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THE DIGITAL SHIFT IN AGRICULTURAL EXTENSION: SOCIAL MEDIA ADOPTION IN ASHANTI REGION, GHANA

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ABSTRACT

The incorporation of social media into agricultural extension services offers a significant opportunity to improve communication, information dissemination, and outreach among Agricultural Extension Agents (AEAs). In Ghana, where agriculture is fundamental to the economy and a principal source of livelihood for many, efficient communication and information distribution channels are essential for enhancing agricultural practices and securing food availability. Despite the growing relevance of digital technologies, the extent to which AEAs understand and utilise social media tools in their professional activities remains insufficiently explored. This research therefore examined the knowledge, use and determinants of social media adoption by Agricultural Extension Agents from Ashanti Region in Ghana. We used a quantitative methodology and administered a structured questionnaire to 444 Agricultural Extension Agents by snowball sampling. The results indicate that majority (94.4%) of AEAs comprehend social media as a medium for user engagement, and 96.2% acknowledge the requirement of an email account for access. WhatsApp was the most utilised platform, with a mean score of 4.48, followed by Facebook at 3.98, whilst platforms such as TikTok and Instagram were less commonly used. The research revealed socio-economic factors affecting social media use; gender, education, training, and age. The findings suggest that social media should be formally integrated into agricultural extension policy frameworks in Ghana. Given the high awareness and usage among Agricultural Extension Agents, policymakers can leverage platforms such as WhatsApp and Facebook as official communication channels for extension delivery. This implies a shift from purely face-to-face models toward hybrid digital extension systems, which can improve reach, timeliness, and cost efficiency.

Keywords: Agricultural extension agents, Communication, Innovation, Rural Development, Social Media, Sustainability

JEL classification: A13, O13, Q10
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INTRODUCTION

For decades, agricultural extension services have served as a crucial bridge between scientific knowledge generation and on-farm practice improvement. Yet, across much of the global South, conventional extension systems have been persistently constrained by insufficient personnel, limited outreach capacity, and the prohibitive costs of maintaining regular farmer–agent contact (Jayathilake et al., 2017; Tham-Agyekum et al., 2023). The traditional model in which a small number of public extension officers serves large numbers of geographically dispersed smallholders has struggled to meet the rising demands for timely, location-specific advisory information, a shortfall that has intensified in the face of accelerating climate variability, emerging

transboundary pests, and volatile market conditions (Jayathilake et al., 2017; World Bank, 2012; Davis et al., 2012).

Against this backdrop, digital technologies have rapidly emerged as a potentially transformative force in agricultural advisory service delivery. At the heart of this digital shift lies an increasingly visible role for social media platforms; from WhatsApp and Facebook to YouTube and, more recently, TikTok as channels through which farmers access agronomic advice, weather forecasts, market prices, and pest management guidance (Munthali et al., 2021; Tham-Agyekum et al., 2023).

Social media refers to online platforms and technologies that enable users to create, share, and exchange user-generated content and information with individuals within their social networks or the broader online community, facilitating interactive communication and information dissemination within virtual communities (Zhao et al., 2021; Kipkurgat et al., 2016). These platforms facilitate user interaction, communication, and engagement through diverse content formats, including text, images, videos, and links. Social media platforms encompass Facebook, Twitter, Instagram, LinkedIn, TikTok, YouTube, Snapchat, and Pinterest (Saravanan & Suchiradipta, 2017). By leveraging digital tools and platforms, extension services can transcend geographical distances, enabling extension agents to reach a wider audience, exchange experiences and expertise, and facilitate collaboration among farmers, researchers, and experts (Kipkurgat et al., 2016; Rhodes, 2021; Bhattacharjee & Raj, 2016).

The Ashanti Region presents a particularly instructive case for investigation. As a region characterised by a mix of peri-urban and deep rural farming communities, substantial crop diversity, and relatively well-developed telecommunications infrastructure compared to more remote parts of northern Ghana, Ashanti occupies an intermediate position that may illuminate both the opportunities and the persistent barriers that shape digital extension adoption. Moreover, the region's agricultural extension system operates within a network of farmer-based organisations, youth groups, and women's associations that may either facilitate or impede the diffusion of digital advisory practices, depending on prevailing social structures and power relations (Munthali et al., 2021).

While there is growing recognition of the role of social media in enhancing agricultural extension services, there is a notable gap in understanding the specific knowledge levels of extension agents regarding social media use and the various factors that influence its extent of use. Most existing studies, such as those by Eduafo et al. (2024) and Ocran et al. (2024), highlight the potential benefits of social media for information dissemination and engagement between extension agents and farmers. However, these studies often focus broadly on social media's perceived usefulness rather than assessing extension agents' actual competencies and familiarity with different platforms. Additionally, the literature tends to focus on the general opportunities and barriers to social media use (Paudel, 2018), without sufficiently investigating the specific factors influencing its adoption among extension agents. For example, while factors such as digital literacy, data costs, and innovative proneness are acknowledged (Shanmuka et al., 2022), there is limited in-depth analysis on how these and other factors, like access to training or institutional support, vary across different regions or

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demographic groups within the extension service. The role of social media training, infrastructural support, and organizational policies in shaping extension agents' social media use remains underexplored. Furthermore, few studies delve into how extension agents' knowledge of social media correlates with their frequency and depth of usage. Most available research (Nyarko & Kozari et al., 2021; Eduafo et al., 2024) calls for general ICT training but does not offer specific insights into the types of knowledge and skills that would be most beneficial for enhancing productivity and engagement through social media platforms.

To address these research gaps, this study draws on the diffusion of innovations theory (Rogers, 2003) as its primary analytical framework, supplemented by insights from the Technology Acceptance Model (Davis, 1989) to examine the perceived usefulness and ease-of-use dimensions of social media adoption among both extension agents and smallholder farmers. Specifically, the study pursues three interconnected objectives: (1) assess the knowledge of agricultural extension agents on social media use, (2) ascertain the extent to which extension agents use social media in their activities and (3) determine the socio-economic factors that affect their extent of use of social media.

LITERATURE REVIEW

This study is grounded in the Diffusion of Innovations Theory (Rogers, 2003) and the Technology Acceptance Model (TAM) (Davis, 1989), which collectively explain how individuals adopt and use new technologies within social systems. Diffusion of Innovations Theory posits that adoption decisions are influenced by factors such as relative advantage, compatibility, complexity, trialability, and observability, while TAM emphasises perceived usefulness and perceived ease of use as primary determinants of technology adoption behaviour. These frameworks are particularly relevant for understanding the uptake of digital social media platforms in agricultural extension communication, where both individual perceptions and social influence shape usage patterns. The integration of these theories provides a structured basis for interpreting adoption behaviour and ensures that the empirical model is theoretically anchored in established explanations of technology uptake and communication diffusion.

METHODOLOGY

To address the identified gap regarding limited empirical evidence on the use of social media for agricultural extension communication, a quantitative survey design was employed among Agricultural Extension Agents (AEAs) in the Ashanti Region of Ghana to systematically assess the situation within the agricultural extension system.

The Ashanti region of Ghana was used as the study area for this study. This research employed only the quantitative methodology (survey). We employed quantitative methodologies to minimise the risk of bias in data interpretation. This impartiality facilitates enhanced reproducibility, enabling other researchers to reproduce the study using same procedures and achieve comparable results. This study's target demographic

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comprised all agricultural extension agents affiliated with the Ghana Cocoa Board, the Ministry of Food and Agriculture and private extension organisations in the Ashanti Region.

A total of 444 AEAs were chosen. We employed the snowball sampling method to identify the respondents. Snowball sampling was considered appropriate for this study because there was no publicly accessible sampling frame containing all Agricultural Extension Agents (AEAs) actively using social media platforms for agricultural communication across the Ashanti Region. In addition, many respondents were more effectively reached through professional referral networks, including district-level extension groups and WhatsApp communication platforms commonly used among AEAs.

We developed a structured questionnaire using Google Forms and disseminated it via social media (WhatsApp) to the AEAs. The questionnaire was initially sent to their leaders, who then disseminated it over their group platforms. We used the questionnaires to gather the necessary information to address each objective. Prior to the actual data collection, the questionnaire underwent pre-testing with 10 Agricultural Extension Agents in the Tafo District, Eastern Region, to ascertain its reliability and validity. We performed a reliability assessment to evaluate the consistency and dependability of the questionnaire's responses. A Cronbach's alpha of 0.83 signifies enhanced internal consistency. This was deemed suitable for the research. The analysis of the data was conducted using statistical software, STATA 17. Descriptive and inferential statistics were used to analyse the data. The descriptive statistics were mean, standard deviation, frequency, and percentage. The inferential statistics included the Tobit Regression Model.

In order to assess the knowledge of agricultural extension agents on social media use, we asked questions related to social media knowledge of the extension agents using a binary response format (True/False) (Kondylis et al., 2015). The True/False responses were analysed using descriptive statistics (e.g., frequency and percentage). For each knowledge statement, the number and percentage of "True" and "False" responses were calculated.

In order to measure the extent to which extension agents use social media platforms in their activities, a five-point Likert scale: never (1), rarely (2), sometimes (3), often (4), and always (5) was used. A list of social media platforms was shown, and AEAs were requested to indicate their frequency of usage. The averages and standard deviations were calculated using the scores (Ali-Hassan et al., 2015; Subramaniam and Youndt, 2005). The social media platforms included in the study were selected based on evidence from existing literature on agricultural communication and social media use, as well as insights obtained during the pre-testing of the research instrument with extension agents to identify platforms commonly recognised or utilised within the study context.

In order to determine the socio-economic factors influencing Agricultural Extension Agents' (AEAs) extent of use of social media, the Tobit regression model was employed. The Tobit model is appropriate for analysing censored dependent variables where observations are clustered at a limiting value, typically zero, while positive values vary continuously. It is therefore suitable for modelling both the decision to use social media and the intensity of its use. The dependent variable in this study is the extent of use of social media, measured

as a continuous proportion ranging from 0 to 1. This was computed by dividing the total number of minutes each AEA spends on social media per day by the total available minutes in a day (1440 minutes). Thus, AEAs who do not use social media were assigned a value of 0, while users were assigned values between 0 and 1 depending on their level of engagement. This specification captures both adoption and intensity of use within a single censored framework. This approach is consistent with Tambo and Abdoulaye (2011), who argue that technology use decisions often involve both participation and intensity dimensions. Given this structure, Ordinary Least Squares estimation would be inappropriate due to censoring at zero and potential heteroskedasticity in the error term (Pindyck & Rubinfeld, 1991). The Tobit model therefore provides consistent and efficient estimates by accounting for the censored nature of the dependent variable. The model was estimated using Maximum Likelihood Estimation (MLE), allowing for simultaneous estimation of the probability of adoption and the intensity of use (Asfaw et al., 2010).

The equations related to the Tobit model are as follows:

Selection Equation: The selection equation estimates the probability of observing a non-zero value of the dependent variable. It uses a binary probit or logit model to estimate the selection equation. The selection equation is given by: $Pr(y^*>0|x) = \Phi(X\beta)$,

where $Pr(y^*>0|x)$ is the probability of observing a positive value of the dependent variable y^*, X is the matrix of independent variables, β is the vector of coefficients, and $\Phi(.)$ is the cumulative distribution function of the standard normal distribution.

Regression Equation: The regression equation estimates the relationship between the independent variables and the latent variable underlying the observed dependent variable. It uses a linear regression model to estimate the regression equation. The regression equation is given by: $y = X\beta + u$,

where y is the observed dependent variable: extent of use of social media (censored or truncated), X is the matrix of independent variables (Table 1), β is the vector of coefficients, and u is the error term. The observed dependent variable y is obtained by applying the censoring or truncation rule to the latent variable y^*. The observed dependent variable is equal to y^* if $y^*>0$ and is censored or truncated at a specific threshold if $y^*\leq 0$. The Tobit model is estimated using maximum likelihood estimation, where the likelihood function takes into account the censoring or truncation in the data. The model estimates the coefficients (β) of the independent variables and provides insights into the factors influencing the observed dependent variable while accounting for the censoring or truncation (Asfaw et al., 2010).

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Extension Agents

Table 1. Socio-economic characteristics of extension agents

Characteristics	Measurement	Minimum	Maximum	Mean	Std. Dev.
Gender of respondent	Dummy: Male=1, Female=0	-	-	0.77	0.42
Gender of household head	Dummy: Male=1, Female=0	-	-	0.76	0.43

Age	Continuous: Years	21	49	35.60	5.27
Years of formal education	Continuous: Years	10	18	15.92	0.86
Household size	Continuous: Number of household members	1	20	4.79	2.45
Marital status	Dummy: Married=1, Single=0	-	-	0.63	0.48
Religion	Dummy: Yes=1, No=0	-	-	0.80	0.40
Secondary occupation	Dummy: Yes=1, No=0	-	-	0.63	0.48
Years of experience in extension work	Continuous: Years	1	20	7.74	5.04
Number of communities working in	Continuous: Number	1	42	8.31	5.91
Years of social media use	Continuous: Years	1	14	10.53	2.84
Time spent on social media	Continuous: Minutes	2	300	90.19	89.70
Ownership of smart device	Dummy: Yes=1, No=0	-	-	0.84	0.37
Access to office computer	Dummy: Yes=1, No=0	-	-	0.39	0.49
Specific day for social media use	Dummy: Yes=1, No=0	-	-	0.14	0.35
Specific time for social media use	Dummy: Yes=1, No=0	-	-	0.32	0.47
Membership of extension groups on social media	Dummy: Yes=1, No=0	-	-	0.93	0.26
Stable network	Dummy: Yes=1, No=0	-	-	0.34	0.48
Training on social media	Dummy: Yes=1, No=0	-	-	0.21	0.28

Source: Field Data, 2023

The results show that the majority of the respondents were males (mean = 0.77). The majority of the household heads (mean = 0.76) of the AEAs were males. The mean age of 35.60 years indicates that most of the respondents were in their youthful state. The mean of 15.92 years indicates that, on average, extension agents had tertiary education. According to Bamiro and Oyetoki (2019), with more education, the prospect of introducing modern technology into the field of agricultural extension is high. A mean of 4.79 indicates AEAs had about five people in their household. The study revealed that most of the respondents were married, and they made up about 63% of the respondents. The study also revealed that most of the respondents were Christians, who made up about 80% of the total number of AEAs, while all the other religious groups were in the minority with 20%. Most of the AEAs also had secondary occupations. They made up about 63% of the total number of respondents, while about 37% did not have any secondary occupation. The average years of

experience in extension work were found to be 8 (eight) years. The average number of communities assigned to the AEAs was about eight.

Extension agents have been using social media on average for 11 years. In a study by Alabi and Nnaji (2021), they found that the majority of the extension officers had been using social media for one to five years. On average, extension agents spend about 90 minutes on social media daily (approximately 1 hour, 30 minutes daily). The results give the impression that AEAs spend some appreciable time using social media platforms on a daily basis. Alabi and Nnaji (2021) and Kamruzzaman et al. (2018) showed that most extension agents (53% and 51%, respectively) use social media for half an hour to one hour every day. About 84% of the respondents owned a smart device, while only 39% had access to an office computer. Only about 14% and 32% of the respondents had a specific day and time for using social media, respectively. The majority of the respondents, who made up about 93%, were members of one or more extension-related social media groups. Most of the respondents (66%) did not have a stable network for accessing social media. Only about 34% of them had a stable network for accessing social media. About 21% of the respondents have had some kind of training on how to use social media effectively and efficiently.

Knowledge of Agricultural Extension Agents on Social Media Use

Table 2. Knowledge of Agricultural Extension Agents on Social Media Use

Knowledge Statements	True	False
It is a collection of internet-based communities that allow users to interact with each other online	419 (94.4)	25 (5.6)
Users are content creators	368 (83.1)	75 (16.9)
It can be accessed without an internet connection	395 (89.0)	49 (11.0)
A potential user needs an email account to access it	427 (96.2)	17 (3.8)
There are paid services on it	204 (45.9)	240 (54.1)
Basic services are free of cost	406 (91.4)	38 (8.6)
Different accounts can be linked to each other	281 (63.3)	163 (36.7)
You do not have to be an official representative of an organisation to create a page for that organisation	361 (81.3)	83 (18.7)
There is no time limit for using it	284 (64.0)	160 (36.0)
An account can be suspended if the users violate the rules	288 (64.9)	156 (35.1)

Source: Field Data, 2023

The results shown in Table 2 suggest that Agricultural Extension Agents (AEAs) have a fair amount of knowledge about social media platforms, their nature, functions, and operational features. The respondents overwhelmingly saw social media as an internet-based community where people interact with each other on the internet and 94.4% of the respondents agreed with this question. This understanding of social media as a

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mechanism for promoting user engagement illustrates the AEAs' acknowledgement of its capacity to improve communication and outreach initiatives. By leveraging these platforms, AEAs may optimise the dissemination of agricultural information, providing advice and resources to farmers and other stakeholders more efficiently (Susanto et al., 2022).

Likewise, 83.1% recognized social media users are active content creators, signalling a high awareness of the participatory and interactive nature of social media platforms. This indicates that the majority of AEAs understand that social media is a communications medium that cannot only be used to disseminate information, but also to engage users, share knowledge and enable users to generate content. This aligns with studies in developing countries showing that extension agents are increasingly familiar with ICT concepts, though practical use may lag (Aker, 2011).

The findings also show that AEAs are very technically aware about access and the functionality of social media. Most respondents (96.2%) were correct when they said it is usually necessary to have an email account to use most social media and 91.4% noted that many of the basic services are ‘free’. This understanding is essential for enhancing agricultural extension services, as it enables Agricultural Extension Agents to proficiently assist potential users in navigating and employing social media for agricultural objectives (Udoye & Okoro, 2024). AEAs can emphasise this reality while encouraging farmers and other users to engage with social media, especially in resource-constrained environments (Eduafo et al., 2024). Additionally, 63.3% knew that it is possible to connect or merge different social media accounts in various platforms. The findings suggest that AEAs have the basic level of digital literacy required to utilise and navigate through social media tools to promote agricultural extension. This competency is crucial for timely communication, information sharing and farmer engagement within increasingly digital agriculture systems.

There were some misconceptions and uncertainties, however. Notably, 89.0% of respondents stated that social media can be used without the internet connection, a large proportion of what is a huge misconception about the technological requirement for using social media. This may be a result of the confusion of offline mobile apps and online social networking websites. Likewise, 45.9% confirmed social media paid services exist while 54.1% disagreed. The differences indicate that AEAs are aware of the overall functioning of social media but some might not have a deeper understanding of how monetisation works on the platforms, how to set up a subscription, and what data is needed. This may reflect a “free” mental model, which is problematic because agricultural organisations might need to budget for promoted posts or advertising to reach target audiences (Aguilar-Gallegos et al., 2022).

Results further suggest moderate levels of awareness of governance and regulatory aspects of social media use. Some 64.9% of respondents were aware that user accounts can be suspended for breaking platform rules and 64.0% were aware that there are usually no set time limits on the use of the platform. Moreover, 81.3% correctly interpreted that one doesn't have to be an official representative of an organisation to create a page related to that same organisation. Most AEAs seems to be aware of the flexible and open-access nature of the

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social networks environments as well, but this openness can also be dangerous in terms of misinformation, impersonation, and credibility issues in agricultural communication.

Generally, the results show that AEAs have high social media knowledge, which will support the use of social media as tools for agricultural extension delivery. In terms of the Technology Acceptance Model (TAM), this level of knowledge can positively affect perceived ease of use and perceived usefulness, thus improving the chances of social media being used in extension activities (Davis, 1989). Likewise, according to Diffusion of Innovations Theory (Rogers, 2003), the more people are familiar with the communication technology, the more likely they are to adopt and sustain using the technology.

The Extent of Use of Social Media Platforms by Agricultural Extension Agents

Table 3. Extent of use of social media platforms by extension agents

Social Media Platforms	Mean	Std. Dev.
Facebook	3.984	0.75
WhatsApp	4.482	0.57
YouTube	3.586	0.90
TikTok	3.095	1.06
Twitter	2.948	1.04
Instagram	3.072	0.99
LinkedIn	2.682	1.04
Pinterest	2.286	1.05
Snapchat	2.403	1.04
Telegram	3.552	0.91
Zoom	2.993	0.86
Google Meet	2.502	1.03
Skype	2.239	0.99
Podcast	2.047	1.00
StumbleUpon	1.820	0.95
Slideshare	2.054	1.00
MySpace	1.694	0.93
Reddit	1.592	0.93
Tumblr	1.590	0.92

Source: Field Data, 2023

NB: Never: 1; Rarely: 2; Sometimes: 3; Often: 4; Always: 5

The most commonly used social media platforms were WhatsApp, Facebook, YouTube and Telegram, with TikTok, Instagram, Zoom, Twitter, LinkedIn and Google Meet being used just occasionally by Agricultural

Extension Agents (AEAs). The result matches the study conducted by Suleiman et al (2018) and Kehinde and Ayobami (2015) who obtained the same result that WhatsApp and Facebook are the most commonly used social media platforms by extension workers. These platforms are also widely adopted by farmers and other agricultural stakeholders, primarily due to their accessibility, affordability, and interactive communication capabilities, as reported by Tham-Agyekum et al. (2023). The popularity and ease of use of WhatsApp and Facebook may explain this, along with the features that allow for blogging, tagging, debating, networking, group interactions, voice messaging, image sharing and the rapid sharing of agricultural information. As per Davis (1989) model of Technology Acceptance Model (TAM), user adoption and sustained use of platforms depends on how easily they are to use and beneficial to the end user. Therefore, AEAs might opt for platforms that ease communication and enable smooth engagement with other stakeholders and farmers.

The relatively high use of YouTube also indicates that there is growing interest in visual and video-based approaches to agricultural extension. Video demonstrations and recorded training sessions can improve farmers' understanding of farming practices, including for farmers with differing literacy levels. Likewise, Telegram's limited application can be associated with its ability to handle big groups and file sharing, which makes it advantageous for extension communication.

However, the majority of respondents used these social sites infrequently: Snapchat, Pinterest, Skype, Slideshare, Podcasts, StumbleUpon, MySpace, Reddit and Tumblr. This could be because these platforms are not widely adopted and not seen as relevant to extension agents. A similar trend was noted by Alhassan et al. (2022), who found that extension staff are more likely to focus their work on a small number of major, and more practical, social media platforms rather than less common or less agriculturally relevant platforms. Some of these platforms also have relatively small active user base, or are less equipped for agricultural extension activities, which may help to understand why they are not patronized as much.

The results also indicate that there is a strong preference for platform factors, such as practicality and communication efficiency, in AEAs. The agricultural extension work needs to propagate information about market opportunities, farming practices, pest infestation and weather condition very rapidly. As a result, AEAs will be more inclined to embrace platforms that offer instant feedback, low-cost interactions and simple sharing of information. It's in line with the Diffusion of Innovations Theory by Everett Rogers that innovations which are compatible with the user's needs and existing communication patterns are more easily adopted. The dominance of WhatsApp and Facebook therefore speaks to their suitability with the extension communication needs and operational dynamics.

Factors Influencing AEAs Extent of Use of Social Media

Table 4. Factors influencing the extent of use of social media by agricultural extension agents

Extent of use	Coef.	Std. Err
Gender	0.150**	-0.070
Age	-0.134***	0.050

Years of formal education	0.051**	0.022
Household size	-0.002	0.001
Marital status	-0.000	0.006
Religion	-0.009	-0.012
Secondary occupation	0.012*	-0.006
Number of communities you work with	0.011**	0.001
Years of experience in extension work	0.369	0.221
Access to personal smart device	0.014*	0.008
Specific day of social media use	-0.012	-0.009
Specific time of social media use	-0.001	-0.008
Membership of extension group on social media	0.014*	-0.007
Availability of stable network	-0.010	0..006
Training on social media	0.107***	0.039
_cons	-0.128**	-0.057
Var (e. extent of use)	-0.004	0.000

Source: Authors' Construct, 2023

NB: *, **, and *** indicate 10%, 5%, and 1% significance respectively

Number of observations: 444; Pseudo R^2: 0.281; Prob > chi^2: 0.000; Log likelihood: 435.5271

The regression analysis reveals that gender, age, years of formal education, the number of communities served by AEA, access to personal smart devices, membership in a social media extension group, and training on social media significantly influence the utilisation of social media by agricultural extension agents. Gender exhibits a positive correlation with social media usage, evidenced by a coefficient of 0.150, suggesting that male extension agents may have greater engagement with these platforms than their male counterparts. This discovery corresponds with earlier studies indicating that women frequently utilise social media for community involvement and information dissemination in agricultural settings (Eduafo et al., 2024). The correlation between age and social media usage is negative, indicated by a value of -0.134. This indicates that younger extension agents are more inclined to utilise social media compared to their older counterparts, aligning with general trends where younger individuals exhibit greater technological proficiency and familiarity with digital communication (Shanmuka et al., 2022).

Years of formal education positively affect social media usage, with a correlation of 0.051. This suggests that elevated educational attainment may furnish individuals with the requisite skills and confidence to employ social media proficiently for professional objectives. Educated persons typically demonstrate superior digital literacy, hence improving their capacity to navigate these platforms (Bamiro & Oyetoki, 2019). Extension agents possessing advanced education may have superior digital competencies, improved information-seeking behaviours, and a more favourable attitude towards technology, hence enabling their use of social media for

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communication and knowledge sharing. The respondents' university education correlates with their competency in social media usage and reading (Alhassan et al., 2022).

It is noteworthy that extension agents with additional vocations utilise social media more frequently than those without supplementary employment. The notion that multitasking and varied professional roles impact social media utilisation is accurate, as individuals with numerous job obligations may require enhanced communication and information sharing, rendering social media platforms an effective means for managing these tasks (Akram, 2019). Extension agents operating in a greater number of communities utilise social media more frequently than those engaged with fewer communities. This supports the idea that social media might enhance communication and collaboration among broader communities. Extension agents active in various communities may leverage social media platforms to expand their outreach, disseminate information, and interact with stakeholders across diverse locales (Mutai et al., 2019; Nyarko et al., 2021).

Access to a personal smart gadget exerts a positive albeit small influence, reflected by a coefficient of 0.014. This emphasises the need of possessing appropriate technology to promote social media interaction among extension agents, as access to personal devices can significantly improve their capacity to interact with stakeholders online (Al-Harbi et al., 2019). Membership in an extension group also compels extension agents to utilise social media more frequently than their peers. Participation in groups can augment social media interaction. It enables extension agents to engage with peers, exchange experiences, obtain pertinent information, and partake in debates pertinent to their domain. Instruction on social media might affect social media utilisation. This is due to the enhancement of digital literacy and provision of practical information regarding the utilisation of social media platforms. This training provides agents with essential abilities, confidence, and knowledge to proficiently utilise social media for their tasks, including communication with farmers, information dissemination, and participation in agricultural conversations (Chowdary & Choudhury, 2024).

CONCLUSION

The study demonstrates that Agricultural Extension Agents (AEAs) possess a strong understanding of social media and its application in agricultural extension delivery. Most AEAs were familiar with the interactive nature of social media platforms and the technical requirements needed to access and utilise them effectively. Among the various platforms examined, WhatsApp and Facebook emerged as the most widely used tools for agricultural communication, reflecting their accessibility, affordability, and ease of interaction. In contrast, platforms such as TikTok and Instagram recorded relatively low levels of utilisation, indicating untapped potential for diversifying digital agricultural outreach strategies. The findings further revealed that socio-demographic factors such as gender, education, training, and age significantly influence the extent of social media use among AEAs.

The study contributes to the growing literature on digital agricultural extension by highlighting the increasing relevance of social media as a complementary communication channel within extension systems in

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Ghana. The findings suggest that integrating social media into extension delivery can improve communication efficiency, timeliness of information dissemination, and interaction between extension officers and farmers. This underscores the need for policies that support hybrid extension systems combining conventional face-to-face approaches with digital communication tools.

Despite these contributions, the study is not without limitations. The use of snowball sampling may have resulted in the overrepresentation of more digitally connected AEAs while underrepresenting less networked individuals, thereby limiting the generalisability of the findings. In addition, the study focused exclusively on AEAs within the Ashanti Region, which may not fully reflect social media usage patterns in other regions of Ghana. Future studies should therefore consider broader geographical coverage and employ mixed-method or longitudinal approaches to examine how digital extension practices evolve over time and influence agricultural outcomes.

Based on the findings, the study recommends that policymakers and agricultural institutions formally integrate widely used platforms such as WhatsApp and Facebook into extension delivery systems. Continuous digital capacity-building programmes should also be organised to enhance AEAs' proficiency in using emerging platforms such as TikTok, YouTube, and Instagram for agricultural education and outreach. Furthermore, investments in rural digital infrastructure, internet accessibility, and affordable data services are necessary to improve effective utilisation of social media in agricultural communication. Finally, extension institutions should establish professional digital networks and guidelines to support responsible, coordinated, and effective use of social media in agricultural extension practice.

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