Jurnal Ilmu Komputer & Agri-informatika

Tersedia secara *online* di:
http://journal.ipb.ac.id/index.php/jika

Volume 11 Nomor 2 halaman 143 – 155
e ISSN: 2654-9735, p ISSN: 2089-6026

Pengukuran Kesiapan Adopsi Teknologi Informasi Pada Poktan Hidup Baru Dengan Metode Digital Literacy Index

Measuring E-Readiness for Information Technology Adoption in Poktan Hidup Baru using Digital Literacy Index

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Abstract

Although advances in digital technology offer great opportunities to improve efficiency and productivity in agricultural sector, its application has been uneven. Adoption of information technology still faces challenges, especially among farmers. This study aims to measure the readiness of information technology adoption in the Kelompok Tani (Poktan) Hidup Baru, Cempaka District, OKU Timur, using the Digital Literacy Index (DLI) which includes four main pillars such as Digital Skill, Digital Ethics, Digital Safety, and Digital Culture. The results show that farmers' digital literacy index has an average of 2.91, lower than the national average of 3.54. The biggest gap is in the digital skills pillar (2.20), signaling difficulties in operating devices. Meanwhile, digital ethics awareness is quite good (2.87). Education level (r = 0.79) and frequency of internet use (r = 0.97) have positive correlations with digital skills. However, the correlation between digital skills and digital safety was weak (r = 0.14), indicating a lack of understanding of cybersecurity. Targeted initiatives, such as digital training, mentorship, and improved access to affordable internet and devices, are key to enhancing digital literacy in Poktan Hidup Baru, thereby supporting technology adoption.

Keywords**:** Digital Literacy Index, DLI, E-Readiness, Information Technology Adoption, Kelompok Tani, Poktan.

INTRODUCTION

Indonesia as an agrarian country relies heavily on the agricultural sector, which serves as the backbone of the national economy (Halawa 2024). There are approximately 27.8 million farmers managing agricultural land and 17.2 million seasonal farmers (Badan Pusat Statistika,2023), of which 16.15% of the total Indonesian population in 2023 work in this sector. With a contribution of 12.53% to the Gross Domestic Product (GDP) in 2023 (Afandi 2024), it is clear that the agricultural sector has an important role in generating labor and supporting the Indonesian economy.

To improve farmers' productivity and welfare, the government has encouraged the formation of Kelompok Tani (Poktan). Poktan is a group of farmers, ranchers, or planters formed based on common interests, socio-economic conditions, resources, commodities, and familiarity to support the business development of its members (Kementerian Pertanian Republik Indonesia 2013). In today's digital era, the utilization of information technology is needed to support the role of Poktan in improving the efficiency and quality of agricultural products.

Advances in information technology open up new opportunities for the agricultural sector. The utilization of technology is able to increase efficiency, productivity, and quality of results which are the main keys in encouraging innovation (Maulina 2023). For example, the use of Internet of Things (IoT)-based applications and automated systems can increase farmers' productivity and income (Maulana *et al*. 2023). However, the adoption of these technologies

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requires adequate readiness from farmers to avoid barriers in the use of digital tools. Technology adoption readiness or e-readiness is an important indicator that shows the willingness of individuals or organizations to utilize technological innovations (Haffar, *et al*., 2023).

One way to measure technology adoption readiness is through the Digital Literacy Index (DLI), which assesses individual abilities in four main pillars, including digital skills, digital ethics, digital safety, and digital culture (Kemenkominfo & Katadata Insight Center 2023). Research by Wahyuni *et al* (2023) found that digital literacy training can improve the digital literacy index among public service staff, while Ma *et al* (2024) demonstrated positive impacts on livestock farmers' livelihood resilience by diversifying income sources, improving access to information and training, and fostering a positive psychological outlook. Additionally, Gong *et al* (2024) highlighted the role of digital literacy in empowering farmers to adopt sustainable agricultural practices and understand market demands. These findings underscore the critical importance of digital literacy in the modern era, emphasizing its potential to drive innovation, improve livelihoods, and promote sustainable development.

Based on this description, this study aims to apply the Digital Literacy Index (DLI) method in the context of Poktan Hidup Baru in Cempaka sub-district, OKU Timur. The District Chief of OKU Timur, Lanosin Hamzah, said that the farmers in Cempaka sub-district cultivate approximately 5,000 hectares of land as part of the Ministry of Agriculture's 2024 land optimization program (ANTARA 2024), a major initiative aimed at improving agricultural productivity and land use efficiency. Given the growing role of technology in agriculture, assessing Poktan members' digital literacy is crucial for the success of this program. By measuring the digital literacy level of Poktan members, this study will evaluate their readiness to adopt information technology and compare it with the national digital literacy index. The research will also analyze the influence of demographic factors on digital literacy and Poktan members' readiness to adopt technology. By analyzing the relationship between the various pillars of digital literacy, the results of this study are expected to contribute greatly to the improvement of digital literacy among Indonesian farmers, particularly in regions engaged in agricultural programs like that in Cempaka.

METHODS

The research process focused on measuring the Digital Literacy Index (ILD) through its four main pillars such as Digital Skill, Digital Ethics, Digital Safety, and Digital Culture. This systematic process began with problem identification, literature study, and determining the research method, population, and sample, followed by instrument validation and data analysis. Figure 1 illustrates the flowchart of the research conducted by the researcher.

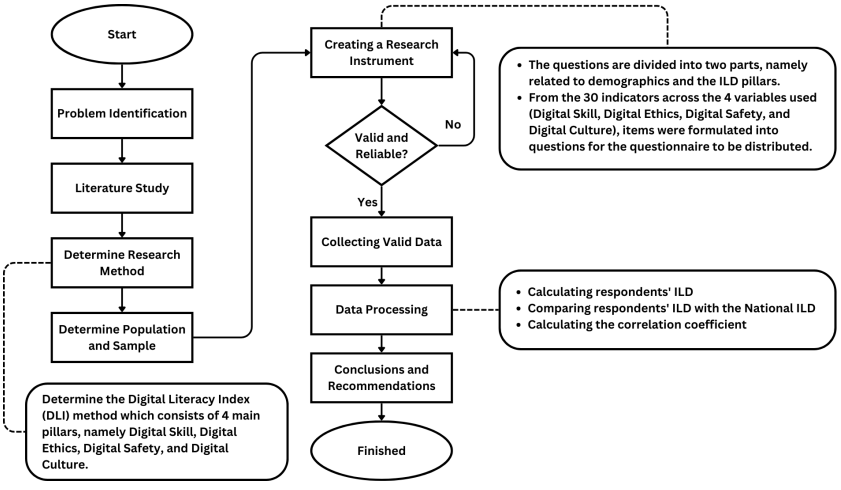

Figure 1 Research Flowchart

Data Collecting Method

The research phase began with identifying problems related to digital literacy that wanted to be researched. After that, researchers conducted a literature study to obtain a theoretical basis and a deeper understanding of the research topic. Next, researchers chose the appropriate research method, namely the Digital Literacy Index (DLI) method. Then determine the population and sample. This study involved all members of Poktan Hidup Baru as a population, which were 29 people.

The next step involved developing research instruments, including questionnaires to measure identified variables. The first section collected respondent profiles, such as name, gender, age, education level, internet usage status (user or non-user), and purpose of internet use. The main section then focused on digital literacy indicators from the Indonesia Digital Literacy Road Map 2020–2024. To adapt the DLI for Poktan Hidup Baru's rural agricultural setting, questions emphasized farming-related digital skills, such as accessing agricultural information and using online marketplaces. Digital safety questions were also refined to help farmers identify reliable sources and securely use public internet resources. The full set of digital literacy indicators is presented in Table 1.

Table 1 Diagram of Respondent Characteristics

Variable	Code	Question Instrument
Digital Skill	SK1	I am able to download files or applications
	SK2	I am able to connect my device to the internet
	SK3	I am able to upload files or documents
	SK4	I am able to search for and access data, information, and content on digital media
	SK5	I am able to store data, information, and content in digital media
	SK6	I am able to interact through various digital technology communication devices
	SK7	I am able to shop through online shops
	SK8	I am able to compare various sources of information to decide whether the information is correct
	SK9	I am able to find out whether the information I find on websites is true or false
Digital Ethics	ET1	I do not persuade people to make negative comments
	ET2	I avoid screenshots of private conversations on social media
	ET3	I refrain from making rude comments
	ET4	I do not create groups or add people without their permission
	ET5	I do not upload photos of other people's children
	ET6	I do not tag friends without notifying them
	ET7	I avoid sharing accident information immediately
Digital Safety	SA1	I habitually create complex passwords incorporating alphanumeric and special characters
	SA2	I configure my social media privacy settings to control post visibility
	SA3	I deactivate geolocation services on my devices
	SA4	I employ a redundant data backup system
	SA5	I am familiar with the procedures for reporting abuse on social networks
	SA6	I utilize applications designed to identify and eliminate malware
	SA7	I am capable of differentiating between spam, virus, and malware-infected emails
Digital Culture	CU1	I tailor my communication to foster mutual respect and avoid causing offense
	CU2	I am cognizant of the sensitivities of readers from diverse religious backgrounds
	CU3	I consistently acknowledge and respect cultural diversity in my online interactions
	CU4	I am mindful of the perspectives of readers from various ethnicities
	CU5	I digitally disseminate Indonesian traditional and contemporary artistic expressions
	CU6	I am respectful of the diverse political viewpoints of my audience
	CU7	I attribute authorship when sharing the work of others

Source: (Kemenkominfo & Katadata Insight Center 2023)

Through validity and reliability tests, all instruments were proven valid and reliable for use in collecting data from the research sample. Data collection was conducted directly at the Village Hall of Cempaka Sub-district, East Ogan Komering Ulu Regency. Although only 23 members or 79.3% of the total population were successfully interviewed for questionnaire completion, this sample was considered representative enough to describe the characteristics of the entire population, given the relatively homogeneous nature of the population and the use of a random sampling technique.

Data Analysis Technique

The raw data collected was then processed in depth to answer the research questions. The calculation of the Digital Literacy Index (DLI) was carried out in several stages, consisting of:

1. Calculating the percentage of each variable by dividing the number of respondents who chose a particular category by the total respondents on that variable which can be shown through Equation (1).

$$P_{ij} = \frac{n_{i,j}}{N_j} \times 100 \quad (1)$$

Description:
P_{ij} = Percentage of the -th criterion for the -th variable
$N_{i,j}$ = Number of respondents who chose the -th criterion for the -th variable
N_j = Total respondents for the -th variable

2. Calculate the index of each variable by multiplying the weight of each category by the percentage of respondents who chose that category, then summing the results of multiplying all categories as shown in Equation (2).

$$I_j = \sum_{i=1}^{k} W_i \times P_{i,j} \quad (2)$$

Description:
I_j = Index of the -th variable
W_i = Weight of the -th criterion (measured on a Likert scale of 1-5)
$P_{i,j}$ = Percentage of the -th criterion in the -th variable
k = Number of criteria categories

3. Calculating the total index per pillar by summing up all variable indices in the pillar, then dividing by the number of variables in the pillar as in Equation (3).

$$I_{pillar} = \frac{\sum_{i=1}^{k} I_j}{m} \quad (3)$$

Description:
I_{pillar} = Total index for the pillar
I_j = Index of the -th variable
m = Number of variables in the pillar

4. Calculating the total digital literacy index by summing up all the total pillar indices, then dividing by the number of pillars as in Equation (4).

$$I_{total} = \frac{\sum_{p=1}^{n} I_{pillar}}{n} \quad (4)$$

Description:
I_{total} = Total Digital Literacy Index
I_{pillar} = Total index for -th pillar
n = Number of pillars

Furthermore, a correlation coefficient analysis using Pearson's Product-Moment was conducted. In this research, correlation analysis will be carried out using SPSS software to process data and calculate the correlation coefficient between related variables. The interpretation of the correlation coefficient value based on general guidelines is as follows (Nugroho, 2005):

- Pearson Correlation value 0.00 to 0.20 = very weak correlation
- Pearson Correlation value 0.21 to 0.40 = weak correlation
- Pearson Correlation value 0.41 to 0.70 = strong correlation
- Pearson Correlation value 0.71 to 0.90 = very strong correlation
- Pearson Correlation value 0.91 to 0.99 = extremely strong correlation
- Pearson Correlation value 1.00 = perfect correlation

Finally, based on the results of the data analysis, the researcher draws conclusions and provides relevant recommendations or suggestions to address the problems that have been identified at the beginning of the research.

RESULT AND DISCUSSION

Respondent Profile

The profile of the respondents was identified through a number of characteristics, including age, gender, latest level of education, internet user status (user or non-user), and purpose of internet use. Details of the respondents' characteristics are presented in Figure 2.

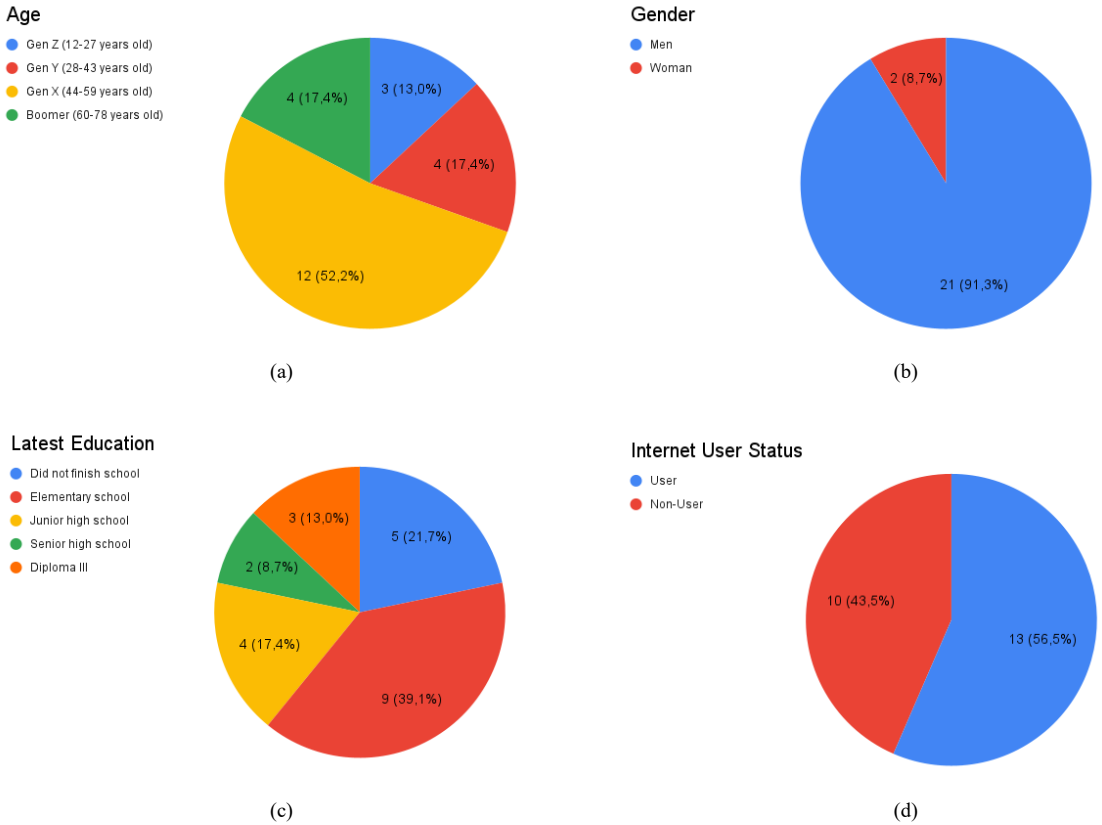

Figure 2 Pie Chart of Respondent Characteristics

Figure 2(a) shows that the majority of respondents are from Generation X (44-59 years old) with 12 respondents (52.2%), followed by Generation Y (28-43 years old) and Baby Boomer (60-78 years old) with 4 respondents each (17.4%), while Generation Z (12-27 years old) is only represented by 3 respondents (13.0%). Furthermore, Figure 2(b) shows that men dominate with a proportion of 91.3% (21 respondents), while women are only 2 respondents (8.7%). In terms of education, Figure 2(c) shows that 9 respondents (39.1%) have primary school education, 5 respondents (21.7%) did not complete formal education, 4 respondents (17.4%) graduated from junior high school, 2 respondents (8.7%) graduated from senior high school, and 3 respondents (13.0%) graduated from Diploma III. Meanwhile, Figure 2(d) shows that the majority of respondents, 13 people (56.5%), are internet users, while 10 respondents (43.5%) do not use the internet. This analysis reflects a diverse demographic profile in terms of age, gender, education and access to technology.

Of the 13 respondents who use the internet, in-depth information about the purpose of using the internet from the respondent's daily life is conducted as shown in Figure 3. All internet users (100%) access social media, chat, or video calls. 92.3% use the internet as a source of information, 84.6% for entertainment and online shopping or banking services, and 38.5% for health and government services.

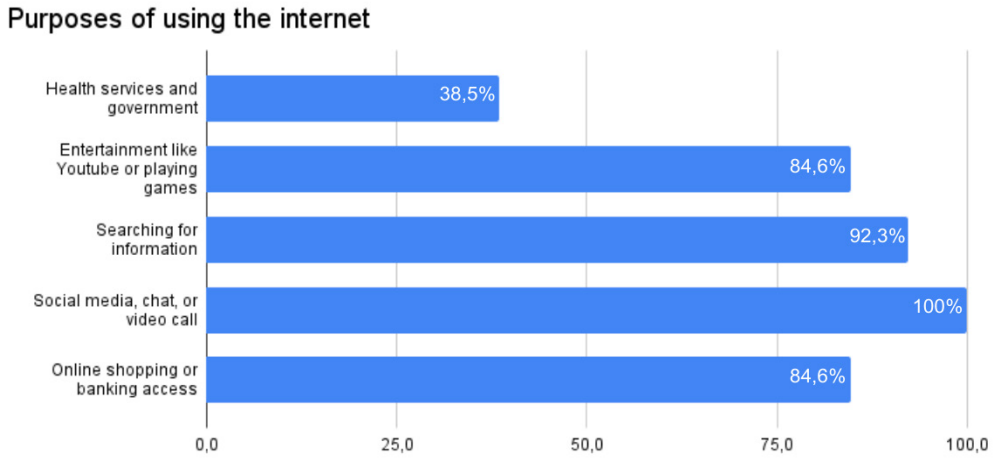

Figure 3 Diagram of Respondent Characteristics Based on Purpose of Internet Use

Digital Skill Pillar

Figure 4 shows the digital skill pillar index survey. The top indicator that respondents mastered was the ability to seacrh and access data, information, and content on digital media (index 2.96), while the lowest indicator was the ability to verify the accuracy of information (index 2.20). These skills are crucial for technology adoption and data-driven decision-making.

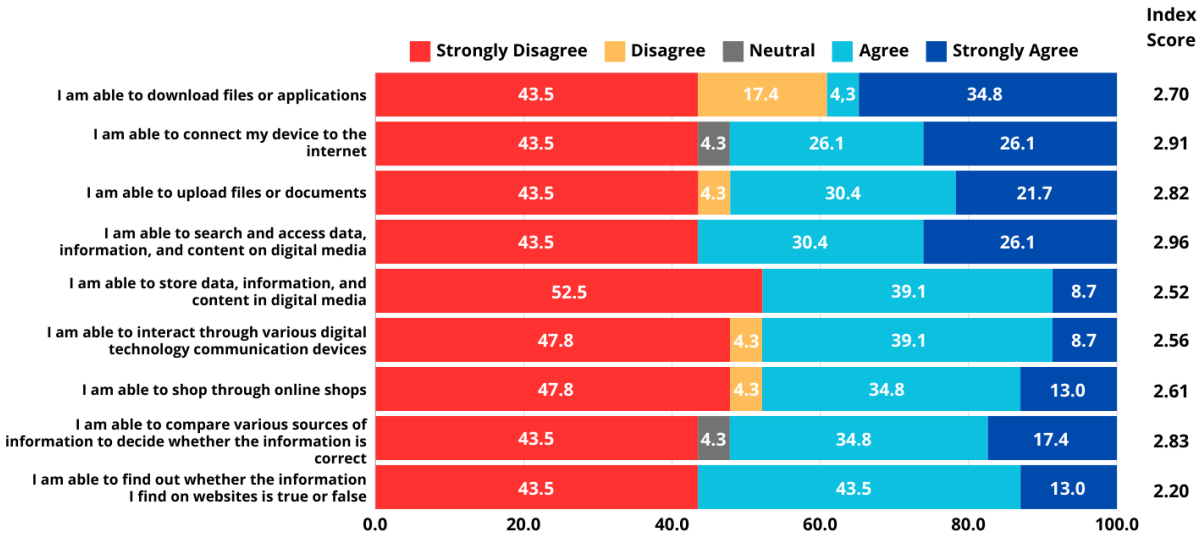

Figure 4 Digital Skill Pillar

Figure 5 clearly shows the comparison between the respondents' digital skills index and the national index. This indicates that there is a significant gap in the mastery of digital skills among respondents compared to the general population, which may hinder readiness for effective adoption of information technology. Without adequate digital skills, an individual's ability to utilize technology will be hampered.

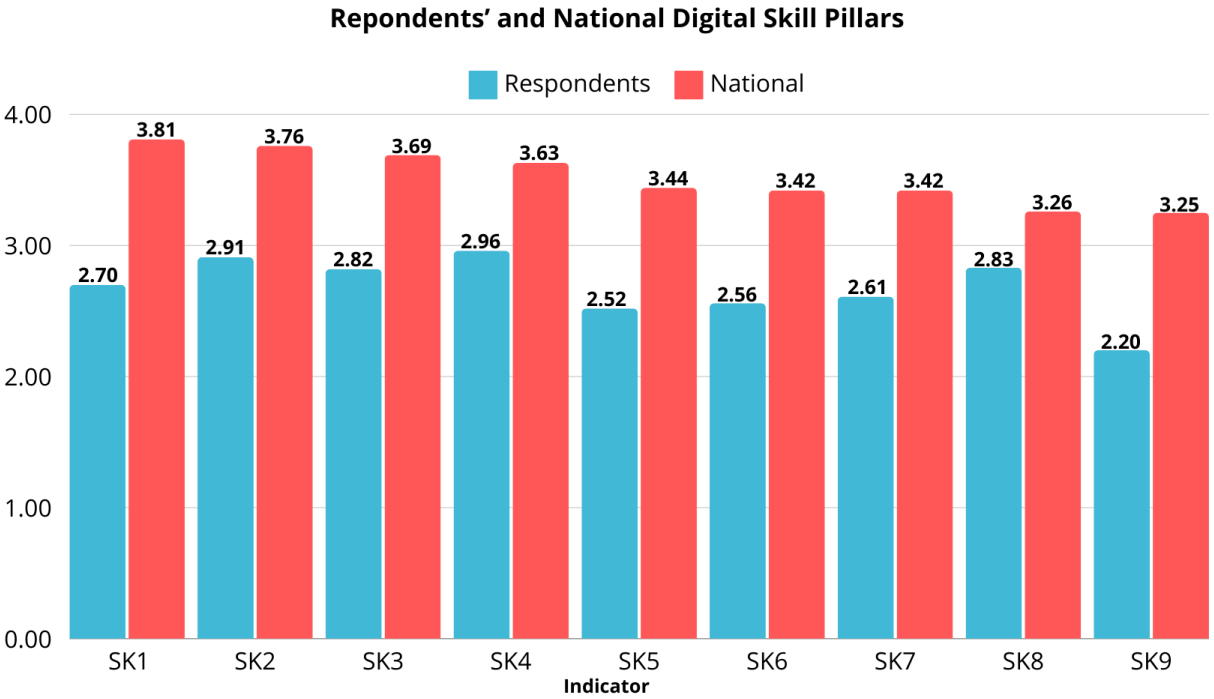

Figure 5 Respondents' and National Digital Skill Pillars

Digital Ethics Pillar

Figure 6 displays the survey results of the digital ethics pillar, where awareness of not persuade people to make negative comments is the largest contribution (index 3.48). However, the low awareness of avoid screenshots of private conversations (index 2.87) indicates a gap in the understanding of digital ethics, which may affect the adoption of information technology.

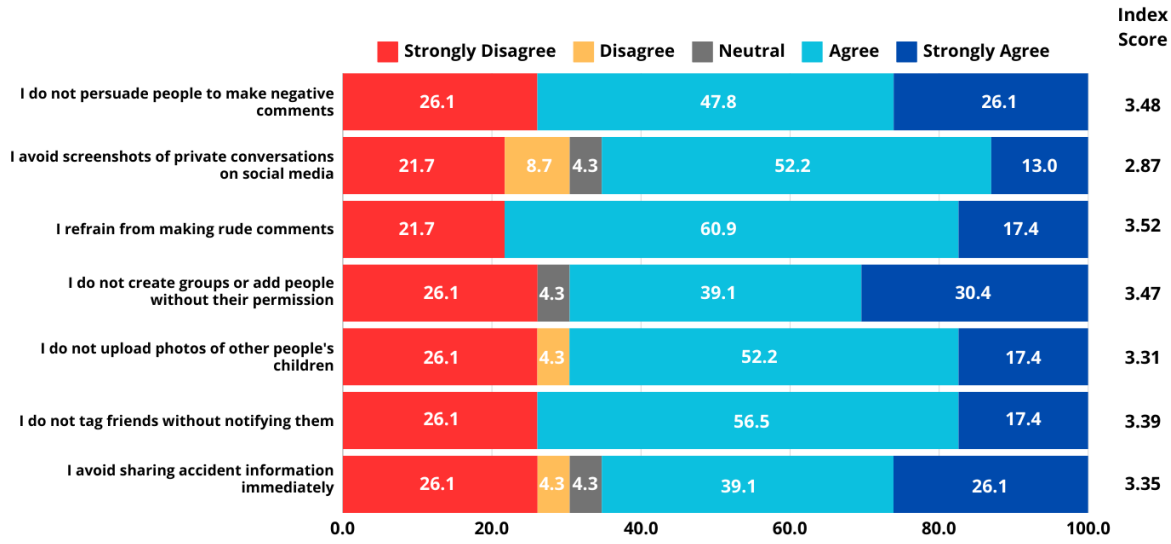

Figure 6 Digital Ethics Pillar

Figure 7 shows a comparison of the digital literacy index of the respondents' digital ethics pillar and the national one. However, the indicator related to not sharing screenshots of private conversations is significantly lower, reaching only number 2. This indicates that although most respondents have a fairly good understanding of digital ethics, there are still gaps in understanding the importance of maintaining the privacy of personal data, which may hinder the readiness to adopt technologies that involve processing personal data.

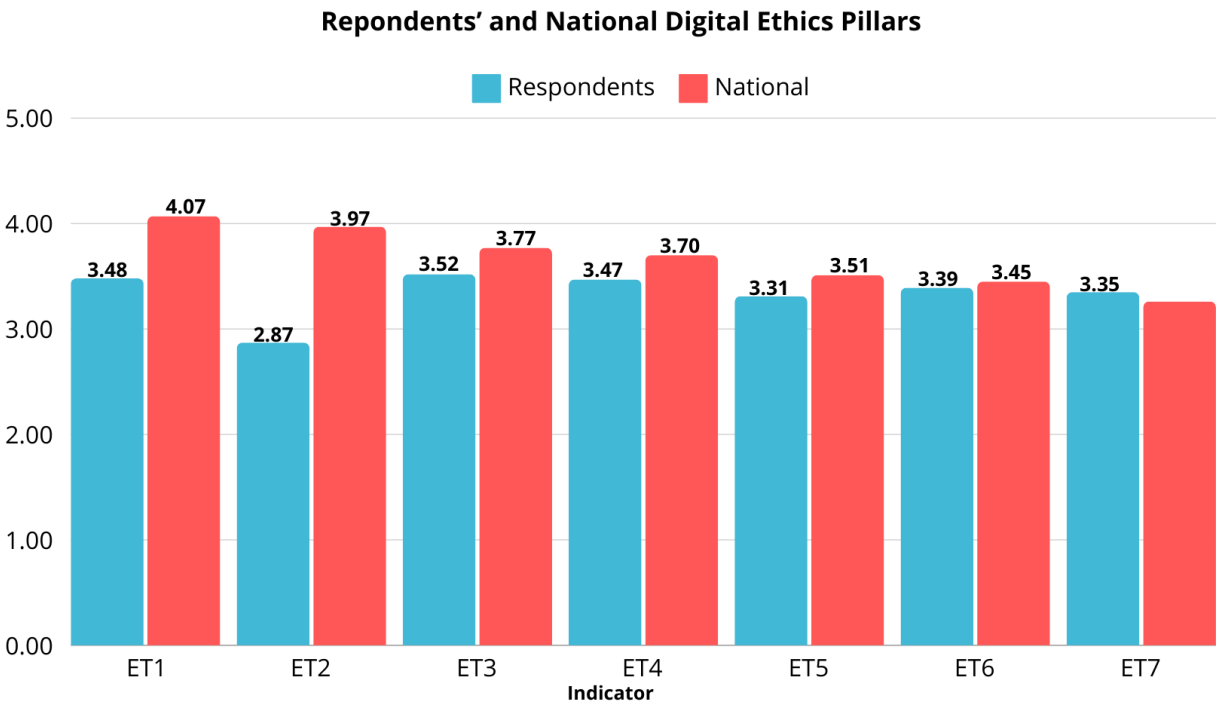

Figure 7 Respondents' and National Digital Ethics Pillars

Digital Safety Pillar

Figure 8 shows the digital safety pillars, where the ability to manage location privacy settings is the highest (index 2.70). However, the understanding of using antivirus applications is low (index 1.91). Technology adoption readiness is strongly linked to digital safety understanding.

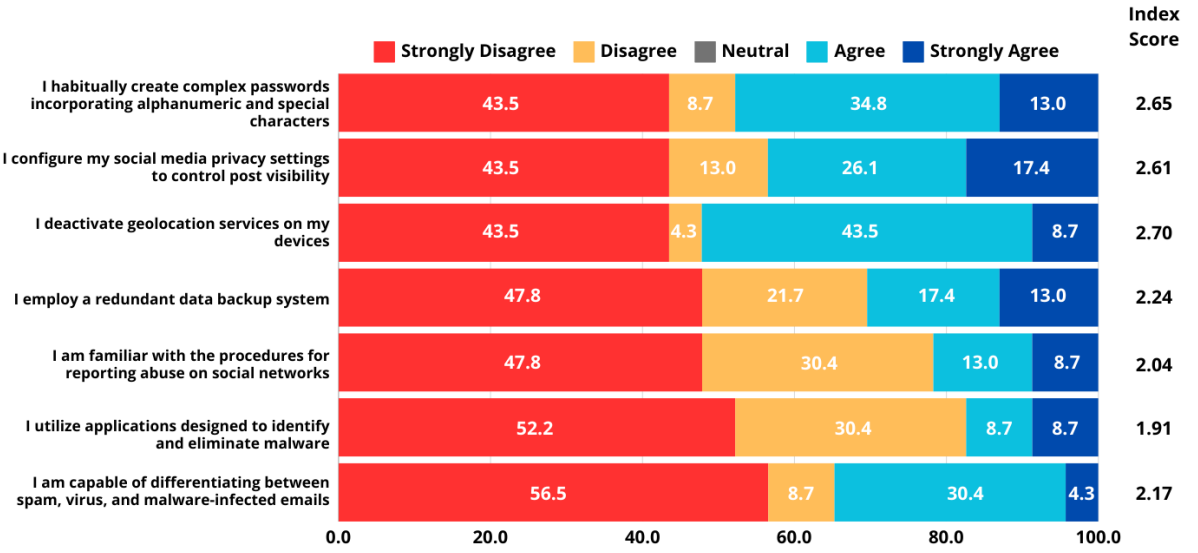

Figure 8 Digital Safety Pillar

Figure 9 shows a comparison of the safety pillar digital literacy index between respondents and the national. The respondents' index value is still lower than the national index. Even the indicator related to the use of antivirus applications only reaches 1. This indicates a very limited understanding of the importance of protecting devices from cyber threats. This limited understanding can be a significant obstacle to information technology adoption readiness. Without adequate security measures, individuals are at risk of facing security issues that can disrupt their experience and trust in using technology.

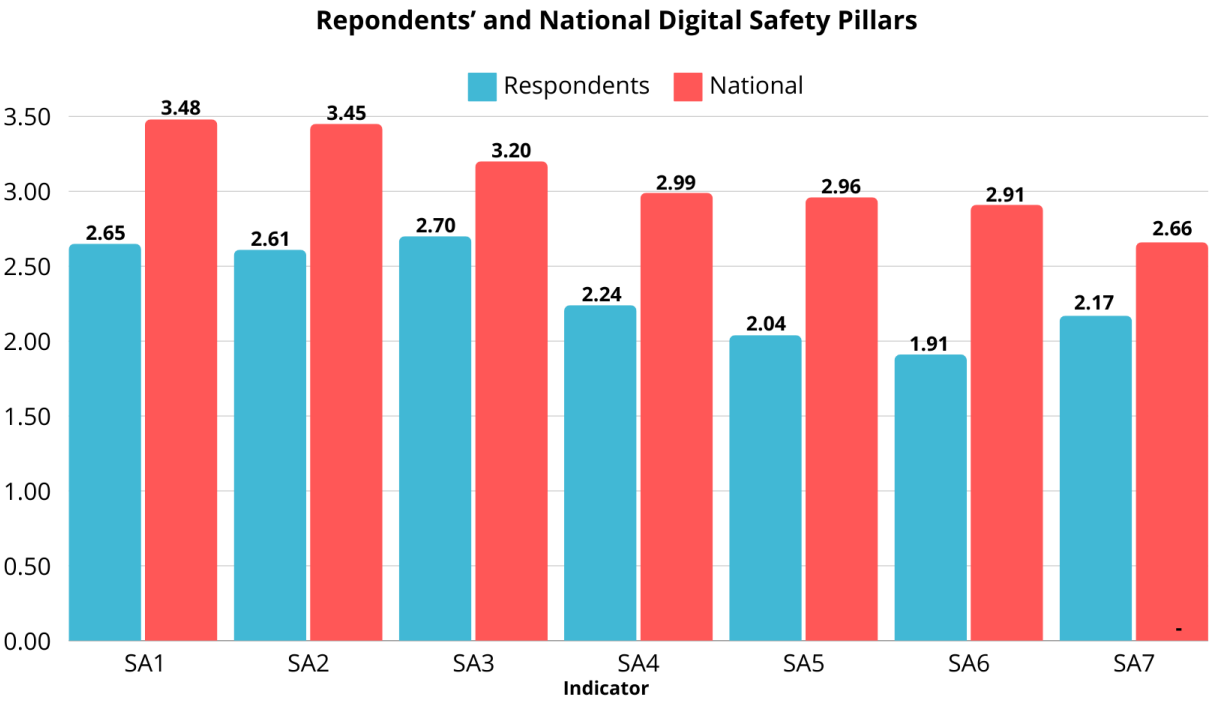

Figure 9 Respondents' and National Digital Safety Pillars

Digital Culture Pillar

Figure 10 shows that all indicators in the digital culture pillar are above 3, with the ability to communicate non-offensively being the highest (index 3.74). However, digitally sharing Indonesian cultural arts was recorded as the lowest indicator (index 3.08), indicating the need to maximize technology in preserving culture.

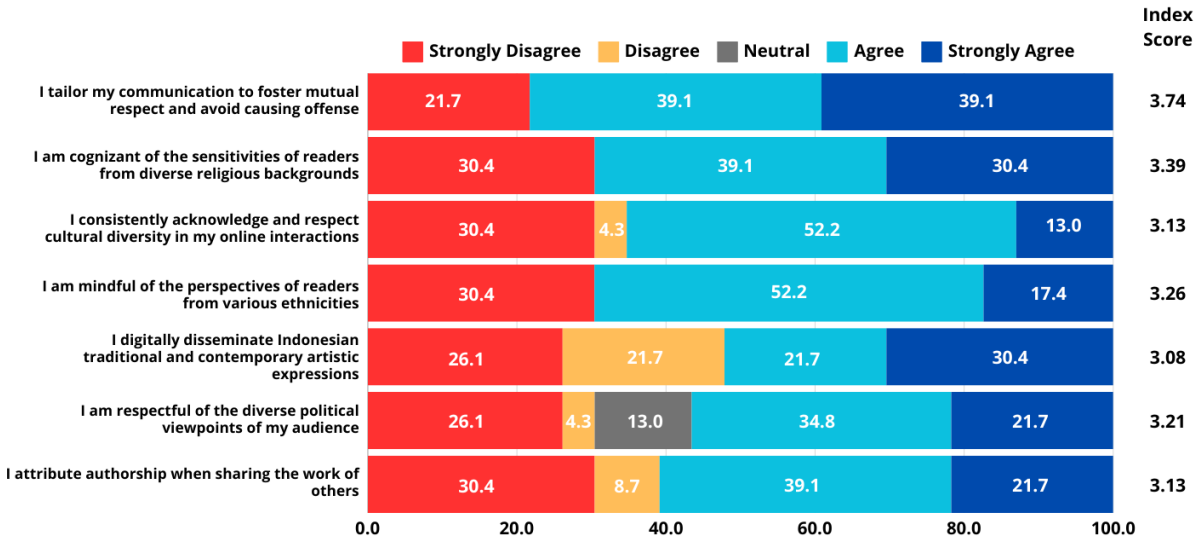

Figure 10 Digital Culture Pillar

Figure 11 shows that overall, respondents have a fairly good level of digital literacy in the digital culture pillar, with all indicators above 3. Although the indicator related to sharing Indonesian art digitally is the lowest in the respondent group, it is still higher than the national average index. In addition, the indicator related to tolerance of different political views also shows a better index compared to the national average. This positive level of digital literacy contributes to the readiness of information technology adoption. A good understanding of digital culture and openness to differences can encourage individuals to be more active and confident in using technology in various contexts, including in sharing information and collaborating online.

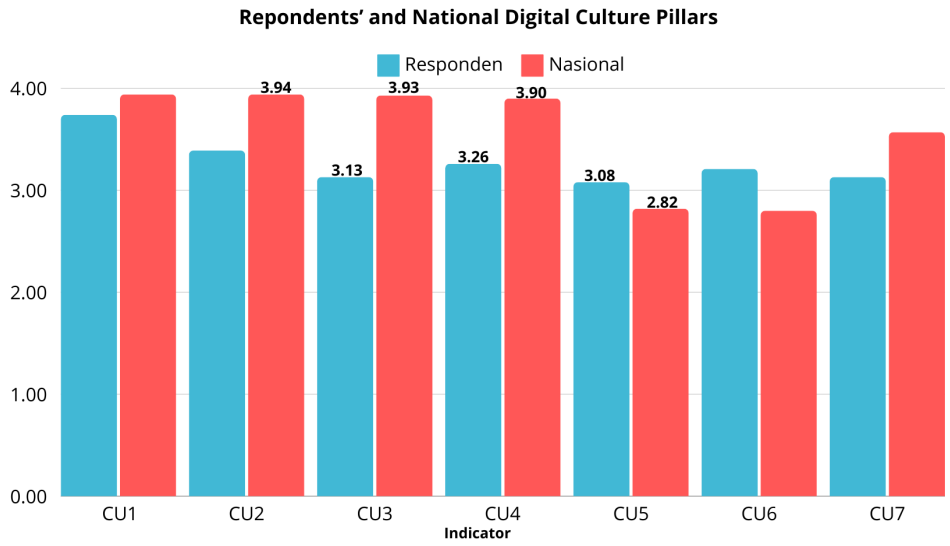

Figure 11 Respondents' and National Digital Culture Pillars

Comparison of Index Results

Figure 12 shows a comparison of the average and total index for each pillar of the digital literacy index between respondents and the national level. All pillars and the total index show lower values in the respondent group compared to the national. This gap indicates that overall, respondents still need to improve their digital literacy to optimize the use of information technology and support the adoption of agricultural technology. However, the respondents' index (3.34) is relatively close to the national index (3.68) on the digital ethics pillar. Meanwhile, the digital skill pillar has the most striking gap with a respondents' index of 2.68 compared to the national index of 3.52. The lowest overall score was achieved by the respondents' digital safety pillar which only reached 2.33.

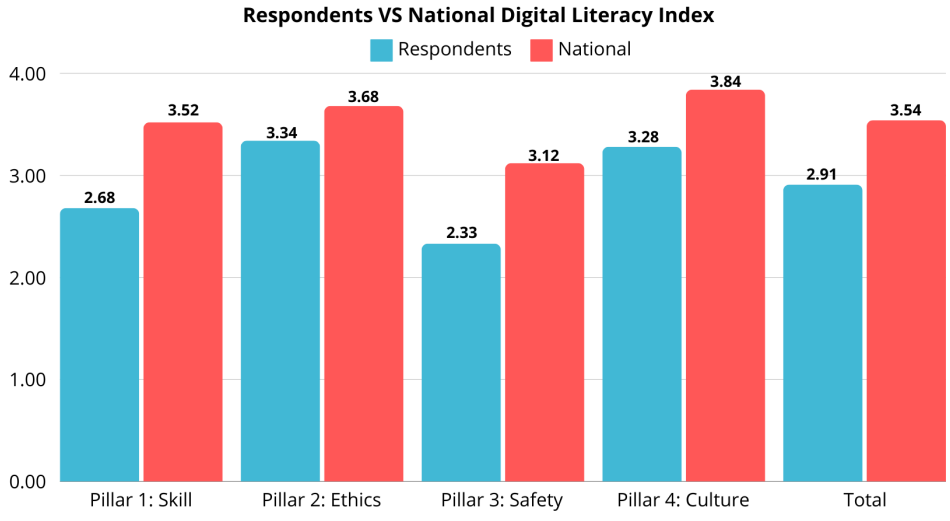

Figure 12 Comparison of Average and Total Indices of Respondents and Nationals

Correlation Analysis

Correlation analysis was conducted to explore the linear relationship between respondents' profiles and the digital literacy index for each pillar, as well as to identify intercorrelations between pillars. The results of the correlation analysis are presented in detail in Figure 13 and Figure 14.

Aspect	Skill	Ethics	Safety	Culture
Age	0.69	0.39	0.60	0.33
Latest Education	0.79	0.50	0.31	0.56
Internet User Status	0.97	0.60	0.46	0.53

Weak Correlation Strong Correlation Very Strong Correlation Extremely Strong Correlation

Figure 13 Correlation between Profile and Pillars of Respondents' Digital Literacy Index

Figure 13 reveals a mixed relationship between respondents' profiles and digital literacy pillars. A weak correlation exists between age and the culture (r = 0.33) and ethics (r = 0.39) pillars, as well as between recent education and the safety pillar (r = 0.31), suggesting a modest relationship. Conversely, strong correlations were found between age and the skill (r = 0.69) and safety (r = 0.60) pillars, between recent education and safety (r = 0.50) and culture (r = 0.56), and between internet user status and the ethics (r = 0.60), safety (r = 0.46), and culture (r = 0.53) pillars. Additionally, a very strong correlation was observed between the latest education and the skill pillar (r = 0.79), and an extremely strong correlation between internet user status and the skill pillar (r = 0.97), indicating a very close relationship. These findings suggest that experience with internet use and levels of education are significant influencing factors on individual readiness to adopt technology.

Aspect	Skill	Ethics	Safety	Culture
Skill	-	0.59	0.46	0.56
Ethics	0.59	-	0.14	0.95
Safety	0.46	0.14	-	0.12
Culture	0.56	0.95	0.12	-

Very Weak Correlation Strong Correlation Extremely Strong Correlation

Figure 14 Correlation Values between Pillars of Respondents' Digital Literacy Index

Figure 14 shows the correlation between the pillars of the respondents' digital literacy index. Very weak correlations were found between the ethics and safety pillars (r = 0.14), as well as the safety and culture pillars (r = 0.12). Strong correlations were found between the pillars of skill with ethics (r = 0.59), skill with safety (r = 0.46) and skill with culture (r = 0.56). A very strong correlation was found between the ethics and culture pillars (r = 0.95). The weak correlation between the safety pillar and culture and ethics suggests that the development of digital literacy is not always balanced. Individuals with high digital skills tend to be more ready to adopt technology, but perceptions of ethics and safety can be a barrier. In conclusion, a holistic approach to digital literacy development, with a focus on digital skills, is important to improve understanding of digital ethics, safety and culture, and people's readiness to adopt new technologies.

CONCLUSION

The level of digital literacy of Poktan Hidup Baru members shows mixed results. Although they already have basic skills in using technology to connect devices to the internet

(index 2.91), the ability to sort out true and false information (index 2.20) and use security applications (index 1.91) is still low. There is a significant gap between the respondents' digital literacy index (average 2.91) and the national average (3.54), especially on the digital skills pillar with a difference of 0.84 points. This indicates that the ability of Poktan members to operate and utilize information technology is still limited, potentially hindering the adoption of more advanced agricultural technology.

Demographic factors such as education level, age, and internet usage frequency play a significant role in influencing digital skills. Respondents with higher education levels ($r = 0.79$) and those who use the internet more frequently ($r = 0.97$) tend to have better digital skills. Additionally, analysis revealed strong relationships between the skill pillar and ethics ($r = 0.59$), safety ($r = 0.46$), and culture ($r = 0.56$), as well as a very strong correlation between ethics and culture ($r = 0.95$). These findings emphasize the importance of improving digital skills to enhance understanding of ethics, safety, and culture in digital literacy, which is crucial for supporting Poktan members' readiness to adopt information technology effectively.

To address digital literacy gaps, targeted initiatives are essential. Local governments, NGOs, and educational institutions can help by providing digital training and mentorship. Expanding access to affordable internet and devices in rural areas is also crucial. By improving digital literacy, Poktan Hidup Baru will be better prepared to adopt technology, boosting agricultural productivity and supporting the Ministry of Agriculture's land optimization program in Cempaka sub-district.

ACKNOWLEDGEMENT

The research/publication of this article contributes to another research that was funded by DIPA of Public Service Agency of Universitas Sriwijaya 2024. DIPA Number 023.17.2.677515/2024, On November 24, 2023. In Accordance with the Rector's Decree Number: 0013/UN9/LP2M.PT/2024, On May 20, 2024.

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