

Digital media literacy of rural communities after the COVID-19 pandemic

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Article Info	Abstract
Article history: Received Oct 1 st , 2025 Revised Jul 14 th , 2026 Accepted Jun 18 th , 2026 Published Jan 30 th , 2026	In Indonesia, digital literacy has become a major concern since the COVID-19 pandemic. The COVID-19 pandemic has forced the use of social media to disseminate information to rural areas. On the other hand, various public service activities have been digitized. These two aspects can only be utilized if you have an adequate level of digital literacy. This study uses quantitative methods to examine digital literacy and its influencing factors in rural areas, with a focus on Bojonegoro Regency. First, the digital literacy levels in most rural communities have shifted from low to high. One of them is digital ethics. Collective experience forces rural communities in Bojonegoro Regency to be cautious. Moreover, through SmartPLS calculations, the distance between residence and the district capital affects the level of digital literacy. The farther from the district capital, the lower the digital literacy. On the other hand, social capital factors, especially social participation, are highly beneficial for improving digital literacy.
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INTRODUCTION

Been going on for more than a century. When the Dutch colonial government implemented forced cultivation (1835- 1870) and then economic liberalization (1870), rural communities entered the global economic structure; farmers no longer produced food for subsistence but rather for the benefit of global industries. The situation continued until the Soeharto administration with its green and blue revolutions. To produce, they need industry, ranging from seeds and fertilizers to agricultural tools. To maintain food security in the community, the relationship between rural communities and the industrial world is regulated by the government in various ways. However, regulations are more concentrated on the downstream, such as the highest price of grain and rice, as well as other basic needs. This is intended to maintain people's purchasing power. The transition process of rural communities from traditional to modern has been well described by Daniel S. Lerner (1958). By examining cases in Middle Eastern countries, he found that the character of citizens who were open, literate, and highly mobile accelerated societal change. Daniel S. Lerner's research was

further developed by Everett M. Rogers (1960) on the stages of innovation (Shah, 2011). These theories underlie, or are used to accelerate, change in society, especially in rural areas (Rogers, 2003a). With the advent of digital technology in the late 20th century and its continued development into the 21st, there has been a tremendous acceleration. In several countries, from Israel and Japan to Thailand, rural communities are connected to digital technology and are building smart agriculture.

Changes continue to take place into the 21st century. The introduction of technology is not only focused on agriculture but is also integrated into marketing through digital technologies (internet networks). The COVID-19 pandemic situation (2020-2022) accelerated the introduction of digital technology. The penetration of digital technology, especially the internet, is increasing year by year in Indonesia. Some rules to prevent the movement of people, among others: work, study, and worship from home, have increased the number of smartphone purchases. It can be seen in Figure 1 that there was an increase in users up to 26 million, or 14.9% (Annur, 2022).

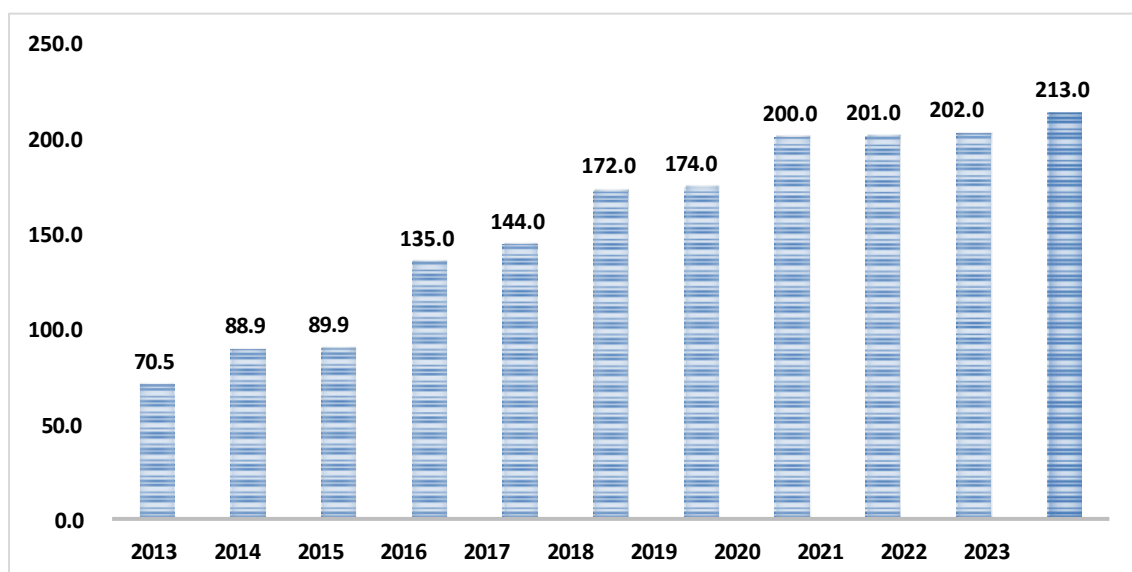


Figure 1. Indonesia Internet Users Figure 2013-2023

Source: Authors own works

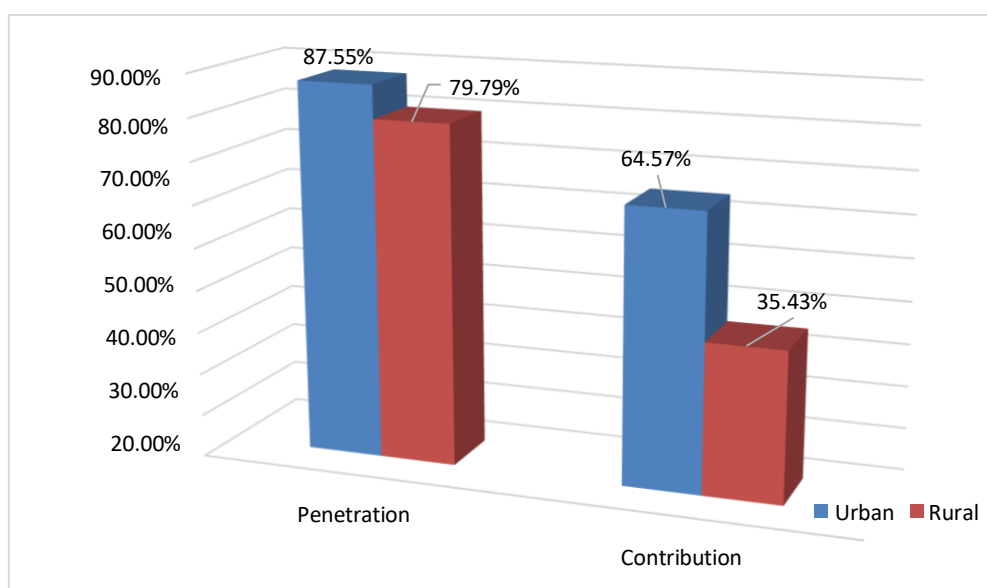


Figure 2. Composition of Internet Users in Indonesia by Place of Residence

Source: Authors own works

In addition to the COVID-19 pandemic, it turns out that several years have experienced a very significant increase since a decade ago. In general, within a decade, the number of internet users increased by approximately 300%, from 70.5 million (in 2013) to 213.0 million (in 2023). Five years saw a surge in internet users, namely: 2014 (18.4 million, or 26.1%), 2016 (45.1 million, or 50.2%), 2020 (26 million, or 14.9%), and finally 2023 (11 million, or 5.4%). The increase occurred because the government paid close attention to the introduction of digital technology to achieve the MDGs (2000-2015), namely, by cooperating with the private sector to realize the benefits of new technologies. On the other hand, the smartphone industry, which requires 30% local components and is assembled domestically, has resulted in lower selling prices. Low selling prices result in increased absorption in the market (Ahdiat, 2023).

The penetration of information technology is uneven in Indonesia, can be seen in Figure 2. First, internet user growth is higher in the Western region, especially Java, than in the Central and Eastern regions. Internet users in the Western region have reached 84.42%, equivalent to 83.76% of all users, compared to the Central region (55.52%, or 13.55% of all users) and the Eastern region (66.91%, or 2.72% of all users). Second, there are regional differences among users, with 87.55% residing in urban areas, equivalent to 79.79% of all users. In rural areas, the percentage of users is 64.57%, or 35.49% of all users. (Katadata, 2022). With this data, users in rural areas who have reached more than half have shown that what Th. Fisher (1931) and Eric R. Wolf (1958) envisioned is no longer valid. Rural society is no longer a small, autonomous community in the present and future. (Andari & Ella, 2019).

From the same survey, there are some interesting observations. First, the survey provides information on seven frequently visited contents, namely: health (39.96%), sports (34.34%), infotainment (32.32%), economy, finance and business (28.98%), social politics and human rights (24.73%), culture and tourism (22.17%), and finally education and science and technology (18.44%). Second, although in small numbers, they have done risky things on the internet. Pinjol users, for example, account for only 1.47% but are increasing year over year. The same thing with online gambling, 16.37% of the 34.26% of users who knew had accessed it. For pornography sites, 29.31% of 33.81% of users who know have accessed the site. (Katadata Insight Center (KIC), 2022).

There is something that was not presented in the survey. The survey did not specifically look at whether the dark side of internet use occurs in rural communities. This is very important. First, the survey indicates that digital literacy in rural areas is fairly low. Second, from the results of the OJK study, there has been penetration of online loans (pinjol) in rural areas, especially illegal pinjol. Previous research on rural digital transformation has primarily examined internet access, connectivity, and technology adoption, often neglecting the influence of unequal rural conditions on the quality of digital literacy. This oversight is significant because digital expansion in rural areas does not inherently foster critical, safe, or responsible digital engagement. Instead, limited digital literacy may coincide with increased exposure to digital risks, such as the proliferation of online lending services, particularly illegal online loans, which exacerbate economic pressures on rural households (Hidayah, 2022; Nugraha et al., 2022; Ozili, 2023; Setiawan et al., 2021, 2021). Accordingly, the primary concern extends beyond digital connectivity in rural communities to encompass their capacity to access, evaluate, and engage with digital media in critical, safe, ethical, and socially meaningful ways.

While recent studies have associated these challenges with computer literacy, financial literacy, and digital financial literacy (Chatterjee, 2016; Choung et al., 2023a) there has been limited focus on the structural and community factors influencing computer literacy in rural communities. Current research does not sufficiently explain how geographical distance, personal conditions, socio-economic status, and social capital contribute to disparities in digital skills, digital culture, digital safety, and digital ethics within rural contexts. In response, this study investigates the determinants

of digital competence among rural populations following the COVID-19 pandemic. By connecting the four dimensions of digital literacy to distance, personal conditions, economic and social status, and social capital, this study seeks to move beyond a narrow focus on digital access and to offer a more contextual explanation of how digital literacy is produced under unequal rural conditions.

LITERATURE REVIEW

Dimensions of digital literacy

Digital (media) literacy was initially understood in a relatively narrow sense as the ability to use computers, internet networks, and information presented in digital formats. Early perspectives, however, had already suggested that digital competence was not merely about operating digital tools, but equally about developing the cognitive capacity needed to interpret and use information in digital environments. In this regard, digital competence differs from the use of classical media, where people were more often positioned as readers or passive audiences. Since digital communication has become more interactive and complex, literacy in digital settings has increasingly required not solely technical competence but also critical judgment in accessing and interpreting information. (Gilster, 1997). Digital literacy is no longer viewed simply as the ability to operate digital devices or access online information. More broadly, it refers to the capacity to engage with digital environments in a critical, safe, and responsible manner. (Belshaw, 2012). In this study, digital literacy is understood in terms of four interrelated dimensions: digital skills, digital culture, digital safety, and digital ethics.

Recent scholarship demonstrates that a purely functional understanding of digital literacy is insufficient. In contemporary digital environments, digital literacy encompasses the ability to critically evaluate information, identify misinformation and disinformation, and participate responsibly in digital spaces. Empirical studies indicate that digital literacy correlates with more discerning judgments regarding information accuracy, although technical familiarity alone does not always prevent problematic sharing behaviors (Sirlin et al., 2021). Similarly, media literacy interventions in Indonesia have reduced users' intentions to share false headlines, highlighting the necessity for verification, critical evaluation, and ethical responsibility within digital literacy (Ford et al., 2023). In Indonesia, this expanded perspective is reflected in the national digital literacy framework, which comprises four interrelated dimensions: digital skills, digital ethics, digital safety, and digital culture (Katadata Insight Center (KIC), 2022). Digital skills involve effective access to and use of digital technologies; digital ethics pertain to norms and responsibilities in online interactions; digital safety addresses privacy, personal data protection, and digital security; and digital culture emphasizes socially and culturally appropriate participation in digital spaces. Collectively, these dimensions indicate that digital literacy should be conceptualized as an integration of functional, critical, ethical, and cultural competencies.

Factors affecting digital literacy in rural communities

Both structural and social factors influence digital literacy in rural communities. Following the COVID-19 pandemic, digital technologies have become integral to daily life, encompassing education, healthcare, communication, and economic activities. This integration has established digital engagement as a new social norm, while simultaneously exposing disparities in access and digital competence across communities. Lohr (2025) contends that digital literacy and access should be analyzed through the lens of equity, as the proliferation of digital systems often highlights, rather than resolves, pre-existing inequalities. (Lohr, 2025). Similarly, recent studies indicate that digitalization during and after the pandemic has enhanced resilience among those with strong digital capabilities, whereas individuals with limited digital skills remain susceptible to exclusion and unequal outcomes. (Abidi et al., 2023a).

In Indonesia, these disparities are evident within rural contexts. Akbar and Wijaya (2024) demonstrate that digital literacy in rural areas is unevenly distributed across various dimensions. Their research finds that rural communities generally exhibit stronger performance in digital ethics, digital culture, and digital safety, but remain less proficient in digital skills, especially where digital infrastructure and the integration of technology into daily routines are limited. This evidence suggests that digital inclusion cannot be reduced to mere connectivity or device ownership, as different aspects of digital literacy may develop at varying rates within the same community. (Akbar & Wijaya, 2024).

While previous studies have primarily focused on digital access and technology adoption, less emphasis has been placed on the social and structural determinants that influence the quality of digital literacy in rural communities. In this background, this study identifies distance, personal condition (*age, sex, and marital status*), economic and social status (*education, occupation, and income*), and social capital (*solidarity, political participation, social participation, and social networks*) as key factors influencing digital literacy. These variables matter because digital engagement is not determined only by individual ability, but also by access to resources, social position, and the wider community context in which individuals are embedded. (Andari & Ella, 2019; Neumeyer et al., 2021). The expansion of information and communication technology in rural areas does not necessarily mean that all community members are equally prepared to benefit from it. Although improved infrastructure may increase access and connectivity, meaningful digital engagement still depends on broader social and economic conditions. Differences in education, occupation, and income, for instance, may shape both the opportunity to access digital tools and the capacity to use them effectively. (Abidi et al., 2023a, 2023b). In this regard, digital inclusion remains closely tied to existing social inequalities.

Recent evidence from Indonesia confirms that rural households remain significantly less likely than urban households to have internet access, and that this disparity is closely associated with education, age, and employment-related conditions. This finding indicates that digital inequality persists not simply because of personal choice, but because structural barriers continue to shape who can access and benefit from digital technologies. Social capital also plays an important role in shaping digital literacy in rural settings. Community solidarity, participation, and social networks influence how information is shared, how trust is built, and how digital practices develop within everyday social life. Digital literacy, therefore, should be understood not solely as an individual competence but also as a socially embedded capacity shaped by community interaction and collective experience (Julien, 2015).

Research gap and research focus

Previous studies have examined digital literacy and technology adoption in various contexts, yet have given limited attention to the social and structural factors influencing digital literacy in rural communities, particularly in the post-COVID-19 period (Neumeyer et al., 2021; Abidi et al., 2023). Existing discussions also tend to emphasize the opportunities brought by digital expansion, while paying less attention to the risks and vulnerabilities that may accompany it, including exposure to harmful digital financial practices (Choung et al., 2023b; Hidayah, 2022; Nugraha et al., 2022; Ozili, 2023; Setiawan et al., 2021).

Although previous studies have examined digital access and technology adoption in rural areas, they have paid insufficient attention to how digital literacy is socially and structurally differentiated within rural communities. Much of the existing literature equates digital inclusion with connectivity or use, overlooking the fact that digital literacy is multidimensional and may develop unevenly across rural groups. Consequently, there remains limited understanding of how geographical distance,

personal condition, socio-economic inequalities, and social capital shape the quality of digital literacy in rural settings.

This gap is particularly important in the post-COVID-19 period, when digital engagement has become more embedded in everyday life. However, it has also exposed unequal capacities to use, evaluate, and respond to digital media. Against this backdrop, the present study examines the factors affecting digital literacy among rural communities after the COVID-19 pandemic. By focusing on *digital skills*, *digital culture*, *digital safety*, and *digital ethics* as the main dimensions of digital literacy, and by relating them to *distance*, *personal condition*, *economic and social status*, and *social capital*, this study seeks to provide a more contextual understanding of how digital literacy is shaped in rural settings.

METHODS

The approach used is quantitative with a survey method. There are several explanations for the use of a quantitative approach. First, in the social fact paradigm, every social phenomenon can be real, concrete, and measurable. This means that the level of digital literacy can be measured individually. Secondly, social phenomena, in this case the level of digital literacy, cannot exist without the presence of other social phenomena. Therefore, it is appropriate to use a quantitative approach.

By adopting the perspective of functional structural theory (Emile Durkheim), a number of researchers have observed that a person's digital literacy level is influenced by their objective conditions, ranging from gender and education to SES. If education and SES are seen as one's economic capital in Pierre Bourdieu's social practice theory, then one's social capital and cultural capital also affect the level of digital literacy (Bourdieu, 2013). The role of social capital in accepting new things is reinforced by M. Rogers' theory of innovation adoption applied to the process of accepting digital technology (Neumeyer et al., 2021; Rogers, 2003b).

Table 1. Validity and Reliability of the Questionnaire Items

No.	Indicators	Question Item Validity		Reliability
		Valid	Not Valid	
1. Social Capital (SC)				
	a. Solidarity (IHS)	39	1	0,857
	b. Political Participation (PPol)	29	2	0,887
	c. Social Participation (SocPart)	20	0	0,947
	d. Social Network (SN)	66	3	0,955
2. Digital Literacy (DL)				
	a. Digital Skill (LDT1)	8	0	0,945
	b. Digital Culture (LDT2)	6	0	0,914
	c. Digital Safety (LDT3)	7	0	0,933
	d. Digital Ethics (LDT4)	4	0	0,828

Source: Authors own works

The rural community chosen was from Bojonegoro district. There are several reasons for this choice of location. First, the Bojonegoro area is a transition from the coast to the inland. Some survive as rice farmers, especially around the Bengawan Solo, while others cultivate fields near the forest, as if representing a model of rural communities in Indonesia. Secondly, the presence of industry, especially oil and gas exploration in Bojonegoro, has provided dynamics for rural communities, especially in the inland areas around the project. There is a shift in employment from the agricultural to the non-agricultural sector, whether as workers in oil and gas exploration or in jobs that are a multiplier effect of oil and gas exploration. Meanwhile, purposively selected villages, viz: urban,

peripheral, and rural areas, were used, while the randomly selected respondents were characterized as heads of households or adults representing heads of households. The total number was 206 people.

The respondents were then asked to answer questions compiled in the interview guidelines. The interview guide contains questions that serve as indicators of the respondents' objective condition variables (age, gender, marital status, education, employment, and income), social capital (social participation, solidarity, social relationships, social networks, and political participation), and digital literacy. Interview data were tabulated and analyzed with SMARTPLS ver. 3.29 (Hair et al., 2022, 2022; Weiber & Mülhhaus, 2014). Prior to the main analysis, the questionnaire underwent validity and reliability testing. Validity was evaluated using the product-moment correlation test, and reliability was assessed with Cronbach's alpha. These assessments focused on the multi-item constructs of social capital and technological literacy. In contrast, distance, personal condition (sex, age, and marital status), and economic and social status (education, income, and occupation) were treated as directly measured variables using single indicators.

As indicated in Table 1, the majority of questionnaire items satisfied the validity criteria, with only a few items classified as invalid. Within the social capital construct, one item in solidarity, two items in political participation, and three items in social network were excluded due to insufficient validity. In contrast, all items in social participation were valid. For the digital competence construct, all items across the four dimensions digital skills, digital culture, digital safety, and digital ethics demonstrated validity. Reliability coefficients ranged from 0.828 to 0.955, reflecting satisfactory to excellent internal consistency. Consequently, the retained indicators were deemed suitable for further analysis. During data collection, the research team communicated the study's objectives, emphasized the voluntary nature of participation, and assured respondents that their information would be kept confidential. Informed consent was obtained from all participants prior to questionnaire administration, and all data were utilized exclusively for research purposes

RESULTS AND DISCUSSION

A Changing Rural Society. In rural studies, society is often described as a community with strong social ties and homogeneity. However, when looking at rural communities in Bojonegoro, they are relatively homogeneous religiously. Most of them are Muslims with a traditional santri culture, according to C. Geertz. Geertz. Fewer than 5% of respondents were non-Muslim (question no. AR031). In terms of education, the village community has experienced a shift, with only 47.58% having primary education, 33.01% having secondary education (33.01%) and the rest having university degrees. This shift is inseparable from the government's WAJAR 9-year (9-year compulsory education) policy, pioneered under the Soeharto administration (1966-1998). This obligation became a human development index (HDI) achievement program (Kusumah, 2021; Widyastari & Isarabhakdi, 2016). In terms of employment and income, rural communities have shifted from agriculture to various non-agricultural activities. The percentage of those working in the agricultural sector (as farmers, laborers, or fishermen) remains quite large, at 40.56%. However, others have become factory workers (21.69%), employees (25.47%), and the rest are civil servants/TNI-Police, pensioners, homemakers, or not working. Farmers work mostly in rural areas. After work in the rice fields is finished, while waiting for the harvest, they work across the kabupaten as farm laborers (mboro).

The shift in employment from the agricultural to the non-agricultural sector is expected to continue. This is done mainly by the youth. Young people are already reluctant to work in the agricultural sector, either as farmers or farm laborers. From the interview sessions, some admitted that working in the non-agricultural sector provides more certainty than the agricultural sector. "It is better to be a factory worker; the salary is fixed, rather than working in the rice fields. It is hot. Iyo

nek kasil, nek nggak kerjo yo ora mangan (Javanese, if you don't work, you're hungry)." The tendency of young people to enter the nonagricultural sector has actually occurred in almost all rural areas of Indonesia, especially in Java, Bali and Sumatra, resulting in difficulties in the regeneration of farmers (Ani et al., 2024; Anwarudin et al., 2020; Tolinggi et al., 2023; Yuniarti et al., 2020). The areas of Java, Bali, and Sumatra, which Clifford Geertz calls Inner Indonesia, are fertile rice-growing regions due to their ecological conditions. The first cause is the farmers' exchange rate (Geertz, 1963), which has not improved. Farming is not considered very profitable (Ani et al., 2024) and there is no clear regeneration scenario (Yuniarti et al., 2020). The second cause is industrialization in rural areas to avoid the increase in regional minimum wages in suburbia. The rural youth quickly moved into industry and no longer continued their parents' business. Industrial labor is considered to provide income certainty.

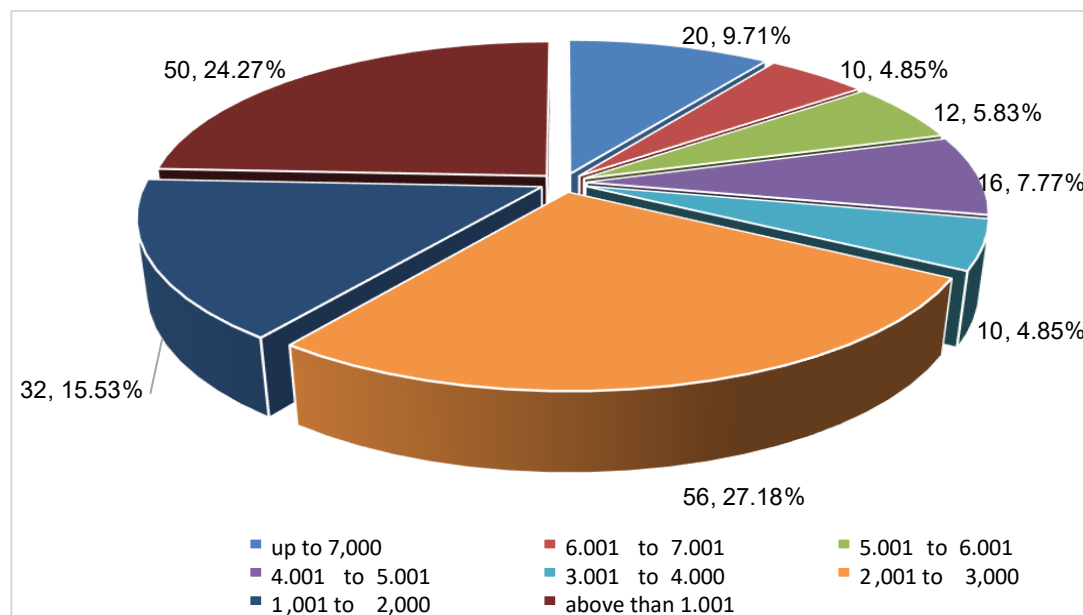


Figure 3. Salary (thousand IDR)

Source: Authors own works

In terms of income, based on the mapping shown in Figure 3, the amount earned in one month ranged from Rp. 0 (null rupiah) to above Rp. 7,000,000.00 (seven million rupiah). Because of their non-agricultural business, some respondents have an income of Rp. 32,000,00.00. (thirty-two million rupiah). There is a wide variety of businesses, ranging from renting out celebration equipment to opening certain processed factories. It is conceivable that, for just one rental of a soundsystem, an entrepreneur could earn around Rp 3 million. If you deduct the cost of labor that is paid every time there is an activity, then the profit can reach Rp. 2,000,000.00 (two million rupiah). If he gets a response (rented) 10 times a month, his income can reach Rp. 20,000,000 (twenty million rupiah). *"My parents used to be farmers, I rent out my rice fields (adol tahunan). I use the rent money as capital for the sound system business. Coincidentally, his wife is also a bridal makeup artist."*

Socio-economic status in rural communities was reflected not only in formal indicators such as education, occupation, and income, but also in the material and symbolic expressions of everyday household life. In this context, the house functioned as an important social marker, representing how families positioned themselves socially and culturally within the community. The living room, in particular, often served as a symbolic showcase of the household. Furniture such as chairs, tables, cabinets, and televisions signaled material well-being, while neatly arranged holy books, Islamic

calligraphy, and photographs of *kiyai* reflected religious culture. Trophies, certificates, and graduation photographs, meanwhile, indicated aspirations toward educational and intellectual achievement. Field observation also confirmed this pattern. In one respondent's house, for example, the outer walls were made of weathered teak sheets, some of them already decayed, yet the living room contained well-varnished teak furniture carefully arranged to present a respectable impression. This suggests that socio-economic status in rural communities was expressed not only through the physical condition of the house as a whole, but also through selective symbolic investment in particular domestic spaces. Such patterns were commonly found in subdistricts near teak forest areas, including Padangan, Ngraho, Gayam, and surrounding areas.

Collective experience of vulnerability due to lack of digital (media) literacy

The intervention of digital technology, especially the internet, in rural Bojonegoro has actually been intensive around two decades ago. BPS data (2022) shows that the percentage of Bojonegoro residents over 5 years old who use mobile phones has increased from 69.5% (in 2020) to 71.38% (in 2022). Meanwhile, in terms of network coverage, providers have reached all corners of the village, although there are some areas not yet covered, especially in the teak forest area, the South (border of Ngawi and Nganjuk districts), and the West (border of Blora district). This means that the percentage of mobile phone usage is also inseparable from network coverage. (BPS Jawa Timur, 2023).

On the other hand, related to the virtual world, a family from the rural community of Bojonegoro has been in the news at the national level. The incident has become a collective experience for the community to be wise when responding to celebrity news in the virtual world, in this case the artist Ayu Ting-ting (ATT). The case occurred during the COVID-19 pandemic. During the implementation of the movement restriction policy to minimize exposure to COVID-19, ATT's family traveled from Jakarta to Bojonegoro, visiting the house of KD (Kartika Damayanti). These haters work as TKWs in Singapore. Together with the police, they came to confront KD's parents. In addition, they reported to the authorities for unpleasant behavior. KD is considered to have insulted ATT and her son B. As a result, KD's family experienced stress over the persecution by ATT's family. However, with the support of netizens and advocated by lawyers, they reported back. From netizens, a petition to ban ATT on television was signed by more than 50 thousand netizens. (Alamsyah, 2021; Rachmawati, 2021; Saputra, 2021). This incident seems to be one of the reasons rural communities that use smartphones consider social media ethics more important. The result is a shift from low to high as shown in Table 2.

In digital ethics, a person will respect others' privacy, avoid harmful behavior safely and politely, build trust, and, finally, not engage in or facilitate online criminal acts, such as hacking or other online crimes. This is what concerns the Bojonegoro community: promoting digital ethics, where ethical principles guide individual behavior in virtual space. So that such incidents do not happen again. They also understand the importance of respecting others' privacy rights and not sharing sensitive information without permission. Moreover, they should avoid bullying behavior on social media and ensure that information shared is accurate and not misleading. So that technology will be used responsibly without damaging or abusing personal interests and harming others.

Table 2. Digital Literacy Results

Category	Digital Skills		Digital Culture		Digital Safety		Digital Ethics		Digital Literacy	
	f	%	F	%	f	%	f	%	f	%
High	69	33,5	55	26,7	51	24,8	70	34,0	87	42,2
Moderate	46	17,5	51	24,8	38	18,4	60	29,1	2	1,0
Low	100	49,0	100	48,5	117	56,8	76	36,9	117	56,8

Source: Authors own works

Table 3. Outer Loading Indicators

No.	Indicators	Outer Loading
1.	Distance	1,000
2.	Personal Condition (PC)	
	a. Age	0,033
	b. Sex	-0,387
	c. Marriage	0,910
3.	Economic and Social Status (SES)	
	a. Education	-0,692
	b. Job	0,200
	c. Salary	0,838
4.	Social Capital (SC)	
	a. Solidarity (IHS)	0,519
	b. Political Participation (PPol)	0,395
	c. Social Participation (SocPart)	0,780
	d. Social Network (SN)	0,359
5.	Digital Literacy (DL)	
	a. Digital Skill (LDT1)	0,930
	b. Digital Culture (LDT2)	0,931
	c. Digital Safety (LDT3)	0,959
	d. Digital Ethics (LDT4)	0,965

Source: Authors own works

The digital skills section, which refers to the ability to use digital technology effectively, still needs attention. The percentage of respondents with digital skills reached 49.0%, with low coverage of results. This is supported by the statement of one respondent, Y (40 years old), who admitted, "The important thing is that I can wa or call, if the others are at most only YouTube..." In fact, digital skills are identical to the process of adapting to existing technological devices. The desire to continue learning and adapting needs to be improved so that the Bojonegoro community can use technology as an effective and efficient problem-solver.

Meanwhile, the digital culture section encompasses the values, norms, and social practices that develop within the digital space. It is necessary to habituate values to interact with the digital world. Therefore, in the digital culture indicator, there is a shift from low to high, although people with low literacy are more dominant (48.5%). The influence of this shift has led Bojonegoro society to develop in its thinking and work, and certainly affects the way they interact now. One clear example is the increasingly widespread online interaction through various applications such as Instagram, WhatsApp, and YouTube.

In addition to the three indicators, the low level of digital security warrants closer attention. This means that more than half, 56.8% to be precise, rarely pay attention to digital security. They do not protect their online identity, data, and assets, ranging from photos, passwords, and PINs, and even tend to ignore them. When writing the words "Bojonegoro ID card" in a data search engine, several photos of Bojonegoro residents' ID cards are displayed. So, the Bojonegoro government routinely conducts digital security socialization, and several villages and DPRD websites have been hosted. Therefore, it is important to safeguard personal information from unauthorized access, whether through strong passwords, data encryption, or security software. All of this is to avoid online fraud, such as phishing and other scams. If digital security can be improved, the Bojonegoro community will be able to understand the limits of utilizing technology, maintain physical and mental well-being, and avoid internet addiction.

The findings reveal a pattern of collective vulnerability within rural communities resulting from limited digital literacy. This issue is evident not only in the prevalence of low digital literacy, particularly regarding digital safety, but also in the community's restricted ability to verify information, safeguard personal data, and respond critically to harmful digital practices. Consequently, low digital literacy affects not only individual users but also produces broader consequences for households and the wider community, including shared risks, financial strain, and social insecurity. Therefore, rural digital inequality should be conceptualized as encompassing both unequal access to technology and unequal capacity to use, evaluate, and navigate digital media safely, critically, and in socially meaningful ways.

Social factors affecting digital (media) literacy

In the analysis, there are three independent variables, namely: distance, personal conditions, and SES. Each variable has indicators. Table 3 shows the meaningful indicators of the variables. Distance is only characterized by the distance between the place of residence and the district capital. The district center area is the center of information and technological transformation (digital). The area is not only home to offices but also the center of trade, one of whose products is telecommunications equipment. In Bojonegoro, as in other Indonesian cities, the center of government is located in Bojonegoro sub-district. The surrounding area has markets and shops, including mobile phone shops. Similar shops can also be found in the subdistrict capitals, but they are more expensive and have a smaller selection of products.

Meanwhile, of the three indicators, marital status represents the personal condition variable, while socioeconomic status is represented by income, which has an outer loading of 0.8128. Among the four social capital indicators, only the social participation indicator is significant. The social participation indicator is characterized by individuals' involvement in community activities, ranging from the RT level to the kecamatan level, including the election of the RT head and participation in discussions of development issues. In accordance with government regulations, the village government holds a village development plan meeting (*musrembang*) before deciding whether to submit it to the government as a priority-scale program. Those with high social participation will be involved and provide input.

In the digital literacy variable, four indicators were tested. All indicators significantly measured the digital literacy of the respondents. That is, through the questions asked, they can be identified: digital skills, culture, and security behaviors in using digital, and can look at ethics and security. The results, as shown in Table 1, indicate that the level of digital literacy has shifted towards high due to the various dynamics experienced by the people of Bojonegoro during the COVID-19 Pandemic.

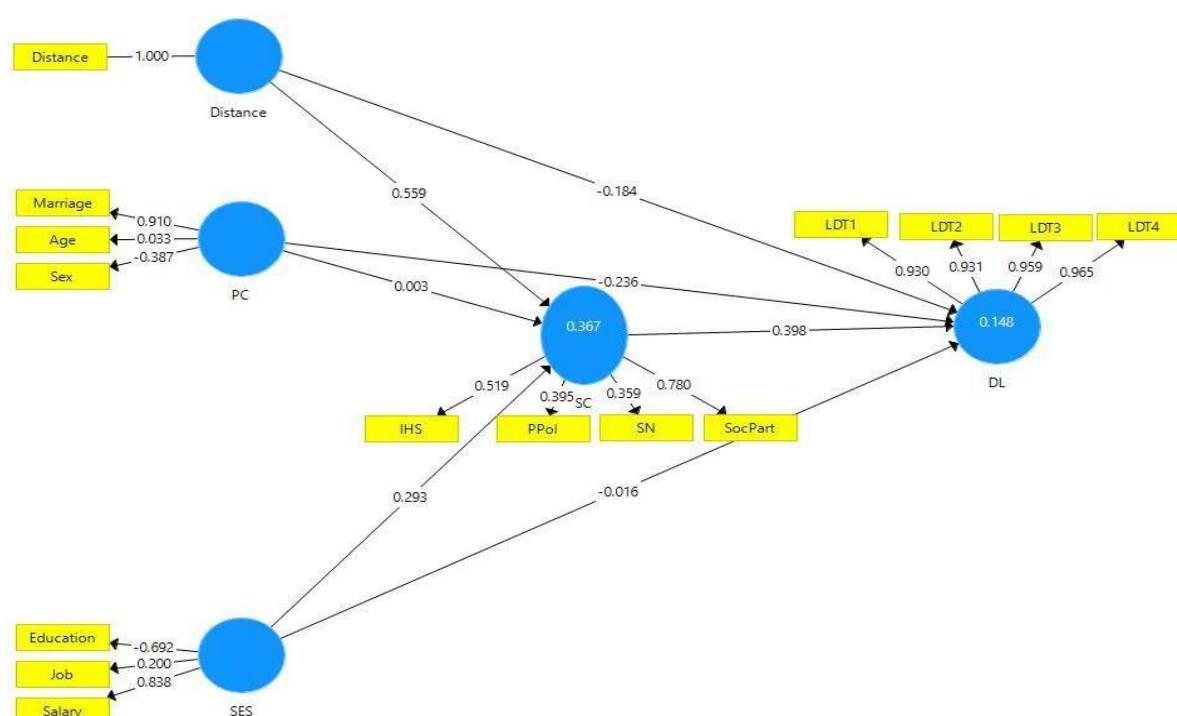
First, Table 4 concludes that digital literacy in rural communities is influenced more by the interaction between spatial conditions and social relations than by individual demographic or socio-economic factors. The negative direct effect of distance on digital literacy confirms that remoteness continues to limit the development of digital capacity. Conversely, the positive effect of distance on social capital indicates that rural communities situated farther from urban centers tend to exhibit stronger solidarity, participation, and social networks.

Second, social capital has a significant positive relationship with digital literacy (H7). When traced deeper, of the three indicators, social participation plays a significant role in social capital. This means that if a person is actively involved in the community, it increases the chance of improving digital literacy. Through their involvement, people will learn about digital information technology with their friends. They ask questions and get tips and practices together with their friends. Discussions about cellphone brands and prices, cheap internet packages, cheap and guaranteed stores, and applications and their features and uses are carried out in between their activities.

Table 4. Hypothesis Testing

	Hypothesis	R	t-value	p-value	Significant
H1	Distance→ DL	-0,184	2,491	0,013	sig, negative
H2	Distance→ SC	0,559	7,934	0,000	sig, positive
H3	PC→ DL	-0,236	1,188	0,235	non-sig
H4	PC→ SC	-0,003	0,038	0,969	non-sig
H5	SES→ DL	0,117	0,148	0,883	non-sig
H6	SES→ SC	0,293	1,026	0,305	non-sig
H7	SC→ DL	0,398	4,471	0,000	sig, positive
H8	Distance→ SC→ DL	0,223	4,096	0,000	sig, positive
H9	PC→ SC→ DL	0,001	0,038	0,970	non-sig
H10	SES→ SC→ DL	0,117	1,030	0,303	non-sig

Source: Authors own works

**Figure 4.** Structural model of digital media literacy among rural communities in the post-covid-19 era

Source: Authors own works

Social capital, in turn, exerts a significant positive effect on digital literacy and mediates the impact of distance. From a sociological perspective, these findings suggest that geographical marginality does not solely result in digital disadvantage; it also fosters communal attachments that can partially offset structural constraints. Therefore, digital literacy in rural areas should be understood as a socially embedded capacity that arises from the interplay among remoteness, collective life, and community-based relations. In contrast, personal conditions and economic or social status did not exhibit significant direct or indirect effects on digital literacy. This outcome indicates that individual-level characteristics cannot sufficiently explain rural digital inequality. Instead, the findings underscore the importance of conceptualizing village society as a relational space in which social cohesion, participation, and networks are more influential than demographic or economic differences. The results therefore support the sociological perspective that digital transformation in rural communities is shaped not only by access to technology, but also by the

strength of collective social organization. In summary, the decisive factors are not solely individual attributes or income, but also the degree of remoteness and the strength of community connections.

Third, there is a positive relationship between distance and social capital. This suggests that the more remote a village is, the higher its level of social capital, particularly in terms of social participation. This pattern is also supported by Figure 4, which shows a positive path between distance and social capital in the structural model. In this sense, geographical remoteness appears to be associated with stronger community ties and greater participation in collective life. This finding resonates with classic sociological perspectives on rural society. Émile Durkheim, for example, argued that rural communities are more likely to be characterized by mechanical solidarity, marked by shared occupations, common values, and strong social cohesion. (Cloke, 2006). This differs from urban settings, where greater occupational diversity tends to produce organic solidarity. In such contexts, social bonds are formed through differentiated and interdependent roles rather than through similarity. As a result, participation in communal activities may become less central, as individuals are often more focused on their respective work and tend to relate to others in more impersonal ways.

In contrast to what happened to the people in Bojonegoro Regency, the community's dynamic conditions led to changes in their interactions. Solidarity is characterized by a deep relationship rooted in high social cohesion in agriculture, and is supported by an adequate internet network that exposes rural communities in Bojonegoro Regency to technology and information. Distance is characterized by access to digital literacy, which is highly dependent on social capital, referring to the resources available to the community in Bojonegoro District. This is also supported by trust, norms, and relationships that foster cooperation among its members. The farther the distance and the stronger the social capital among the community, the greater the desire to improve understanding of digital literacy. Social capital is very important because it makes it easier for someone to understand digital literacy and receive input from their peers and community members. Conversely, even when the distance is short and social capital is low, people will be reluctant to understand digital literacy. In the context of digital literacy, social capital helps individuals adapt and develop through interactions with technology. The existence of this social network is necessary to support the social capital individuals possess. One of them is to build awareness of the importance of digital literacy. This allows individuals to be better prepared to deal with rapid technological change. Access to resources and opportunities involving vertical relationships between individuals, communities, or institutions that control natural resources will have a significant impact. This is especially important in alleviating problems caused by distance that makes it difficult to access technological developments.

The implementation of digital literacy is not only focused on the technical ability to use digital devices, but also on people's understanding of how to adopt and utilize technological innovations. The process of technology adoption, as explained in the Diffusion of Innovations theory, depends on the social capital of individuals and groups. Therefore, the existence of social capital variables depends on groups from diverse social backgrounds, thereby involving individuals in a wider and more heterogeneous network. In line with the Bojonegoro Community, if we want to improve digital literacy skills, active involvement in larger community groups is needed, for example, professional networks or digital communities that span various layers of society. The development of digital literacy extends beyond the technical ability to operate digital devices. It should be understood as part of a broader social process in which individuals adopt, interpret, and utilize technological innovations in daily life. From a sociological perspective, the diffusion of digital practices is intrinsically linked to the social relations that connect individuals to others, groups, and institutions. Social capital serves as a crucial foundation by facilitating the circulation of information, trust, and

shared learning within the community. In the context of Bojonegoro, strengthening digital literacy relies not only on individual competence but also on active participation in broader and more diverse social networks, including professional groups, digital communities, and other collective forums that extend beyond immediate village affiliations.

Engagement with social networks in Bojonegoro enables community members to collectively learn, exchange, and internalize new digital practices. Social capital should thus be conceptualized not only as interpersonal closeness but as a social resource that reinforces group solidarity and facilitates access to relationships across groups and institutions. Internal solidarity fosters trust and collective support, while broader networks provide opportunities to access new knowledge, digital resources, and institutional assistance. This is particularly significant because digital literacy among socially and economically vulnerable groups often depends on support from external actors, such as government agencies and organizations capable of delivering interventions tailored to local infrastructure, public services, and local wisdom (Neumeyer et al., 2021). Furthermore, digital literacy should not be regarded as an isolated individual skill, as it is continually shaped by the social environment in which individuals live, interact, and ascribe meaning to technology (Kusumawardani et al., 2022). Consequently, enhancing digital literacy in Bojonegoro requires not only improved technological access but also stronger social relations that empower individuals and communities to participate in digital life in a more collective, meaningful, and socially embedded manner.

While education and socio-economic status are often considered forms of economic capital, the present findings indicate that economic resources alone do not fully account for digital literacy in rural communities. These results support the argument that digital capacity in village contexts is shaped not only by access to technology, but also by the interaction between digital resources and existing offline capital, such as social and cultural capital. (Rahmawati et al., 2021). This perspective clarifies why personal conditions and socio-economic status were not significant predictors in this study. In contrast, social capital emerged as a more influential factor in the development of digital literacy. Thus, digital literacy in rural communities should be conceptualized not simply as the possession of devices or financial means, but as a socially embedded capacity developed through relationships that facilitate collective access to, interpretation of, and engagement with digital practices. The primary contribution of this study is to demonstrate that social capital not only accompanies rural digital engagement, but also directly enhances digital literacy and mediates the impact of remoteness.

The findings further indicate that rural digital transformation is mediated by collective social organization, rather than being determined solely by individual demographic or economic characteristics. The importance of social capital demonstrates that digital inequality cannot be resolved through infrastructural improvements alone; it requires comprehensive support systems that engage community-based actors and local institutions (Bahagijo et al., 2022). This study contributes by showing that, in rural contexts, community-based relationships serve not only as external support, but also as internal mechanisms through which digital literacy is developed and maintained. This perspective also clarifies why remoteness functioned not only as a structural disadvantage, but also as a condition that preserved collective ties capable of facilitating digital adaptation. Therefore, rural digital literacy should be understood as a socially produced capacity, shaped by spatial inequalities and by the collective processes through which digital practices are integrated into village life.

CONCLUSION

The findings indicate that digital literacy in rural communities is shaped not only by access to technology and individual capacity, but also by the interaction between spatial conditions and social

relations. Distance was found to have a direct negative effect on digital competence, while simultaneously strengthening social capital, which in turn contributed positively to digital literacy. In contrast, personal condition and socio-economic status did not demonstrate significant effects, suggesting that rural digital inequality cannot be adequately explained by individual demographic or economic variables alone. These results confirm that digital literacy continues to be shaped by the unequal conditions in which rural communities live, interact, and build collective resources. Therefore, rural digital transformation is mediated not only by access to technology, but also by the strength of solidarity, participation, and social networks within the community.

These conclusions suggest that efforts to improve digital literacy in rural areas should extend beyond a narrow focus on infrastructure provision. Given that distance and social capital were the strongest explanatory factors, policy strategies should integrate digital access initiatives with community-based approaches that enhance collective learning, social participation, and locally grounded digital support. Government agencies, village institutions, local community organizations, and other public bodies can play a strategic role by organizing participatory training, developing village-based digital learning spaces, and designing programs tailored to rural spatial conditions and existing social networks. Emphasis should be placed on strengthening digital safety, critical information verification, and responsible digital practices, as these areas remain unevenly developed in rural settings. Future research could expand upon this study by examining rural digital literacy in other regional contexts, incorporating qualitative approaches to capture everyday digital experiences more deeply, and exploring how various forms of community support influence digital literacy over time.

Author Contribution

Conceptualization, F.X.S. and E.K.H.; methodology, F.X.S. and E.K.H.; validation, F.X.S., E.K.H., and D.U.; formal analysis, F.X.S. and E.K.H.; investigation, E.K.H., D.U., E.E., and F.T.; resources, F.X.S., S.H., N.C.S., and F.T.; data curation, E.K.H., D.U., and E.E.; writing—original draft preparation, E.K.H. and F.X.S.; writing—review and editing, F.X.S., E.K.H., S.H., N.C.S., E.E., and F.T.; visualization, E.K.H. and E.E.; supervision, F.X.S. and E.K.H.; project administration, F.X.S. and E.K.H.; funding acquisition, F.X.S. and E.K.H. All authors have read and agreed to the published version of the manuscript.

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Conflict of Interests

The authors declare no conflict of interest.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to ethical and privacy considerations.

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