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Social Media Literacy among Oil Palm Smallholders in East Malaysia and Association with Oil Palm Integration Practices

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Abstract: With advancements in technology, social media has revolutionised the way farmers communicate, resulting in an increased level of shared agricultural knowledge. Therefore, this study investigates social media literacy among oil palm smallholders in East Malaysia and the association with oil palm integration practices. A survey of 194 respondents was conducted using a random sampling method. The survey questionnaire was adapted from several previous studies on social media literacy. Descriptive and inferential statistical analyses, involving *t*-test, ANOVA, and logistic regression were conducted. Social media literacy was significantly higher among oil palm smallholders who were younger, with higher educational levels ($p < 0.05$). The logistic regression analysis showed that as the level of social media literacy increased, the probability for agricultural integration practices also increased (odds ratio (OR) = 1.052; 95% confidence interval (CI) = 1.022, 1.083). However, smallholders needed to optimise their use of social media to provide greater benefits to their agriculture. The findings of this study are useful in illustrating that interventions in social media literacy may efficiently facilitate oil palm integration. The results of this study can provide information and recommendations towards policies for the modernising of oil palm farming in Malaysia. Such studies, however, need to be further expanded by involving a larger sample of smallholders nationwide, to represent the geography of smallholders with varying levels of internet accessibility in Malaysia.

Keywords: digital literacy; farmers; mixed farming; Sarawak; social networking sites

1. Introduction

The emergence of social media has transformed the way individuals communicate in today's world. Social media can also be referred to as a new form of media that involves interactive participation. Thus, it is an online communication channel that allows users to interact easily with each other in any part of the world, and share and discuss information via a combination of multimedia elements comprising text, images, video, and audio. Most modern-day activities need people to connect via social media platforms such as WhatsApp, Facebook, Instagram, and WeChat. The advancement in smartphone technology, affordability, and ease of use has resulted in a surge in social media use [1] Facebook is the most widely used social networking platform today, with 1.6 billion active

users followed by WhatsApp, with a billion subscribers, and YouTube, with 149 million users [2]. In Malaysia, WhatsApp is the most widely used social media app, with almost 9 out of 10 people (88 percent) using it at least once a week. Malaysia is now ranked sixth in the world, and first in Southeast Asia, for mobile social media penetration [3]. Malaysians spend an average of three hours each day on social media, placing the country among the world's top ten users of social media [4].

The ability of social media to connect people worldwide, as well as the benefits of its use by various industry sectors, cannot be denied. The impact of the use of social media can be observed in the agricultural industry as well. Smartphones have become the farmers' extended channel for communication, supporting the dissemination of intensive information regarding the agricultural sector among their groups, and information gathering regarding production and technology information for crop use. Many recent studies clearly show that the use of social media has benefited many smallholders. Among its many benefits are facilitating smallholders' access to information, marketing agricultural products, and reducing dependence on middleman services [5,6].

With its increasing sophistication and widespread use, social media technology can help oil palm smallholders resolve issues caused by the lack of functional social networks [7]. Rural residents and smallholders are frequently found to lack or have ineffective social networks, due to their remote settlements. Even if they have social networks, most are not diverse, consisting primarily of family and friends who live close to their homes. As a result, the advantages of social networks may be reduced. Effective usage of social media is viewed as a means of addressing or alleviating this problem.

The COVID-19 pandemic has forced many countries, including Malaysia, to acknowledge that agriculture is critical in ensuring that a country has an adequate food supply and that it must be self-sufficient in producing enough food for its population without relying on other countries [8]. Indeed, before the COVID-19 outbreak, the Malaysian Government promoted agricultural entrepreneurs to embrace new or modern farming methods through the use of technology, the diversification of agricultural activities, or agricultural integration [9].

Malaysia is the second-largest producer of palm oil in the world, after Indonesia [10]. Malaysia and Indonesia provide more than 80% of the world's palm oil production [11]. About 77% of Malaysia's agricultural land, or 15% of its total land area, is used for oil palm plantations, which is estimated to be around 5,849,330 hectares [12]. Oil palm cultivation was introduced to rural areas in an effort to alleviate poverty. According to Selvadurai et al. [13], there are approximately 650,000 smallholders involved in the oil palm sector in Malaysia, accounting for 16.7% of Malaysia's oil palm planted areas [12].

According to a study by Zakaria et al. [14], the average monthly income of independent smallholders was only around RM700 (equivalent to USD 165). Smallholders are particularly hard hit by the volatile prices of agricultural commodities and difficulties in sustaining oil palm plantations. The Malaysian Government is aware of the threats or challenges faced by most smallholders in the oil palm industry. One of the most effective ways of reducing income uncertainty among smallholders, particularly among the poor, is crop integration [15]. An oil palm–cash crop integration strategy, according to Khasanah et al. [16], can help smallholder farmers reduce the social and economic risks of depending solely on oil palm. Crop integration, therefore, can help stabilise and diversify the smallholders' sources of income [17].

Recognizing the importance for oil palm smallholders to practice agricultural integration, the Malaysian Government has provided various schemes to encourage smallholders to carry out oil palm integration, to increase their income and not be entirely dependent on oil palm. Among others, the Crop Integration with Palm Oil (ITa) Incentive Scheme, and the Livestock and Palm Oil Integration Scheme (ITe), were introduced through the Malaysian Palm Oil Board [18]. More recently, an integrated cultivation project between oil palm and kenaf was also introduced to help smallholders from the state of Perak to optimise their land use [19].

1.1. Agriculture Integration

Agricultural integration, in general, refers to a farming system that integrates a combination of different crops, livestock or both. The definition of oil palm integration in the context of this study refers to practices that integrate oil palm with other economic activities, either crops, livestock, or both at once, or integration with non-agriculture activities, for example, running retail businesses and food stores [20–22].

Agricultural integration can help oil palm smallholders in increasing productivity and income. Additionally, this may help minimise the risk of palm oil price fluctuation, reducing the agricultural and economic risk for the farmers [23,24]. This is because smallholder farmers who practice agricultural integration are not restricted to a single crop type [24]. Smallholder farmers diversify their income with non-agricultural economies such as grocery stores, handicrafts and construction [25–27]. Diversifying their income can also serve as a safety net for crops that fail or are negatively impacted, for example, due to low palm oil prices, the influence of bad perceptions of palm oil, or the impact of weather uncertainty on production yields. Oil palm integration has the potential to provide benefits to oil palm smallholders. In a study conducted by [22], oil palm smallholders in the states of Johor and Sabah agreed that the practice of oil palm integration had increased their income.

A study by [28] has shown empirical evidence that agricultural integration is effective in rationalising agricultural operating costs. Dependence on one type of agriculture is not enough to meet the income needs of smallholders. Among the advantages of implementing agricultural integration is improving system productivity through synergies with different agricultural activities. Besides that, agricultural integration can increase profits because production costs can be reduced. Rathore et al. [29] also reported an increase in productivity, profitability, and the efficient use of resources in agricultural integration systems incorporating integration practices (e.g., crop and livestock operations, horticulture, forestry enterprises, poultry enterprises, and fisheries). Therefore, agricultural integration can be the main method of agriculture in arid and semi-arid countries to ensure food security and environmental sustainability.

Growing crops and raising livestock requires farmers to deal with a wide range of socioeconomic and environmental challenges. Farmers need a variety of risk management strategies, including combining agricultural activities with non-agricultural activities. Abdullah and Hairunnizam [27] conducted a study on non-agricultural integration among 100 oil palm smallholders in Perak, Malaysia and reported that almost 68% of oil palm smallholders were involved in non-agricultural integration. These included opening food and beverage, and retail and clothing outlets. According to the smallholders, their involvement in non-agricultural economic activities was with the aim to increase their income, and not depend on oil palm solely.

1.2. Social Media Literacy and Agriculture

According to UNESCO [30], media literacy is the capacity of consumers to evaluate the opportunities and risks inherent in the media which, essentially, is the capacity to access media critically [31]. In other words, social media literacy is the ability of social media users to access, analyse, and evaluate their content and communicate effectively [32]. The definition of social media literacy in the context of the study only refers to smallholders' ability to access and communicate via social media, in which social media refers to an online communication platform that allows users to interact, collaborate, and share information [33].

Several studies have shown that social media can facilitate knowledge development, as innovative farmers constantly exchange information, knowledge, and experience via WhatsApp [6]. For example, according to Nwafor et al. [34], the use of Information Communication Technology (ICT) is critical in assisting smallholder livestock farmers in obtaining market-related information. However, Kimani et al. [35] stated that although

social media can benefit agriculture, its use among smallholders remains low and is influenced by their educational level, age, and gender.

Recent studies have examined the relationship between social media literacy and agriculture. According to Yulida et al. [36], a high media literacy level can help smallholders experiencing communication difficulties. In this study, media literacy is defined as the smallholders' ability to use information technology to locate or access agricultural information via the internet, comprehend, leverage, and transmit that information. Media literacy is determined by technical abilities, critical thinking abilities, and communication abilities. The findings of this study indicate that smallholders of oil palm and rubber are unable to use technology in agriculture effectively.

Ciric and Kuzman [37] suggest that smallholders' use of social media may provide a solution for accurate information. Thus, the study sought to ascertain the extent to which farmers in Serbia make use of the internet and social media. According to a survey of 167 respondents, 42% of smallholders use Facebook daily; however, only 38.9 percent of smallholder farmers use the internet to conduct agricultural research.

1.3. Measurement of Social Media Literacy

In terms of measuring social media literacy, previous studies have shown various methods to measure the level of media literacy. According to Bulger [32], the variables in this concept of media literacy are challenging to measure at one time, or cannot be measured with just one survey form. In examining this issue, Bulger [32] has divided the media literacy variable into two most important parts relating to the essence of media literacy. First, the variables related to the ability to access and communicate using media are often also understood synonymously with the meaning of the user's ability to use media effectively. The second is the variable related to the ability of users to analyse or evaluate media content or, in other words, access media critically. According to Wenner [38], usually, in a study that focuses on the ability of users to access and communicate through the media, the purpose of the study is based on improving or obtaining optimal benefits from the use of media. Although many studies focus on the ability of critical thinking in the use of media, the purpose of some studies are related to protecting users of a media, such as by performing research on fake news.

Meanwhile, James [39] also agreed that there is no specific measurement approach to measure the level of media literacy of consumers. The measurement of media literacy is usually made based on the context of the study, if the question developed or asked refers to the type of media, and who the users are, as well as the purpose of a study conducted.

Having a large and effective social network can assist smallholders in implementing agricultural integration more effectively, because it can provide a variety of benefits, including facilitating smallholders' access to various information such as marketing and new farming techniques, as well as opening new opportunities [40–42]. Nonetheless, most previous research has reported that rural populations generally lack extensive and effective social networks, due to their remote location. Even if they have social networks, most are homogeneous, consisting primarily of family and friends who live nearby. This situation may result in their farming techniques becoming outdated, due to still relying on traditional methods [41,43,44].

Several studies have consistently shown that the use of social media in an effective way does indeed have the potential in providing a platform to expand and strengthen social networks. From the influence of social networks, social media users gain various benefits [45–50]. The sophistication and popularity of social media technology were found to be usable by smallholders in overcoming or reducing issues related to the absence or lack of extensive and effective social networks.

In Malaysia, there is a scarcity of empirical studies on the use of social media in agriculture; published studies have tended to focus on traditional media usage. Ramli et al. [51] reviewed ICT growth in Malaysia and the potential benefits that young agriculture entrepreneurs can enjoy. According to these findings, the potential benefits included increased productivity, increased revenue, marketing reinforcement, and new opportunities. However,

to date, no study has examined the relationship between social media and oil palm integration. The present study is relevant because social media has become a necessity in today's world. Its ease of use has increased smallholder agricultural productivity by making communication faster and more effective, and making it easier to expand and maintain social networks.

Additionally, research on oil palm smallholders' level of social media literacy is needed to understand how oil palm smallholders are using social media. Are oil palm farmers in Malaysia benefiting from today's sophisticated social media technology? The ability of oil palm smallholders to access and communicate through social media optimally or effectively is expected to influence the practice of their type of oil palm integration. As such, this study investigates the extent to which oil palm smallholders' level of social media literacy can assist their oil palm farming, particularly in terms of oil palm integration. Oil palm smallholders could use the findings of this study to further develop or advance integrated agriculture, as well as a first step toward modernising their agriculture.

2. Methods

Oil palm cultivation in Malaysia has been around since 1917 on a small and unplanned scale. However, over a century, the oil palm industry proliferated, particularly the plantation sector. The state of Sarawak, located in the east of Malaysia, is the highest contributor to the agricultural sector in Malaysia, where its contribution increased from 11.8 billion (14.3%) in 2010, to 14.7 billion (16.8%) in 2016, compared with other states [52]. The major contributors to the agricultural sector were the crop and livestock subsector at 71%, whereas the major driver of this subsector was oil palm which accounted for 91% of the subsector.

The present study was conducted in the district of Bintulu, Sarawak (Figure 1), which has wide internet coverage and a large number of oil palm smallholders. Based on the Malaysian Palm Oil Board (MPOB) statistics, there are 1639 independent oil palm smallholders in the Bintulu district. Oil palm smallholders who participated in this study were randomly sampled from longhouses located near the town of Bintulu. Based on the Bintulu Division Administration Department and information on internet coverage in Bintulu, there are 40 registered longhouses near the town of Bintulu that have stable internet coverage [53]. Of the 40 longhouses identified that have stable internet coverage, ten longhouses were randomly selected to represent the study population. On average, the number of longhouse occupants is around 100 people.

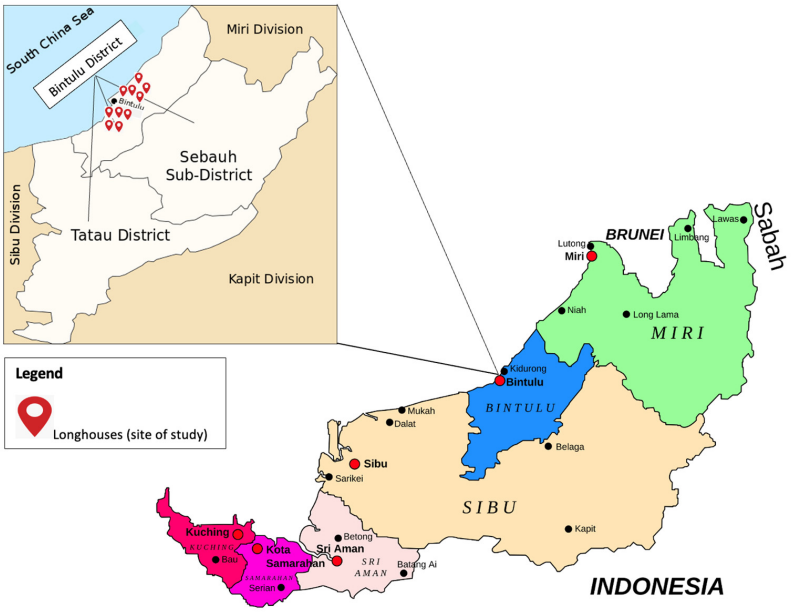

Figure 1. Map of Sarawak showing site of study with insert showing Bintulu District.

This study was conducted using a survey approach. Based on Krejcie and Morgan [54], the sample size required for this study was 310 respondents. Using the random sampling method, 35 smallholders were selected from each longhouse to participate in the survey. A total of 350 questionnaires were distributed; however, only 194 completed questionnaires were successfully collected. Figure 2 is an overview of the process of data collection.

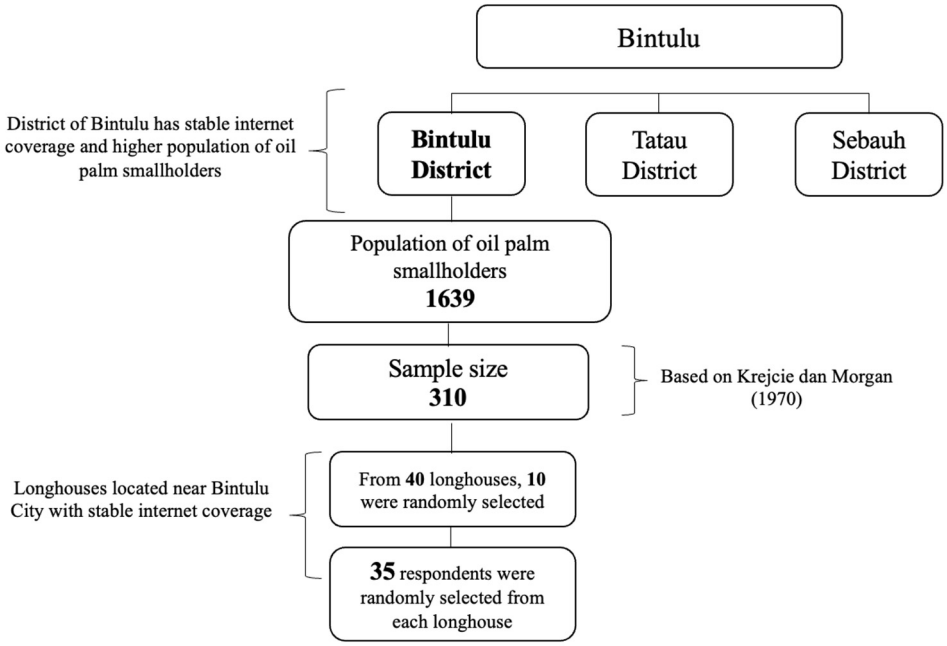

Figure 2. Flow chart of the process of data collection.

The questionnaire was used to obtain information on demography, social media usage, and level of social media literacy, which focused on the ability to access and communicate on social media and integrate agricultural practices. In the context of this study, the definition of social media literacy is the ability of oil palm smallholders to access and communicate using social media. The questionnaire was adapted from several previous studies [55–57] to measure the level of social media access and communication literacy, with some changes to suit the context of the study. Among the items used to measure the level of social media literacy access was "What type of social media do you use often?" and "How long have you been using social media?", whereas items of social media communication literacy questions were "I post questions about agriculture on social media". Items regarding the practice of agricultural integration were adapted from Zaimah et al. [22]. The reliability of the questionnaire items was tested using Cronbach's alpha method. Overall, the obtained Cronbach's alpha value was 0.845, which is a high and good internal consistency reliability value.

In terms of data collection, the researcher has collaborated with officers from the MPOB Bintulu branch to help obtain permission to conduct research in longhouses. Apart from that, the MPOB officer also assisted the researcher in filling in the respondent's questionnaire. This is because most respondents understand the Sarawak language better, compared with Malay or English. The study also used the services of two local enumerators to assist in data collection.

Since there are not many previous studies on social media literacy, there is so far no standard method for measuring the level of social media literacy. Most past studies have been more on mass media literacy [57] or technical skills in using media [36], as well as the intensity of media use measured through the frequency of media use [58]. For the purpose of this study, the level of social media literacy of oil palm smallholders was measured based on the combination of total scores for the access and communication section. These scores were then categorized into low, medium, and high social media literacy, based on

equal numbers of individuals in each category. The groups were created using the visual binning function in SPSS [59].

Descriptive and inferential statistical analyses involving *t*-test, ANOVA, and logistic regression were conducted. An independent *t*-test was used to compare the level of social media literacy among oil palm smallholders by gender, and a one-way ANOVA test was used to compare the level of social media literacy among oil palm smallholders by age category and level of education. Logistic regression analysis was conducted to determine the variables influencing agricultural integration practices. The significance level was set at $p < 0.05$.

3. Results and Discussion

3.1. Respondents' Background

The respondents' analysed background information included gender, race, age, marital status, education level and monthly income. Table 1 shows the demographic distribution of the respondents. Of the total 194 respondents involved in the study, 89% were male, and only 11% were female. On age, 51% of the smallholders were 50 years old and above, 33% were in the 41–50 age group, and 31% were in the 31–40 age group. In terms of the distribution of education levels of respondents, half of them (51%) had secondary education, about 31.4% had primary education, 10.8% did not have any formal education, 5.2% had a diploma, and only 1.5% had a degree. The income distribution of respondents showed that 41.2% were earning RM1000–2000 monthly, 32.5% were earning RM2001–RM3000, and only 3.1% were earning above RM5000 monthly.

Table 1. Demographics of respondents.

Respondent's Profile	Percentage (%)
Gender	
Male	89.2
Female	10.8
Age (years)	
31–40	16
41–50	33
Above 50	55
Marriage status	
Single	7.7
Married	84.5
Widow	5.7
Divorced	2.1
Level of education	
No formal education	10.8
Primary school	31.4
Secondary school	51.0
Diploma	5.2
Degree	1.5
Monthly income (RM)*	
Less RM1000	10.8
RM1000–RM2000	41.2
RM2001–RM3000	32.5
RM3001–RM4000	12.4
RM5000 above	3.1

* RM: Malaysian currency RM1 = USD 0.24.

3.2. Social Media Literacy

Social media literacy generally refers to smallholders' ability to use social media. The social media literacy level measurement indicators are based on two components to evaluate the extent to which smallholders' access and communicate using social media. Figure 3 shows the study framework for the social media literacy component.

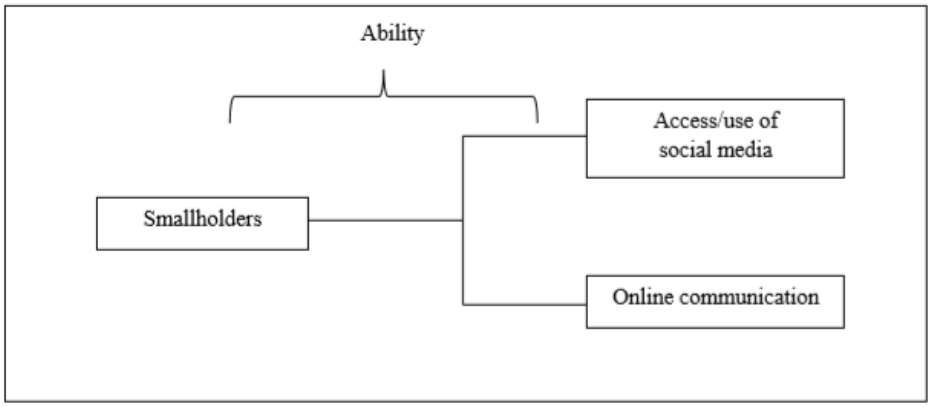

Figure 3. Social Media Literacy Analytical Framework.

3.3. Access to Social Media

Oil palm smallholders acknowledge that social media is easy to use, especially for interacting and sharing information. The present study found that 98% of smallholders use a smartphone device to access social media applications, and only a few use the computer, tab or iPad. The results of smallholders' access to social media can be seen in Table 2. WhatsApp, Facebook and YouTube were the social media applications that the smallholders used. However, for Instagram, WeChat and Twitter, only a small percentage had used it before.

Table 2. Social media used by smallholders.

Type of Social Media	Percentage (%)
WhatsApp	96.4
Facebook	70.6
YouTube	49.0
Instagram	4.1
WeChat	2.6
Twitter	0.5

The duration (in years) that smallholders have used social networking applications for (WhatsApp, Facebook and YouTube) are shown in Table 3. For WhatsApp, most of them answered five years or more (42.2%). As for Facebook, most of them said they had been using it for two years (37.2%) or five years (37.2%). For YouTube, most users had been using it for five years or more (42.1%).

Table 3. Duration of social media usage (year).

Type of Social Media	1	2	3	4	5
WhatsApp	7.5	34.8	3.7	11.8	42.2
Facebook	6.6	37.2	12.4	6.6	37.2
YouTube	7.4	35.8	7.4	7.4	42.1

From the survey conducted, it was found that social media is used for various purposes. Table 4 shows that the primary purpose of smallholders using social media was to connect with family and friends (79.8%), get the latest news (46.1%) and share their views (35.3%). In addition to these three goals, frequency analysis showed that finding old friends, making new friends, adding new business contacts, connecting with business partners, and promoting business and ideas, were not the main purposes of smallholders using social media. Generally, smallholders chose to answer that they rarely used social media for that purpose.

Table 4. The purpose of using social media.

Purpose of Using	Percentage (%)
To connect with family and friends	79.8
Share pictures, videos and play games	28.1
Looking for old friends	12.3
Looking for new friends	4.5
Share views	35.3
To connect with trade partners	10.5
Add new business contacts	7
Promote business	3.5
Promote ideas	10.3
Searching for information	22.8
Get the latest news	46.1

In general, social media's ease of use greatly influenced the ability of smallholders to use social media. Smallholders had no problem learning and understanding social media operations, and they did not need much time to study it. Most respondents learned to use social media from their children and close friends. In addition to being handy, the smallholders interviewed also described using social media to facilitate interactions between smallholders and MPOB officers. This impression comes from some smallholders comparing the situation before social media communications, when interactions with officers from MPOB were more likely to be face-to-face. However, after having a smartphone, interactions were more frequent and occurred online or virtually. In addition, with the sophistication of social media, smallholders could interact with many other smallholders at a time.

3.4. Social Media Communication

Social media communication activity is the second element used for measuring smallholders' social media literacy. The first element was to do with the social media access of smallholders. In contrast, the second element of social media literacy, by its operational definition, is primarily focused on how smallholders are using social media as a medium to interact with the public, especially concerning agriculture.

The results of the study are shown in Table 5. Generally, not many of the smallholders were actively interacting using social media. Out of every question asked, almost half of answered "never" (50%). The data analysis for each question shows that less than 30% of smallholders responded 'frequently' to engaging in the activities listed. In fact, on average, 20% of them responded 'rarely' or 'occasionally' to the activity listed. On the whole, smallholders often used social media to communicate with family members and friends, followed by communication with other oil palm smallholders.

Table 5. Social media interaction activity.

	Never	Rarely	Sometimes	Frequently	Very Often
Engage in discussions on agriculture on social media.	56.7	19.6	19.1	4.6	-
Post questions about agriculture on social media.	64.4	13.9	18.6	3.1	-
Respond to agricultural questions on social media.	58.2	19.1	19.1	3.6	-
Sharing agricultural information on social media.	59.3	18.0	18.6	4.1	-
Click the like button for an interesting agriculture post.	57.2	18.0	15.5	9.3	-
Use social media to communicate with other palm oil smallholders.	50.0	19.6	16.5	13.9	-
Use social media to communicate with employees from agricultural agencies (e.g., MPOB).	59.3	19.6	17.5	3.6	-
Use social media to communicate with family members and friends.	45.4	3.1	8.2	24.2	19.1

Social media applications have made it easy for smallholders to share information. Social media's ability to easily create virtual communities on Facebook and WhatsApp have

made it easier to share information or experiences. The addition of information sharing via this social media is cost-effective, compared with the traditional method, a face-to-face meeting between smallholders and agriculture officers, which is time-consuming and costly. The use of social media, such as WhatsApp and Facebook, also allows smallholders to set up farming-related groups, and facilitates the communication and collection of real-time data, useful for their agricultural activities [60].

The majority of smallholders have several agriculture-related groups, including the DOPPA WhatsApp (Dayak Oil Palm Planters Association). It is through these WhatsApp groups where the information-sharing activity occurs. Smallholders are found to share their experience of farming with other smallholders. MPOB officers also use this WhatsApp group platform to convey information to smallholders. MPOB officers deliver the information by sharing it with the leaders of the smallholders WhatsApp group. Usually, they would share pictures of plants, or the latest information that members have obtained from the leader, and other information.

3.5. Social Media Literacy (SML)

The social media literacy (SML) level of oil palm smallholders was measured based on the combined total score obtained by the oil palm access and communication components. The combined results of these two components were divided into three equal frequency categories: low, medium, and high social media literacy level, using the visual binning function in SPSS [59]. The descriptive statistics for social media literacy are shown in Table 6, whereas the distribution of social media literacy level by category is shown in Table 7.

Table 6. Descriptive statistics for social media literacy (SML).

	N	Minimum	Maximum	Min	Standard Deviation
Social Media Literacy (SML)	194	20	140	52.74	32.46

Table 7. Distribution of social media literacy level by category.

	n	Percentage (%)
Low level of SML	65	33.5
Medium level of SML	65	33.5
High level of SML	64	33.0

3.6. Social Media Literacy (SML) Analysis by Gender

For the relationship between social media literacy and gender, Table 8 shows a *t*-test, showing that male oil palm smallholders had a higher level of social media literacy (min = 53.66) than women palm oil smallholders (min = 45.14). However, there was no significant difference in the level of social media literacy among oil palm smallholders by gender ($p > 0.05$).

Table 8. Comparison of social media literacy (SML) levels by gender.

Gender	N	Min	Standard Deviation	t	Sig. (P)
Male	173	53.66	2.46	1.14	0.257
Female	21	45.14	7.15		

3.7. Social Media Literacy (SML) Analysis with Age

According to Darshan et al. [61], socioeconomic status can also influence social media literacy among smallholders. The younger and higher their academic background, the higher their social media literacy level. An ANOVA test comparing social media literacy levels by age group showed that oil palm smallholders aged 31–40 years old had the highest social media literacy level (min = 73.10), whereas palm smallholders over 50 years old had the lowest social media literacy levels (min = 47.94) (Table 9). This difference was

significant at $p = 0.001$. Therefore, there was a significant difference in social media literacy among oil palm smallholders by age category.

Table 9. Comparison of social media literacy levels by age category.

Age (Years)	N	Min	Standard Deviation	F	df	Sig. (P)
31–40	31	73.10	6.21	7.88	2	0.001
41–50	64	50.31	3.04			
Over 50	99	47.94	3.44			

The results of this study were very similar to some previous studies examining the relationship between social media literacy level with age and education level. The findings of this kind of research can often be found in many studies related to the use of social media [35,36,61].

3.8. Social Media Literacy (SML) Analysis with Educational Level

Table 10 shows the results of the ANOVA test to compare social media literacy levels by educational level. Oil palm farmers with diplomas had the highest levels of social media literacy (mean = 96.90), whereas those with no formal education had the lowest levels of social media literacy (mean = 34.71). This difference was significant at $p < 0.001$.

Table 10. Comparison of social media literacy levels by education level.

Level of Education	N	Min	Standard Deviation	F	df	Sig. (P)
No formal education	21	34.71	3.50	13.91	4	<0.001
Primary school	61	38.20	2.57			
Secondary school	99	61.15	3.30			
Diploma	10	96.90	13.61			
Degree	3	50.00	30.00			

The results of this study were in line with the previous study related to the social media literacy level of smallholders. Recent studies have shown a high level of social media literacy, such as the study conducted by Ciric and Kuzman [37], which reported that almost half of its respondents used Facebook daily. A study by Wangu [56] found that most smallholders used social media positively, saying that social media was beneficial and made it easy to obtain agricultural-related information. However, some studies reported a low level of social media literacy for oil palm smallholders, such as the study by Yulida et al. [36], which showed that smallholders generally had low average scores in technical skills, critical understanding and low communication ability. Dissemination of new knowledge and ideas is vital in examining the extent of interaction between smallholders in the network of friendships and peers [62].

The results of this study were based on the social media literacy questionnaire items. Oil palm smallholders were found to frequently use social media applications such as WhatsApp (96.4%), Facebook (70.66%) and YouTube (49%). The findings of this study were very similar to previous studies that observing social media use. This was evident in a study conducted by Kamal [5], in which smallholders were found using WhatsApp to interact, and share experiences and information. The results of Wilson's [63] study found that Facebook use was highest among smallholders in the United States (46%), while Pal [64] also reported that the majority of smallholders in Uttarakhand India use Facebook, WhatsApp and YouTube for agricultural information, but none of the smallholders used Twitter.

3.9. Oil Palm Integration

The oil palm integration information of the smallholders involved in this study is shown in Table 11. Almost half of the respondents' own oil palm plantations sized between 6 to 10 acres (45.9 percent), while 23.2 percent of respondents had less than 5 acres. Only 32 respondents, or 16.5 percent, had plantations of more than 21 acres.

Table 11. Details of smallholder oil palm integration.

	Frequency (n)	Percentage (%)
Size of oil palm plantation		
Less than 5 acres	45	23.2
6–10 acres	89	45.9
11–20 acres	28	14.4
More than 21 acres	32	16.5
Type of integration practice		
None	27	13.9
Crop	129	66.5
Livestock	8	4.1
Crop and livestock	30	15.5
Type of crop integration		
Banana	96	57.5
Cassava	40	24.0
Durian	36	21.6
Pineapple	30	18.0
Corn	16	9.6
Watermelon	8	4.8
Black pepper	2	1.2
Type of livestock integration		
Chicken	15	39.5
Pig	12	31.6
Fish	7	18.0
Duck/Goose	3	7.9
Goat	1	2.6
Do you practice non-agricultural integration?		
Yes	47	24.2
No	147	75.8
Type of non-agricultural integration		
Eateries	5	10.6
Sundry shop	19	40.4
Contractor	9	19.1
Online business	14	29.8

The majority of the respondents carried out crop integration (66.5 percent), compared with livestock integration only (4.1 percent). Significantly, 15.5 percent of oil palm smallholders carried out livestock and crop integration, whereas 13.9 percent did not practice any form of agricultural integration. There were two types of integration implemented: crop integration and livestock integration. Banana cultivation was the main choice of respondents in implementing oil palm integration (57.5 percent). Apart from bananas, cassava cultivation was also the choice of respondents (24.0 percent), followed by durian (21.6 percent) and pineapple (18.0 percent). The livestock of the respondents' choice were chickens (39.5 percent), followed by pigs (31.6 percent) and fish (18.0 percent).

There were also oil palm smallholders who carried out non-agricultural oil palm integration (24 percent). Most of those who ran non-agricultural palm oil integrations ran small-scale retail businesses (40.4 percent), followed by online businesses (29.8 percent), and contractors (19.1 percent), and some also managed eateries (10.6 percent).

In general, most respondents practiced crop integration, compared with livestock integration. A previous study conducted by Zaimah et al. [22] also showed that oil palm smallholders were more involved in crop integration than livestock. The findings also showed that livestock integration was not implemented because it was not suitable for the early stages of oil palm cultivation, that is, before oil palm reaches the age of three years (for goats) and five years (for cattle). According to Ahmad et al. [65], livestock integration participation is only encouraged to those who already have experience, and this has indirectly resulted in a lack of participation from smallholders. Smallholders also

integrate their oil palm farming with non-agricultural economic activities. Abdullah and Hairunnizam [27] reported that oil palm smallholders in Teluk Intan, Perak, conducted various types of business, assisted by various incentives provided by the Government to improve living standards and increase household income.

3.10. Factors Influencing the Practice of Oil Palm Integration

A chi-square test of independence was conducted to investigate the association between social media literacy level and oil palm integration. Based on the analysis (Table 12), there was a significant association between social media literacy and oil palm integration. Smallholders in the high social media literacy category were more likely to practice oil palm integration than those from the low social media literacy category.

Table 12. Chi-square test of independence of association between level of social media literacy and oil palm integration.

	Oil Palm Integration						
	No		**Yes**				
	n	**(%)**	**n**	**(%)**	χ^2	**df**	**Sig. (P)**
Low level of SML	18	66.7	47	28.1	17.06	2	<0.001
Medium level of SML	7	25.9	58	34.7			
High level of SML	2	7.4	62	37.1			

Logistic regression was conducted to see the extent to which factors such as age, level of education, and level of social media literacy could influence oil palm integration practice. The dependent variable was oil palm integration practice (whether practiced or not), and the independent variables consisted of age, level of education and level of social media literacy (SML). A summary of the logistic regression analysis results is shown in Table 13.

Table 13. Logistic regression analysis to identify factors that influence the practice of agricultural integration.

Variables	**B**	**SE.**	**Wald**	**df**	**Sig.**	**Exp(B)**	**95% CI for Exp(B)**	
							Lower	**Upper**
Age	−0.281	0.385	0.533	1	0.465	0.755	0.355	1.605
Level of education	0.247	0.277	0.790	1	0.374	1.280	0.743	2.205
Social Media Literacy	0.051	0.015	11.845	1	<0.001	1.052	1.022	1.083
Constant	0.022	1.417	0.000	1	0.988	1.022		

Based on Table 13, the logistic regression results show that social media literacy was the strongest predictor of oil palm integration practice, with a value of B = 0.051. The value of Exp (B) is equal to 1.052. This value of 1.052 indicates that the probability (odds) for agricultural integration practices will increase if social media literacy increases.

This analysis and modelling using logistic regression have strengthened the argument that social media literacy influences agricultural integration practice. The advantage of this modelling lies in the statistical proof, with the use of several variables that have been selected from the statistical analysis conducted previously. The contribution of age and level of education is no longer significant in the logistic regression analysis, after taking into account the social media literacy level (SML) factor.

4. Conclusions

This study shows that younger oil palm smallholders with higher levels of social media literacy can be considered a signal to industry players, or palm industry shareholders, not to overlook new media elements or virtual spaces in planning the direction of the palm industry sector. Higher social media literacy has been shown to predict agricultural integration practices. This may be because having an extensive and effective social network

can assist smallholders in adopting agricultural integration more effectively, since social networks can provide various benefits that assist or streamline agricultural integration practices [42]. One of the most significant advantages for smallholders is that they may communicate with agricultural extension workers more diversely and efficiently because it makes obtaining information easier, and information about innovative farming techniques is easily accessible to smallholders. Additionally, social networks can facilitate agricultural product marketing and commerce while creating new economic prospects [7].

The level of use and mastery of smartphone technology may be low or weak for some groups, especially those of advanced age, low education levels, and factors facing internet coverage issues in rural areas. However, knowledge and awareness of the importance of mastering, or at least recognising and striving for, the effective use of smartphones through social interactions and relationships with family members, smallholders, agricultural workers, and anyone else, for information sharing or other agricultural purposes, can contribute to the development and progress of oil palm industry.

As there are many benefits that can be obtained from using a social networking site or social media, smallholders along with the oil palm authority need to take effective initiatives in expanding and strengthening the use of social media in social interactions and agricultural activities to contribute to not only the growth, development and innovation of the oil palm industry but also the sustainability of the smallholders themselves.

Some of the limitations of the study include the fact that the measurement of social media literacy is based on smallholders' ability to access and communicate through social media. The variable or element of social media literacy that was not measured was the ability to analyze and evaluate. Another limitation of this study was the study sample, which can be considered homogeneous, as the focus of the study was among longhouse occupants. According to MPOB officers, most oil palm smallholders living in Bintulu live in longhouses. The occupants of the longhouse were mostly of the Iban ethnic group. Difficulties in achieving the minimum sample size were due to limited internet access coverage, remote study locations and problems in communicating with locals. The coverage area of internet access is still limited, compared with other states in Peninsular Malaysia. Therefore, this study had to focus on areas with stable internet coverage only, which are generally located near the town of Bintulu.

Based on the sample size of the study (n = 194), the study can still be representative of the population because it has sufficient power to detect a statistically significant difference at $p < 0.05$. This is because, according to Cohen [66], the minimum level of power in sample size calculations is 80%. This means that the study has an 80% chance of finding statistical significance in the sample, if the effect is present at the population level. Therefore, based on the power analysis conducted using the sample size of 194 (G*Power 3.1), the present study has sufficient power (0.929 or 92.9%) to detect statistical significance if there is one. Thus, it is able to provide accurate conclusions about the population using the sample data [67].

There are not many studies on social media literacy among smallholders, especially in Malaysia. The results of this study can provide information on the actual state of knowledge and usage of social media via smartphones among palm oil farmers as a source of information. This study also contributes to providing an understanding of the level of social media literacy of oil palm smallholders, and how this may influence the practice of agricultural integration.

The findings from this study can also be the source of policy recommendations for oil palm companies and agencies to modernise palm oil in Malaysia. As the research focused only on smallholders in Sarawak, such studies should be further expanded by involving a larger sample of palm oil farmers from around the country to provide more comprehensive data, and represent the geography of palm oil farmers with access to internet coverage. The application of social media in agriculture is in line with the Malaysian Government's policy, which is to inspire the transformation of traditional agriculture into modern agriculture.

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