.4%)
Europe	6 (10.9%)
Other/Unspecified	2 (3.6%)
Latin America	2 (3.6%)
Africa	2 (3.6%)

Table 4. Document Type and Journal Quartile Distribution of the 55 Included Studies

Document Type	Number of Studies (%)
Journal	32 (58.2%)
Conference	18 (32.7%)
Not specified	4 (7.3%)
Methodological guidelines	1 (1.8%)
Journal Quartile (SJR, self-reported)	Number of Studies (%)
Not indexed / N/A	28 (50.9%)
Q1	18 (32.7%)
Q2	5 (9.1%)
Q3	4 (7.3%)

Indonesia has the highest proportion of studies in the dataset (19 out of 55, or 34.5%), then comes the other Asian countries (15 studies, 27.3%), and after that those with a

global or multi-country focus (9 studies, 16.4%); Europe, Latin America, and Africa each have a smaller number of studies. With regard to the type of publication, journal articles make up the largest number (32 out of 55, or 58.2%), followed by conference proceedings (18 out of 55, or 32.7%), while the rest consist of a methodological guideline document and sources whose type could not be determined from the available metadata. Just 18 of the 55 studies (32.7%) were published in journals that had a confirmed Q1 quartile rating at the time of coding; in the case of the remaining studies, their quartile was either lower or not confirmed, and this is presented here as an extra measure of the literature's quality together with the evaluation criteria in Section 2.2.

3.2. Thematic Analysis of E-Readiness Dimensions

A thematic analysis was undertaken to identify the principal dimensions of e-readiness within the literature on digital villages. The synthesis process employed indicator-based elements and prioritized analytical discussion. Research on e-readiness in the context of digital villages can be categorized into five primary dimensions: infrastructure and technology, human resources and digital literacy, social and cultural factors, governance and policy, and psychological and individual aspects. Table 5 presents a summary of the thematic analysis results.

Table 5. Main Dimensions of E-Readiness in Digital Village Studies

Dimension	Main Indicators	Dominant Themes Identified in Literature
Infrastructure and Technology	Internet access, ICT infrastructure, digital platforms, connectivity	Technological readiness and digital infrastructure remain the dominant focus in digital village studies
Human Resources and Digital Literacy	Digital skills, digital literacy, training, perceived ease of use	Studies emphasize community capability and digital literacy readiness
Social and Cultural	Participation, trust, social influence, community engagement	Community participation and social acceptance influence digital adoption
Governance and Policy	Leadership, regulation, governance, institutional support	Digital governance and policy support are important for implementation sustainability

Dimension	Main Indicators	Dominant Themes Identified in Literature
Psychological and Individual	Optimism, insecurity, discomfort, technology acceptance	Individual readiness and psychological acceptance affect technology adoption

Table 6 presents the number of the 55 included studies that discuss each dimension. Dimension assignment was determined through direct examination of the full text of each article and coding its content according to the five predefined e-readiness dimensions described in Section 2.4. Since individual studies often address multiple dimensions, the percentages exceed 100%.

Table 6. Number of Included Studies Addressing Each E-Readiness Dimension (n = 55)

E-Readiness Dimension	Number of Studies (%)
Infrastructure & Technology	42 (76.4%)
HR & Digital Literacy	35 (63.6%)
Social & Cultural	36 (65.5%)
Governance & Policy	36 (65.5%)
Psychological & Individual	29 (52.7%)

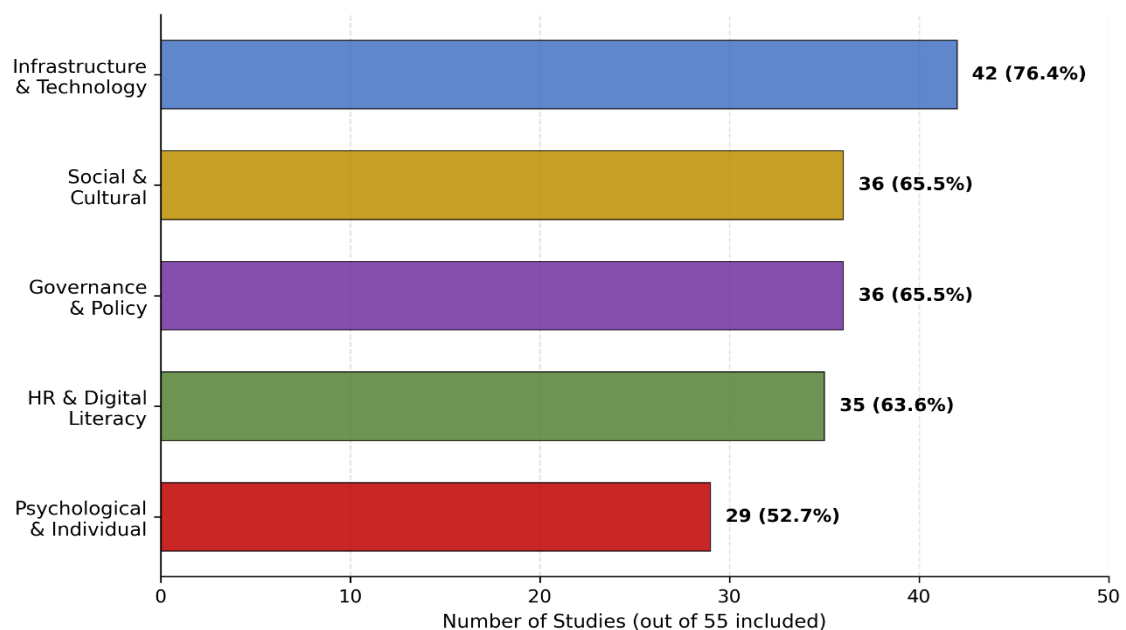


Figure 3. Frequency of the five e-readiness dimensions across the 55 included studies

3.2.1. Infrastructure and Technology

The infrastructure and technology dimension includes internet access, device availability, village information systems, digital platforms, interoperability, and technological support, all of which facilitate effective digital service delivery at the village level. In existing literature, this dimension is central to the development of the Digital Village Index in Indonesia, the ICT based smart village concept, the adoption of cloud-based village information systems, and the establishment of digital ecosystem based rural service platforms[5], [6], [7], [10], [16]. The synthesis demonstrates that connectivity, system availability, and the quality of communication infrastructure are the primary foundations of rural digital transformation.

Technical readiness should not be interpreted solely as the presence of networks and devices. Several studies indicate that system compatibility, security, vendor support, and operational sustainability are also essential for the successful implementation of digital services in villages[10], [17], [18]. Accordingly, this dimension should be conceptualized as digital infrastructure readiness that is operational, secure, and capable of supporting public services and local economic activities in a sustainable manner. The prominence of this dimension in the literature is partly due to the fact that infrastructure indicators are more easily operationalized and measured quantitatively than softer readiness factors. Metrics such as internet penetration rates, device ownership, and bandwidth availability facilitate the implementation of standardized surveys and indices, making them the default starting point for researchers designing e-readiness assessments. In contrast, dimensions such as psychological comfort, governance capacity, and social trust are inherently more challenging to capture with conventional quantitative instruments, which may account for their relative underrepresentation. This methodological bias has practical implications. Future research should move beyond measuring mere access to connectivity and instead assess meaningful utilization, specifically the extent to which villagers can leverage digital tools to achieve tangible improvements in livelihoods, governance, and social participation.

3.2.2. Human Resources and Digital Literacy

The human resources and digital literacy dimension refers to the ability of village officials and community members to access, understand, utilize, and effectively apply digital technology. Existing literature indicates that expanding digital access alone does not

guarantee improvements in digital skills, usage, or the capacity to leverage technology for economic development or public service delivery[3], [19], [20], [21]. Therefore, human resource readiness is a fundamental component of digital village development.

Numerous studies utilize technology acceptance models and inclusive adoption metrics to assess user readiness, drawing on constructs such as perceived usefulness, perceived ease of use, awareness, experience, affinity, and government support[19], [20], [22], [23]. The literature synthesis suggests that training, mentoring, and the enhancement of digital capabilities are essential for ensuring that technology use in villages progresses beyond basic access and evolves into productive, sustainable competencies.

3.2.3. Social and Cultural

The social and cultural dimension underscores the significance of community participation, trust, community support, social capital, and local characteristics in influencing technology adoption in rural areas. Existing literature indicates that the success of digital villages is strongly associated with individuals' willingness to engage with digital services, trust newly implemented systems, and incorporate technology into routine social practices[11], [12], [24], [25].

The synthesis indicates that the socio cultural dimension has been less emphasized compared to the technical dimension, despite evidence from studies on civic participation, community readiness, and community support for technology based village development demonstrating a substantial impact on the sustainability of digital transformation[11], [24], [25]. These findings suggest that the success of digital villages relies not only on technological readiness but also on the strength of social relations, trust, and local leadership that support technology adoption.

3.2.4. Governance and Policy

The governance and policy dimension encompasses leadership capacity, institutional readiness, policy support, financing, data governance, and the capacity of village or regional governments to guide digital transformation. Existing literature indicates that rural digital transformation depends on a well-defined governance framework, sustained policy support, and effective stakeholder coordination to prevent program implementation from stalling at the initial stage [4], [6], [8], [26], [27], [28].

Several studies indicate that the readiness of village government officials, infrastructure support, financial resources, and rural policy interventions influence the quality of public services and the sustainability of rural revitalization [18], [27], [28]. However, the synthesis also reveals that governance models in the literature remain fragmented, with some studies adopting frameworks from smart city or smart regency contexts [26], [13]. Therefore, there is a need for governance and policy-readiness indicators tailored to the village context.

3.2.5. Psychological and Individual Dimensions

The psychological and individual dimensions pertain to an individual's readiness to adopt technology, typically measured through constructs such as perceived usefulness, perceived ease of use, trust, social influence, optimism, innovativeness, discomfort, and insecurity [12], [19], [20], [22], [29]. The literature demonstrates that psychological factors directly influence the intention to use, accept, and sustain digital technology adoption among both citizens and officials.

In the context of digital villages, this dimension is prominent in studies on the adoption of e-government services, digital literacy, and digital tourism villages, which utilize the TAM, UTAUT, and TRI models to assess user readiness [12], [20], [22], [23], [29]. However, the synthesis indicates that discussions of this dimension remain sector-specific and are more frequently addressed in contexts such as tourism or government services. Consequently, psychological readiness has not been extensively examined across the broader village population in the digital village literature.

It is also useful to distinguish three related but conceptually separate constructs that are frequently conflated in the reviewed literature. Psychological readiness refers to an individual's affective and cognitive predisposition toward technology, constructs such as optimism, discomfort, insecurity, and trust, which shape a person's general willingness to engage with digital tools before any specific system is encountered. Digital literacy refers to an acquired, skills based capacity: the practical ability to operate devices, navigate applications, and troubleshoot basic problems. This capacity is typically developed through training and repeated use, rather than disposition alone. Technology acceptance, as defined in models such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT), occupies an intermediate position

between these constructs. It captures an individual's evaluative judgment of a specific system, such as perceived usefulness and perceived ease of use. Technology acceptance is shaped by both prior psychological readiness and existing digital literacy, but it is not reducible to either factor. In practice, these three constructs are often measured together or conflated in the reviewed studies, which limits precision in identifying whether attitudinal, skills based, or system specific readiness barriers are responsible for low adoption in a given context. Future village level instruments should measure these three constructs separately, as the appropriate intervention differs substantially. Psychological barriers may require trust building and community engagement, digital literacy gaps may necessitate skills training, and technology acceptance barriers may require system redesign or usability improvements specific to the digital service in question.

Furthermore, the reviewed dimensions and their relative priorities are unlikely to be consistent across village populations. Village officials, serving as institutional gatekeepers, typically prioritize governance and institutional readiness, including regulatory clarity, budget authority, and inter-agency coordination, as these factors directly influence whether digital initiatives receive sustained local mandate and financing[19], [27]. In contrast, households are more immediately constrained by infrastructure access and affordability; thus, their readiness is shaped primarily by device ownership, connectivity costs, and basic digital literacy rather than institutional capacity [3], [21]. Micro, small, and medium enterprises (MSMEs) and village-owned enterprises (BUMDes) represent a distinct group, with readiness oriented toward digital economic tools such as e-commerce platforms, digital payment systems, and market access applications. For these actors, psychological readiness is closely linked to the perceived usefulness of technology for income generation rather than general technology acceptance[12], [20]. Youth and other digitally native or vulnerable groups constitute another profile, often demonstrating higher baseline digital literacy but encountering unique psychological barriers related to trust, safety, and social norms governing technology use within more conservative community structures [19]–[21]. This actor level heterogeneity indicates that a single, undifferentiated e-readiness score may obscure significant within village disparities. Therefore, disaggregating e-readiness by actor group is identified as an important direction for future empirical research, such as through stratified survey sampling or actor specific readiness indices.

3.3. Cross-Dimensional Interactions

Although the five dimensions discussed above are presented separately for analytical clarity, existing literature indicates that they do not function independently. Rather, these dimensions exhibit potential interdependencies that may collectively shape the development of digital villages. However, these interaction effects were not statistically tested in this review and should be regarded as a conceptual proposition rather than an established finding. A consistently observed pattern is the impact of governance and policy on human resources. The implementation of structured local digital literacy programs, frequently mandated or co-funded by village governance mechanisms, directly influences the quality and accessibility of digital skills training for community members. Enhanced digital literacy has been shown to reduce psychological barriers to technology adoption, particularly the discomfort and insecurity that often deter first-time users of digital government services.

Similarly, the social and cultural dimension intersects with both infrastructure and psychological readiness. Communal norms and social trust within villages can either facilitate or hinder the adoption of digital infrastructure. Additionally, peer influence in close knit rural communities often exerts a greater impact on individual attitudes toward technology than formal information campaigns. The aforementioned interdependencies suggest that e-readiness in digital villages is not merely the sum of five isolated dimensions, but rather an emergent, socio-technical property shaped by how these dimensions reinforce or constrain one another. It is recommended that future empirical research explicitly investigate these interaction effects. Such an investigation could be conducted, for example, using structural equation modeling or system dynamics approaches. This approach would be preferable to treating each dimension as an independent predictor of digital readiness outcomes.

Solid arrows indicate a proposed directional influence; double-headed arrows indicate a proposed mutual/reinforcing relationship; bracketed numbers cite the supporting studies discussed in Section 3.2. These linkages are conceptual and have not been statistically tested in this review

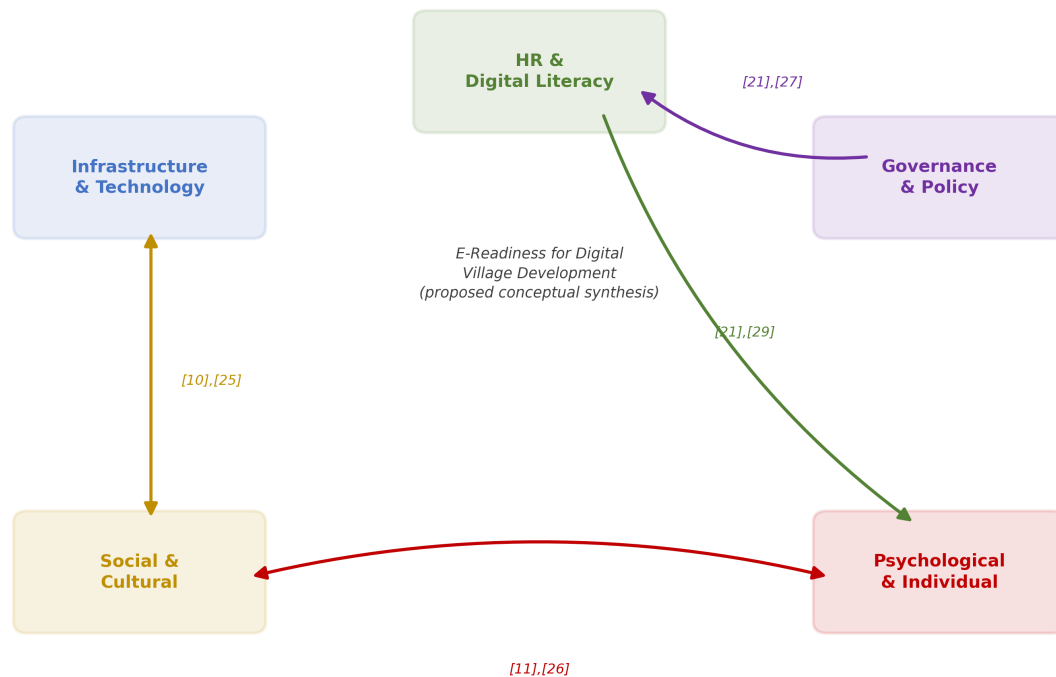


Figure 4. Proposed conceptual model of cross-dimensional interactions among e-readiness dimensions in digital village development

3.4. Bibliometric Analysis

An analysis was conducted using VOSviewer to map keyword relationships (keyword co-occurrence) in e-readiness and digital village studies. Given the medium-sized dataset, the analysis used co-occurrence as the analysis type, author keywords as the unit of analysis, full counting as the counting method, and a minimum occurrence threshold of 2. Prior to mapping, term variations were consolidated using a thesaurus file to ensure that conceptually similar keywords, such as e-readiness and digital readiness, were not separated into different nodes [15].

Prior to thesaurus normalization, the dataset contained 204 unique author keywords across the 55 included studies; after synonym consolidation, 22 keywords met the minimum occurrence threshold of 2, of which 19 formed the largest connected component of the co-occurrence network. Table 7 reports the 19 keywords that met this threshold and formed the largest connected component of the network, ranked by occurrence frequency, along with their total link strength, cluster membership, and average publication year. This provides a quantitative complement to the network visualization in Figure 5.

Table 7. Top Keywords by Occurrence in the Co-occurrence Network

Keyword	Occurrences	Total Link Strength	Cluster	Avg. Pub. Year
digital transformation	12	13	1	2023.3
e-readiness	10	17	2	2022.5
e-government	4	8	3	2022.8
technology adoption	4	3	5	2024.3
smart village	4	1	1	2022.5
technology acceptance	3	9	2	2021.7
smart regency	3	7	6	2022.0
systematic literature review	3	4	4	2024.7
rural	3	3	3	2023.7
rural development	3	3	1	2021.7
e-commerce	2	6	2	2021.5
micro-businesses	2	6	2	2021.5
technology readiness	2	4	5	2022.0
ict	2	3	3	2023.0
participation	2	3	1	2023.0
technology readiness index	2	3	6	2023.0
case study	2	1	1	2022.0
digital governance	2	1	3	2023.0
public sector	2	1	4	2023.0

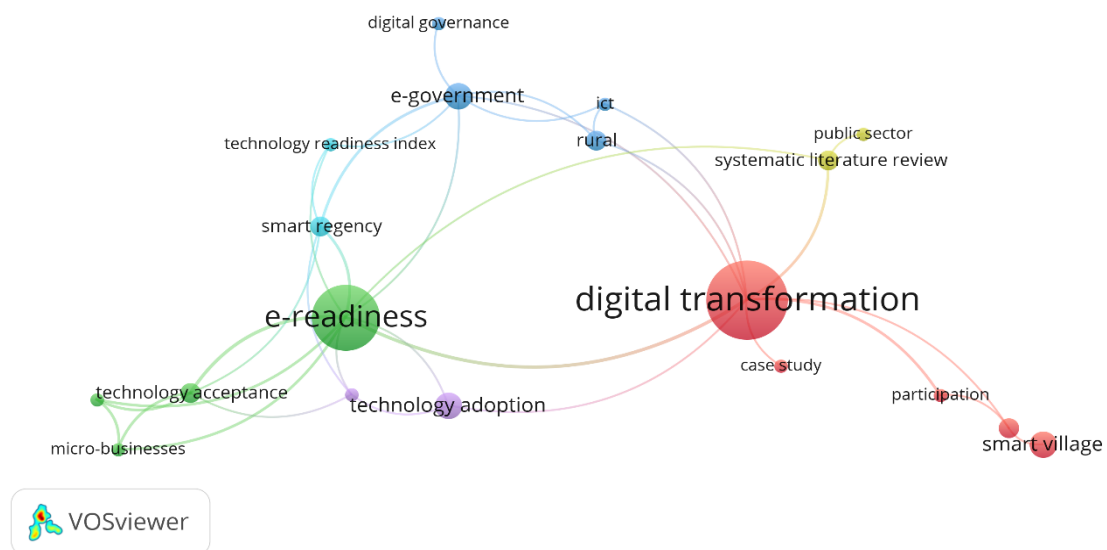
**Figure 5.** Keyword co-occurrence network visualization of e-readiness and digital village studies from 2020 to 2026

Table 8 summarizes the thematic composition of the six clusters identified in Figure 5 to aid interpretation of the network structure.

Table 8. Thematic Interpretation of VOSviewer Clusters

Cluster	Thematic Label	Member Keywords	Total Occ.	Avg. Year	Interpretation
1	Digital Transformation & Rural/Village Development	digital transformation; smart village; rural development; case study; participation	23	2022.8	Broadest cluster; frames digital change at the village/community scale, evidenced through case studies involving community participation.
2	E-Readiness & Business/Economic Technology Adoption	e-readiness; technology acceptance; e-commerce; micro-businesses	17	2022.1	Centers on economic actors (micro-enterprises) and their e-commerce/technology-acceptance behavior as an expression of e-readiness.
3	E-Government, Digital Governance & Rural ICT	e-government; rural; digital governance; ict	11	2023.1	Centers on public-sector digital service delivery and governance mechanisms in rural settings.
4	Public-Sector Review Studies	systematic literature review; public sector	5	2024.0	Smaller, methodology-adjacent cluster tied to review-type studies focused on the public sector.
5	Individual Technology Adoption & Readiness Constructs	technology adoption; technology readiness	6	2023.5	Centers on psychological/behavioral readiness and adoption theory (TAM/TRI-adjacent constructs).

Cluster	Thematic Label	Member Keywords	Total Occ.	Avg. Year	Interpretation
6	Smart Regency & Readiness Measurement Instruments	smart regency; technology readiness index	5	2022.4	Centers on specific administrative-level smart initiatives and standardized readiness measurement tools.

To substantiate the bibliometric claim with source level detail, Table 9 lists the venues that published more than one of the 55 included studies.

Table 9. Most Frequent Publication Venues Among the 55 Included Studies

Source / Venue	Number of Publications
Social Sciences & Humanities Open	6
Pakistan Journal of Life and Social Sciences	2
Journal of Theoretical and Applied Electronic Commerce Research	2
Heliyon	2
Not specified	2

Figure 5 shows that the keyword e-readiness (Cluster 2 in Table 8) is centrally positioned and closely related to the themes of technology acceptance (also Cluster 2), technology readiness (Cluster 5), and e-government(Cluster 3). This pattern indicates that some literature continues to operationalize digital readiness through individual acceptance models, such as TAM and UTAUT, especially in studies that focus on the acceptance of digital services and user behavior [12], [19], [22], [23], [29]. In other words, the keyword map reinforces findings from the thematic analysis that the psychological dimensions of technology adoption have emerged but are still largely approached from an individual-acceptance perspective.

Another prominent cluster (Cluster 1 in Table 8) reveals the connection between smart village, digital transformation, and rural development. This relationship indicates that the literature primarily conceptualizes digital villages as processes involving the transformation of digital services, infrastructure, and activity ecosystems in rural areas,

including indicator development, enhancement of village ICT, and integration of digital platforms for local economic activities [5], [6], [7], [16]. The emergence of keywords such as digital governance(Cluster 3) and smart regency(Cluster 6) in smaller clusters suggests that governance and policy aspects are beginning to develop but have not yet become mainstream in the literature [8], [26], [18], [27]. Overall, these bibliometric results align with the thematic analysis, highlighting the predominance of a technical focus over social, institutional, and impact evaluation dimensions

3.5. Research Gap Analysis

The results of the thematic and bibliometric analyses indicate that e-readiness studies in the context of digital villages continue to exhibit several significant gaps. Most research remains focused on technology readiness, access, and early adoption, while the integration of social dimensions, governance, individual readiness, and evaluation of implementation impact is relatively limited. A summary of the identified research gaps is provided in Table 10.

Table 10. Research Gap in E-Readiness and Digital Village Studies

Research Gap	Studies Discussed	Future Research Directions
Dominate technical and infrastructure focus	Many studies place infrastructure, village information systems, connectivity, and service platforms at the core of digital readiness [5], [6], [7], [10], [16], [17], [18].	Develop a socio-technical e-readiness model that integrates technical, social, institutional, and individual indicators in one operational framework at the village level
Digital capabilities and literacy have not been measured in depth	Digital literacy is often treated as a supporting variable, even though access is not automatically followed by skills, experience of use and productive use [3], [19], [20], [21].	Develop a village digital capability instrument that differentiates village officials, households, MSMEs/BUMDes, and vulnerable groups, then validate it empirically.
Social participation, social capital	Studies on civic participation, community readiness, and community support show the	Adding variables of participation, trust, local leadership, and mutual

Research Gap	Studies Discussed	Future Research Directions
and local cultural context are still poorly mapped	importance of social involvement, but this aspect is not yet dominant in the e-readiness model [11], [24], [25].	cooperation culture to the digital village readiness model; It is recommended to use a mixed methods design to capture local social dynamics.
Governance and policy are still fragmentary and often use a non-village lens	Literature regarding e-government frameworks, smart regency, and the readiness of village officials shows the importance of governance, but the models used are still scattered and some still borrow the lens of smart city [8], [26], [13], [27], [28].	Develop specific governance and policy readiness indicators for villages, including data governance, institutions, leadership, financing and coordination between actors.
The psychological and individual dimensions are still sectoral	Factors such as perceived usefulness, perceived ease of use, social influence, optimism, innovativeness, discomfort, and insecurity have been used, but are generally tested in a specific service context [12], [19], [20], [22], [23], [29].	Testing the TAM/UTAUT model on a wider village population for example households, village officials, village youth, and local economic actors so that the results are not too sectoral.
Evaluation of outcomes and impact of implementation is still limited	Many studies stop at measuring adoption readiness or intention, while relationships with public service quality, government performance, and rural revitalization remain relatively rarely examined [18], [27], [28].	Encourage longitudinal studies or post implementation evaluations that link e-readiness to real outcomes, such as improving public services, village performance and community welfare

In general, Table 10 confirms that the e-readiness and digital village literature is transitioning from a predominantly technical approach to a more multidimensional

perspective. Therefore, future research should move beyond measuring initial readiness and instead examine how readiness translates into implementation, governance, and tangible impacts on rural development.

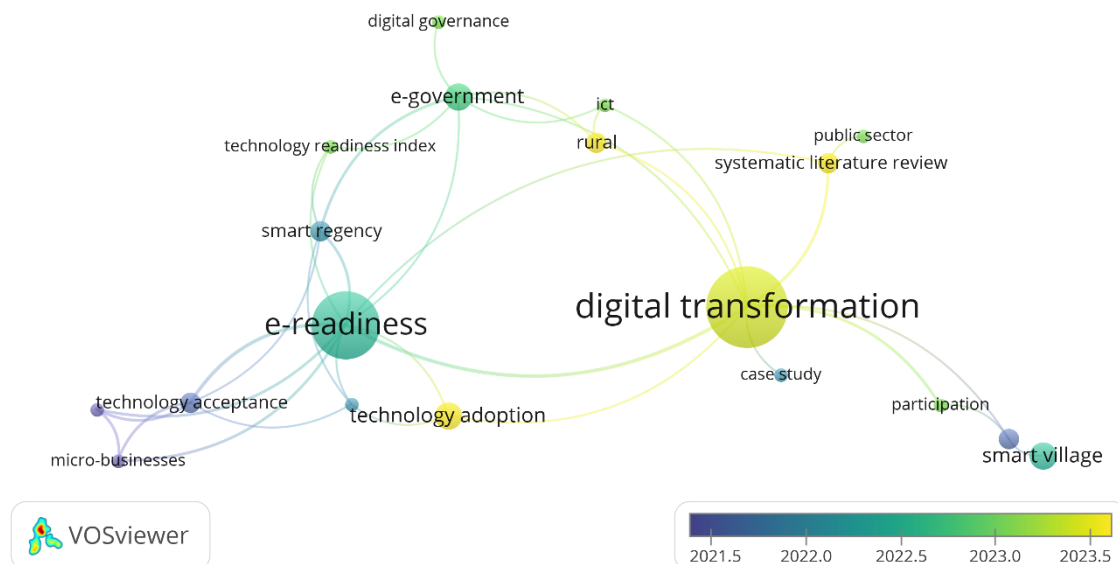


Figure 6. Overlay visualization of keyword co-occurrence in e-readiness and digital village studies (2020–2026)

The blue-green color indicates an older average publication year (2022), while yellow indicates a newer topic (2024). The visualization indicates that the keywords e-readiness and digitalization were predominant in early research, while terms such as digital governance and technology adoption have only recently emerged in the literature. This observation supports the gap analysis presented in Table 10: social aspects, community participation, digital governance, technology adoption, and digital village development outcomes remain relatively underexplored and should be prioritized in future research. This temporal pattern is corroborated by a quantitative comparison of keyword level average publication years, keywords centered on individual and business level technical readiness (e.g., “e-commerce,” “technology acceptance,” “technology readiness,” average publication year 2021.5–2022.5) cluster earlier in the review period, whereas keywords centered on governance and participatory processes (e.g., “e-government,” “digital governance,” “participation,” “digital transformation,” average publication year 2022.8–2024.7) cluster later. This lends quantitative support to rather than relying solely on visual inspection of the interpretation that the field's emphasis has moved from

individual/technical adoption constructs toward governance and participation oriented framings over the review period.

3.6. Study Limitations

Several limitations are present in this study. First, the analysis includes only articles published between 2020 and 2026 and is limited to specific databases, which may exclude relevant publications outside these parameters. Second, the search string, centered on the terms "e-readiness," "digital readiness," "ICT readiness," "digital village," "smart village," and "rural digitalization," may not have captured studies that discuss closely related phenomena using other terms, such as rural digital transformation, village information system, digital inclusion, rural ICT, e-government village, or rural innovation, without explicitly using the term "e-readiness" this represents a boundary of the present search rather than of the underlying phenomenon. Third, although the search strategy is described conceptually in Section 2.1 (a two-tier keyword approach applied across five databases: Scopus, ProQuest, IEEE Xplore, ScienceDirect, and Google Scholar), a fully verified, platform-by-platform breakdown namely the exact number of records retrieved per database and the literal Boolean syntax used in each database interface, could not be reconstructed with full confidence from the authors' retained search logs, which showed inconsistent figures across search iterations conducted at different points in the search process.

Rather than report figures that could not be independently verified, this boundary is disclosed explicitly here. Similarly, Google Scholar was treated as a supplementary, exploratory source alongside the four primary indexed databases, consistent with common systematic-review practice given its non-standardized export format and non-transparent relevance-ranking algorithm, its results were manually cross-checked against the primary-database set for duplicates and topical relevance rather than processed through a separately logged structured protocol. Future replications of this review are encouraged to log per database export counts and platform-specific query syntax prospectively, ideally using reference-management software with database tagged import records, to enable full step-by-step reproducibility. Fourth, the search was restricted to English language publications although Indonesia constitutes a key geographic context for this review, potentially relevant literature published in Indonesian, such as national conference proceedings, government reports, theses, or Indonesian-

language journals, may have been excluded, representing an additional boundary of the search scope.

Fifth, the bibliometric analysis depends on author keywords, so inconsistencies in terminology that are not fully harmonized may affect the structure of the keyword network. Sixth, the study is conceptual in nature and lacks empirical validation of the identified e-readiness dimensions; the five dimensions should be regarded as a conceptual synthesis rather than a validated measurement model. Seventh, the number of directly cited references (29) is smaller than the number of included studies (55), as several included studies are reported collectively rather than individually cited in the narrative; the complete list of the 55 included studies should be made available by the authors as a supplementary appendix for full SLR transparency. Future research should broaden the search scope, adopt a more comprehensive term-normalization approach, and empirically validate the resulting dimensions in digital village contexts, for example through survey based, SEM, Delphi, AHP, or mixed-methods designs.

4. CONCLUSION

This study conducted a Systematic Literature Review integrating thematic and bibliometric analysis to answer three research questions. For RQ1 (dimensions), synthesis of 55 articles (2020–2026) identified five principal e-readiness dimensions: infrastructure and technology, human resources and digital literacy, social and cultural, governance and policy, and psychological and individual, with infrastructure and technology remaining dominant. For RQ2 (thematic and bibliometric structure), keyword co-occurrence analysis shows the field still centers on e-readiness, digital transformation, digitalization, smart village, and e-government, with digital governance and technology adoption themes emerging only recently. For RQ3 (research gaps), community participation, digital governance, psychological readiness, and evaluation of rural development impacts remain underrepresented. As detailed in Section 3.6, key limitations include the restricted publication window and database coverage, possible gaps in search string terminology, dependence of the bibliometric map on author-keyword harmonization, the conceptual (not yet empirically validated) status of the five dimensions, and the smaller number of directly cited references relative to the 55 included studies.

This study presents a multidimensional e-readiness mapping for digital village development, utilizing a socio technical perspective that requires further empirical validation. Future research should empirically validate the five dimension model using structural equation modeling (SEM), Delphi, analytic hierarchy process (AHP), or mixed methods designs. Additionally, it is necessary to develop and validate a village level e-readiness measurement instrument and to investigate, through longitudinal studies, the relationship between e-readiness, implementation, and rural development outcomes.

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