

# Analysis of the Influence of Digital Social Media Literacy on the Performance of Agricultural Extension Workers in Muara Enim Regency, South Sumatra Province

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**Abstract:** This study aims to analyze the influence of social media use on the performance of agricultural extension workers in Muara Enim Regency, as well as to examine the role of digital literacy as a moderating variable. The research was conducted from April to June 2025 using a quantitative approach and an explanatory method. The study population consisted of all active agricultural extension workers in Muara Enim Regency, both civil servants and non-civil servants, totaling 195 individuals. Based on the Slovin formula with a 5% margin of error, a sample of 131 respondents was obtained, considered representative of the population characteristics. Data were collected through a Likert-scale questionnaire (1-5), supported by documentation and observation, and then analyzed using multiple linear regression and Moderated Regression Analysis (MRA) with the aid of SPSS 26. The results show that simultaneously all independent and moderating variables significantly influence the performance of extension workers. Partially, information and communication technology (ICT) competence (X2), personal innovation (X3), and organizational support (X4) have a positive and significant effect on performance. Meanwhile, social media use (X1) and digital literacy (Z) do not have a direct significant effect. However, digital literacy is proven to play a significant moderating role in strengthening the relationship between social media use, ICT competence, and organizational support with the performance of extension workers. Thus, digital literacy is a crucial factor in optimizing the utilization of digital technology to support the improvement of agricultural extension workers' performance.

**Keywords:** Agriculture; Digital literacy; Extension workers' performance; Social media

## Introduction

Agriculture is a strategic sector that plays an essential role in Indonesia's economy. This sector not only contributes to the Gross Domestic Product (GDP) but also serves as the main source of livelihood for more than 30% of Indonesians, most of whom live in rural areas (Badan Pusat Statistik, 2023). Furthermore, agriculture has a vital role in maintaining national food security, which is one of the government's top priorities. However, in recent decades, the agricultural sector has been facing major challenges such as climate change, natural resource degradation, and limited access to technology and information among smallholder farmers (Salasa, 2021). These conditions require innovations and adaptive strategies to sustain agricultural productivity and ensure sustainable development.

In facing these challenges, agricultural extension workers hold a strategic position as agents of change. They not only function as providers of technical information but also act as facilitators, motivators, and connectors between farmers and sources of technology. According to Mailin et al. (2022) in the diffusion of innovation theory, extension workers are key factors in accelerating the adoption of new technologies through effective communication. Previous studies also indicate that well-directed and continuous extension services can enhance farmers' readiness to apply adaptive farming practices and encourage higher productivity (Mahamood, 2018). Thus, the success of agricultural development is highly dependent on the quality and performance of extension workers.

The development of information and communication technology has brought significant changes to extension patterns. Whereas extension was

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previously conducted mainly face-to-face and limited to group meetings, today extension workers are increasingly utilizing social media as a tool for communication, education, and information dissemination. Platforms such as Facebook, YouTube, Instagram, WhatsApp, and Zoom enable extension workers to reach farmers more quickly, broadly, and interactively. Research by Anisa Haswar et al. (2022) shows that the use of social media increases the intensity of communication between extension workers and farmers, which positively affects farmers' decision-making and productivity. Social media can even create dynamic digital communities, allowing extension workers and farmers to continuously share agricultural information, experiences, and solutions (Alif et al., 2023).

Nevertheless, the effectiveness of social media use depends greatly on the digital literacy of extension workers. Digital literacy not only includes technical skills in using digital devices but also the ability to understand, filter, and deliver relevant and valid information (Triaji et al., 2021). Extension workers with high digital literacy can produce creative content such as video tutorials, infographics, or live broadcasts that attract farmers' attention. Conversely, low digital literacy leads some extension workers to use social media in a limited or passive way, which fails to provide significant improvements in the quality of extension services (Kustiari & Ananta Budiman, 2023). This reflects a real gap among extension workers in utilizing digital technology.

This gap is not merely an individual issue but also affects the outcomes of extension activities and farmers' productivity. Several studies demonstrate that extension workers who actively use social media with good content strategies can increase farmers' trust and accelerate the adoption of agricultural innovations (Eza Safitri et al., 2020). However, without adequate digital literacy, social media can instead become a channel for inaccurate information or even misinformation. This emphasizes that digital literacy is a crucial variable with the potential to moderate the relationship between social media use and extension performance (Eza Safitri et al., 2020).

In the local context, Muara Enim Regency, South Sumatra Province, is a region with significant agricultural potential. However, this area also faces specific challenges such as limited internet access, technological infrastructure, and varying levels of digital literacy among extension workers. Some extension workers may already use social media creatively, but many still rely on conventional methods. Until now, no quantitative study has specifically examined the relationship between social media use, digital literacy, and extension worker performance in this region. In fact, the social, cultural, and geographical

conditions of Muara Enim Regency strongly influence the interaction patterns between extension workers and farmers, making locally based studies highly important.

Based on the above, this study focuses on analyzing the relationship between social media use, digital literacy, and the performance of agricultural extension workers in Muara Enim Regency. The results are expected to provide an empirical picture of the real conditions in the field, while also serving as a foundation for recommendations to improve the agricultural extension system in the digital era. Academically, this research is expected to enrich studies on digital literacy in agricultural extension. Practically, the findings may be utilized by local governments and related institutions as a reference for designing training programs and strategic policies to enhance extension workers' capacity. Therefore, this research holds high relevance both for theoretical development and for the practice of sustainable agricultural development in the digital era.

Based on the background described above, two main research problems are formulated as follows:

1. How does social media use influence the performance of agricultural extension workers in Muara Enim Regency, South Sumatra Province?
2. What role does digital literacy play in moderating the relationship between social media use and the performance of agricultural extension workers in Muara Enim Regency, South Sumatra Province?

## Method

This study was conducted in Muara Enim Regency, South Sumatra Province, which is one of the agricultural centers in South Sumatra. The regency was chosen because it has a relatively large number of agricultural extension workers and plays a strategic role in supporting regional food security. In addition, this area faces challenges related to the utilization of social media to support extension tasks.

According to Law No. 16 of 2006 concerning the Agricultural, Fisheries, and Forestry Extension System, extension workers function as agents of change responsible for disseminating innovations, technologies, and information to farmers in order to improve productivity and welfare. In the digital era, extension activities no longer rely solely on face-to-face communication but also require the use of information and communication technology (ICT), including social media (Anang & Cipani, 2022). This is in line with the Diffusion of Innovation Theory, which emphasizes that the adoption of innovation is strongly influenced by the effectiveness of communication channels used, both formal and informal (Suwardi, 2018).

Furthermore, the use of social media in agricultural extension can be explained by the Uses and Gratifications Theory (Karunia H et al., 2021), which emphasizes that individuals use media based on specific needs and purposes, such as seeking information, increasing knowledge, or expanding social networks. For agricultural extension workers, social media can be utilized as a means of accelerating technology transfer, expanding target audiences, and enhancing interactions with farmers in a more flexible manner (Prayoga, 2017).

This research was conducted over a period of three months, from April to June 2025, considering the planting season and the active period of extension workers, so that the data collected would be more accurate and relevant to field conditions. The choice of this period is important because extension activities generally intensify during the planting season, thereby reflecting the actual dynamics between social media use, digital literacy, and the performance of extension workers.

This study employed a quantitative approach with an explanatory method. This method was chosen as it is appropriate for explaining causal relationships between the variables of social media use and extension worker performance, with digital literacy as a moderating variable. According to Akbar et al. (2024), explanatory quantitative research is used to test hypotheses and examine cause-and-effect relationships between variables based on numerical data analyzed statistically. Thus, this study enables the researcher to empirically test the extent to which social media use affects extension worker performance, and whether digital literacy strengthens or weakens this effect.

Data were collected through a Likert scale questionnaire (1-5), which was developed from theoretical indicators related to diffusion of innovation, technology adoption, and digital literacy frameworks. The Likert scale was chosen because it can measure attitudes, perceptions, and levels of acceptance among respondents regarding the research variables (Balaka, 2022).

The Diffusion of Innovation framework explains how new ideas or technologies are adopted by a community based on five dimensions: relative advantage, compatibility, complexity, trialability, and observability. Meanwhile, the Technology Acceptance Model (TAM) emphasizes that user acceptance of technology is determined by perceived usefulness and perceived ease of use. Digital literacy, on the other hand, is understood as an individual's ability to access, understand, evaluate, and use digital information effectively and ethically (Hardani, 2020).

Through this approach, the research results are expected to provide measurable, objective, and

generalizable empirical evidence for the population of extension workers in the study area.

The population in this study consists of all agricultural extension workers actively serving in Muara Enim Regency, both civil servants (PNS) and non-civil servants. Based on data from the Muara Enim Regency Agriculture Office, the total number of active extension workers in the area is approximately 195 individuals.

According to Marlita (2019), a population is a generalization area consisting of objects or subjects with certain qualities and characteristics determined by the researcher to be studied and from which conclusions are drawn. The population in this study is considered administratively homogeneous (as they are all agricultural extension workers) but individually heterogeneous in terms of education level, age, work experience, digital literacy, and social media usage intensity. This makes each individual in the population important for analysis.

Because the population size is relatively large and the study considers resource limitations, the sample was determined using the Slovin formula. According to Santoso (2023), the Slovin formula is used to determine the minimum sample size so that the research results can still be generalized with a certain margin of error. The formula is as follows:

$$n = \frac{N}{1+N.e^2} \quad (1)$$

Explanation:

n = Sample size

N = Population size (195 people)

e = Margin of error, for example 5%

The calculation is as follows:

$$N = n = \frac{195}{1+195(0.05)^2} = \frac{195}{1+0.4875} = \frac{195}{1.4875} = 131$$

Thus, the sample size used in this study is 131 respondents. According to Berndt (2020), when the population size is large, researchers may take a portion using percentages or formulas so that the sample remains representative. The selection of 131 respondents is considered representative because it captures the diversity of agricultural extension workers in Muara Enim Regency.

Data were collected using several complementary techniques to ensure accuracy, validity, and comprehensiveness. According to Tanzeh & Arikunto (2020), data collection techniques are the most strategic step in research because the main purpose is to obtain accurate data.

1. Questionnaire - the primary instrument in this study, in the form of closed-ended questions based on

theoretical indicators of each variable. The questionnaire was distributed online via Google Forms. This method was chosen because it reaches respondents more quickly, practically, and cost-effectively.

2. Documentation - secondary data obtained from extension activity reports, extension worker profiles, and records of social media activities. This supports the primary data and serves as a comparison.
3. Observation - direct observation of social media use, digital devices, and the interaction patterns of extension workers with farmers in the field.

By combining these three techniques, the data collected were not limited to questionnaire responses but also supported by documentation and observation results. This strengthens research validity through source triangulation, making the findings more reliable.

The research instrument was a questionnaire developed from theoretical indicators of each variable:

- Social Media Use ( $X_1$ ) → COBRA Model (consumption, contribution, creation).
- ICT Competence ( $X_2$ ) → TPACK Framework.
- Personal Innovation ( $X_3$ ) → Diffusion of Innovation theory.
- Organizational Support ( $X_4$ ) → motivation, facilities, and organizational regulations.
- Extension Worker Performance ( $Y$ ) → effectiveness, efficiency, and service quality.
- Digital Literacy ( $Z$ ) → DQ Framework (ethics, security, technical skills, digital problem-solving).

The instrument was tested for validity (item-total correlation) and reliability using Cronbach's Alpha with a minimum threshold of 0.70, ensuring consistency and feasibility for use in research. Data processing was carried out through editing, coding, data entry, and tabulation using SPSS 26. Data analysis consisted of:

- Descriptive Analysis: to explain respondent characteristics and response distributions.
- Inferential Analysis:
- Multiple Linear Regression to test the effect of independent variables on extension worker performance.
- Moderated Regression Analysis (MRA) to examine the role of digital literacy as a moderating variable.

Classical Assumption Tests: normality (Kolmogorov-Smirnov), multicollinearity (VIF), heteroscedasticity, and autocorrelation (Durbin-Watson).

In multiple regression, the t-test examines the effect of each independent variable on the dependent variable.

Hypotheses tested:

- $H_0: \beta_i = 0 \rightarrow$  the  $i$ -th independent variable has no significant effect.
- $H_1: \beta_i \neq 0 \rightarrow$  the  $i$ -th independent variable has a significant effect.

$$t = \frac{\beta_i}{SE(\beta_i)} \quad (2)$$

If  $p < 0.05$ ,  $H_0$  is rejected, meaning the variable significantly affects the dependent variable. A positive coefficient indicates an increasing effect, while a negative coefficient indicates a decreasing effect.

### Multiple Regression Model (MRM)

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_n X_n + \epsilon \quad (3)$$

This model analyzes the simultaneous influence of several independent variables on a dependent variable. It requires meeting assumptions such as linearity, normality, homoscedasticity, and absence of multicollinearity.

### Moderated Regression Analysis (MRA)

$$Y = \beta_0 + \beta_1 X + \beta_2 Z + \beta_3 (X \times Z) + \epsilon \quad (4)$$

The interaction coefficient ( $\beta_3$ ) indicates whether moderation is significant. In this study, digital literacy ( $Z$ ) acts as a moderator that may strengthen or weaken the influence of social media use ( $X$ ) on extension worker performance ( $Y$ ).

## Result and Discussion

### The Effect of Social Media Use on the Performance of Agricultural Extension Workers in Muara Enim Regency, South Sumatra Province

To determine the extent to which social media use affects the performance of agricultural extension workers in Muara Enim Regency, multiple linear regression analysis was employed. This method was chosen because it can measure the influence of more than one independent variable simultaneously as well as partially on the dependent variable. Data processing was carried out using SPSS 26 for Windows, and the results are presented in Table 1, Multiple Regression Model (MRM).

**Table 1. Multiple Regression Model (MRM)**

Model	B	Error	Unstandar-	Standar-	Std.
			dized	dized	
			Coefficients	Coefficients	
(Constant)	9.224	3.178			2.903 .004
Total_X <sub>1</sub>	-.172	.103			-1.667 .094
Total_X <sub>2</sub>	.235	.097			2.423 .017
Total_X <sub>3</sub>	.544	.067			8.116 .000
Total_X <sub>4</sub>	.207	.057			3.659 .000
Digital Literacy	-.095	.103			-.065 -.919 .360

### a. Dependent Variable: Performance of Extension Workers

Based on the results of the multiple linear regression analysis, a picture emerges regarding the effect of each independent variable on the performance of agricultural extension workers in Muara Enim Regency. To provide a more detailed understanding, the following discussion outlines the results of the t-test for each variable, starting from social media use, ICT competence, personal innovation in tasks, organizational support, and digital literacy, as explained below.

#### 1. Social Media Use (X1) on the Performance of Agricultural Extension Workers (Y)

The t-test results show that social media use does not have a significant effect on extension workers' performance (sig.  $0.094 > 0.05$ ), with a negative regression coefficient (-0.172). This means that the intensity of social media use alone does not guarantee performance improvement and may even be counterproductive if not directed toward professional purposes. This finding is in line with the Diffusion of Innovation theory and the Technology Acceptance Model (TAM), which emphasize that technology is only effective when it is relevant, useful, and applied appropriately.

#### 2. ICT Competence (X2) on the Performance of Agricultural Extension Workers (Y)

ICT competence has a significant effect on extension workers' performance (sig.  $0.017 < 0.05$ ). Extension workers with strong technological skills are able to access information, communicate effectively, and adopt modern methods more efficiently. This is consistent with the Digital Intelligence theory, which highlights the importance of holistic digital skills, including literacy, security, and digital ethics, in supporting performance.

#### 3. Personal Innovation in Tasks (X3) on the Performance of Agricultural Extension Workers (Y)

Personal innovation has been proven to have a highly significant effect on extension workers' performance (sig.  $0.000 < 0.05$ ). Innovative extension workers act as early adopters in the diffusion of innovations, capable of generating new ideas, and adapting quickly to changes. This supports Rogers' (1962) theory, TAM, and the DQ Framework, all of which emphasize creativity, technological readiness, and collaboration as performance drivers.

#### 4. Organizational Support (X4) on the Performance of Agricultural Extension Workers (Y)

Organizational support also significantly affects extension workers' performance (sig.  $0.000 < 0.05$ ).

Digital facilities, training, and a conducive work environment enhance technology adoption and boost motivation. The Diffusion of Innovation theory, TAM, and the DQ Framework assert that structural support strengthens digital competence while also creating a collaborative work culture that enhances productivity.

#### 5. Digital Literacy (Z) on the Performance of Agricultural Extension Workers (Y)

Digital literacy does not have a significant effect on extension workers' performance (sig.  $0.360 > 0.05$ ), with a negative coefficient (-0.095). This indicates that digital skills alone are insufficient without organizational support or personal innovation. According to the DQ Framework and the Diffusion of Innovation theory, digital literacy is better viewed as a moderating factor that strengthens other variables rather than as a direct driver of performance.

*The Role of Digital Literacy in Moderating the Relationship Between Social Media Use and the Performance of Agricultural Extension Workers in Muara Enim Regency, South Sumatra Province*

To determine the extent to which digital literacy acts as a moderating variable in the relationship between social media use and the performance of agricultural extension workers in Muara Enim Regency, a regression analysis with the Moderated Regression Analysis (MRA) approach was conducted. This analysis was used to test whether digital literacy is able to strengthen or weaken the influence of social media use on extension worker performance. Data processing was carried out using SPSS 26 for Windows, and the results are presented in Table 2.

**Table 2.** Results of the Moderated Regression Model (MRA)

Model	Unstandar-dized Coefficients		Standar-dized Coefficients		
	B	Std. Error	Beta	t	Sig.
1 (Constant)	7.473	2.884		2.591	.011
Penggunaan Media Sosial	1.994	.925	2.720	2.156	.033
X <sub>2</sub>	-	.793	-2.600	-2.153	.033
		1.707			
X <sub>3</sub>	-.301	.438	-.307	-.687	.494
X <sub>4</sub>	1.042	.424	1.204	2.456	.015
X <sub>1</sub> M	-.115	.048	-4.640	-2.399	.018
X <sub>2</sub> Z	.104	.041	4.645	2.499	.014
X <sub>3</sub> Z	.045	.023	1.590	1.943	.054
X <sub>4</sub> Z	-.045	.022	-1.522	-2.035	.044

a. Dependent Variable: Extension Worker Performance

The moderated regression analysis in this study was specifically aimed at testing the role of digital literacy in strengthening or altering the relationship between social media use and the performance of agricultural extension workers. Social media has essentially become one of the main tools for extension workers to deliver information, interact with farmers, and expand professional networks. However, the use of social media does not automatically contribute positively to performance improvement if not accompanied by adequate digital literacy skills.

In this context, digital literacy is positioned as a moderating variable that bridges the intensity of social media use with its effectiveness. As emphasized by Fharaz et al. (2022), digital literacy is not merely technical skills in operating devices but also includes critical abilities to evaluate, interpret, and use information meaningfully. This aligns with the DQ Framework, which underscores the importance of digital intelligence—covering information management, effective communication, as well as ethical and security awareness in the digital space.

Thus, the moderation testing of digital literacy in this study not only answers whether social media affects extension worker performance but also explores the extent to which the quality of extension workers' digital literacy determines the direction and strength of that relationship. The following section presents the results of the moderated regression analysis describing the role of digital literacy in moderating the relationship between social media use and the performance of agricultural extension workers in Muara Enim Regency.

#### 1. Moderating Role of Digital Literacy (Z) on Social Media Use (X1)

The analysis results show that digital literacy (Z) plays a significant role in moderating the relationship between social media use (X1) and extension worker performance (Y), with an interaction significance value of 0.018 ( $< 0.05$ ). This finding indicates that social media use alone does not always produce a significant effect on performance improvement. However, when moderated by digital literacy, its influence becomes strong, positive, and meaningful.

This demonstrates that the essence of social media lies not merely in how often extension workers use it, but in how they use it productively and professionally. Extension workers with high digital literacy are able to filter credible agricultural information, avoid misinformation, and leverage social media features to expand outreach, build collaborations with farmers and academics, and promote agricultural innovations in a targeted manner. Thus, digital literacy has a strategic role in transforming social media from a simple tool of social interaction into a sustainable instrument for improving extension performance.

#### 2. Moderating Role of Digital Literacy (Z) on ICT Competence (X2)

For ICT competence (X2), the analysis results show that digital literacy (Z) also plays a significant moderating role, with an interaction significance value of 0.014 ( $< 0.05$ ). This means that the ICT competence of extension workers will be far more effective in improving performance if supported by adequate digital literacy. Digital literacy provides an additional dimension beyond mere technical skills. Extension workers are not only able to operate technological devices but also understand the context of their use, consider ethical aspects of digital interactions, and ensure the security of the data and information they manage. Without digital literacy, extension workers with strong ICT skills may remain limited to basic functions such as online communication or simple data processing. Conversely, with strong digital literacy, ICT competence can be optimized to support technology-based extension strategies, interactive communication innovations, and digital field data analysis. Thus, digital literacy acts as a catalyst that amplifies the positive impact of ICT competence on the quality and effectiveness of extension work performance.

#### 3. Moderating Role of Digital Literacy (Z) on Personal Innovation in Tasks (X3)

Unlike the two previous variables, the results show that digital literacy (Z) does not play a significant role in moderating the relationship between personal innovation in tasks (X3) and extension worker performance (Y), with an interaction significance value of 0.054 ( $> 0.05$ ). This indicates that while personal innovation strongly affects performance, digital literacy does not substantially alter this relationship. This can be explained by the fact that personal innovation is more intrinsic and individual, influenced by psychological factors such as creativity, risk-taking, problem-solving ability, and internal motivation. An innovative extension worker will still generate new ideas even with relatively low digital literacy. However, this does not mean digital literacy is unimportant—it serves more as a supporting factor in the implementation of ideas. Innovations created by extension workers can be more widely disseminated, adopted more quickly, and communicated more effectively if supported by digital literacy. Thus, although it does not play a significant moderating role, digital literacy can still add value to the effectiveness of implementing personal innovations.

#### 4. Moderating Role of Digital Literacy (Z) on Organizational Support (X4)

The analysis also shows that digital literacy (Z) significantly moderates the relationship between organizational support (X4) and extension worker performance (Y), with an interaction significance value of 0.044 (< 0.05). This means that organizational support in the form of technology facilities, digital training, and ICT infrastructure will produce more optimal outcomes if extension workers possess strong digital literacy. Without digital literacy, organizational support tends to be utilized only in limited ways, such as basic internet use for routine communication or simple reporting. However, with high digital literacy, extension workers can optimize organizational support as a strategic resource—for example, using digital-based agricultural information systems, conducting data analysis to support policy, and building cross-sectoral collaborations through digital platforms. Thus, digital literacy acts as a critical bridge that transforms organizational support into tangible, effective, and results-oriented improvements in extension performance.

## Conclusion

Based on the research results and discussion, the following conclusions can be drawn: (1) Simultaneously, all independent and moderating variables significantly influence extension worker performance. Partially, ICT competence (X2), personal innovation in tasks (X3), and organizational support (X4) have a positive and significant effect on performance. However, social media use (X1) and digital literacy (Z) do not show a direct significant effect on performance in either the Multiple Regression Model (MRM) or the Moderated Regression Model (MRA); (2) Digital literacy (Z) significantly moderates the relationships between social media use (X1), ICT competence (X2), and organizational support (X4) and extension worker performance in the MRA model. This indicates that digital literacy is a crucial factor that optimizes the positive impact of social media use, ICT competence, and organizational support on extension performance.

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## Author Contributions

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## Conflicts of Interest

The authors declare no conflict of interest

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