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EFFECTIVENESS OF INFORMATION MEDIA FOR THE IMPROVEMENT OF INDONESIAN FARMERS' KNOWLEDGE AND SKILLS

[1]ULANI YUNUS, [2]MARIKO RIZKIANSYAH, [3]ARLEEN ARIESTYANI, [4]YOSSIE TRENANTO, [5]SOPHIA ALIM

[1] Marketing Communication Program, Department of Communication, Faculty of Economics and Communication, Bina Nusantara University, Jakarta-Indonesia

[2] Mass Communication Program, Department of Communication, Faculty of Economics and Communication, Bina Nusantara University, Jakarta Indonesia, Indonesia, Indonesia

[3] Mass Communication Program, Department of Communication, Faculty of Economics and Communication, Bina Nusantara University, Jakarta Indonesia - Indonesia

[4]Research Interest Group Cross Cultural Communication, Bina Nusantara University, Jakarta- Indonesia

[5]Researcher. Independent, UK

E-mail: [1]uyunus@binus.edu.[2]mariko.rizkiansyah@binus.ac.id; [3]aariestyani@binus.edu, [4]yossie.trenanto@binus.ac.id, [5]sophiaalim66@gmail.com

ABSTRACT

This study develops problems in the Indonesian agricultural sector recently. Based on this perspective, we examined how farmers could enhance information media to improve their knowledge and skills. The theory that can be generated is that the process of information educating will be successful if directed according to the age and availability of technological facilities. The more young and productive, the easier it will be to establish knowledge and skills for certain objects. The use of Information and Communications Technology (ICT) will be maximal if accompanied by the recipient of the message to adapt equipped with motivation and perception of the information it receives. Data were collected among 243 participants from 3 regions in Indonesia (Bangil, Lembang, and Manado). The results showed that information media and farmers' knowledge had affected farmers' skills. The majority of farmers still rely on information from agricultural extension workers, especially in the Bangil region. While the Manado Region still relies heavily on Television and Youtube.

Keywords: *Information Media, Farmers, Knowledge, Skills*

1. INTRODUCTION

Indonesia is an agricultural country and one of the world's largest producers and exporters of tree crops such as rubber, copra, palm kernels, palm oil, coffee, cocoa, and spices [1]. The agricultural sector contributed 14,43% to national GDP in 2013, which was slightly declined from 2003's contribution, which was 15.19%. The agricultural sector also provides jobs for 49 million Indonesians representing 41% of the country's total labor [2].

Based on the observation, five problems in the Indonesian agricultural sector today will continue to be a problem in the future. There is no trusted initiative to find the solution. Those problems are (1) Less literation for farmers' knowledge; (2) Increasing adding land for agricultural issues because of competition with the property; (3) Less modern agricultural technology; (4) The deficiency of fertilizer; and (5) The lack of knowledge from farmers around marketing products. It is necessary to develop soft skills for farmers in order to solve the problems regarding agriculture. The existence of modern agricultural technology is inevitable, and farmers need to change their mindset to use technology rather than traditional models.

For adaption, farmers need a centralized policy to overcome their problems. Farmers and non-farmers must synergize with each other. One of the policies that were launched to deal with agricultural issues was the formation of agricultural corporations or a combined farmer group. To be a

big force, make the farmer group even bigger. A large group of farmer groups were combined to establish the Farmers' Corporation. There must be a large number of farmer corporations in Indonesia to become a strength.

The modernization of agriculture through the use of agricultural machine tools from the economic aspect is significantly proven to increase the productivity of food commodities and farmers' family income to make the rice production process efficient. Through the use of agricultural machinery at every stage of production, harvest and post-harvest activities are able to save the cost of processing land, planting costs, weeding costs, and harvest costs because most of the labor has been replaced by the use of machines that are much more efficient. The modernization of agriculture today is needed to improve farmers' life.

The rapid pace of globalization, followed by urban development, has encouraged the struggle to gain social access to urban areas called urbanization. With the urbanization phenomenon, demand for land needs in urban areas will increase to extend to the suburbs and encourage the occurrence of urban sprawl phenomenon. It is in accordance with the economic principles oriented towards a rational choice. Less productive activities will be left to find more productive activities. Farmers are increasingly excluded. This will threaten food supply for the wider community, causing new problems.

On the other hand, the government is trying to reach farmers with cyber extension, a mechanism of agricultural information exchange through cyber areas, an imaginary-virtual space behind interconnection of computer networks through communication equipment. The cyber extension is an innovative media innovation that is considered efficient and effective because with a single upload of the counseling material, the material can be read or downloaded by farmers in Indonesia, even farmers around the world. Cyber extension was introduced in 2010 but still needs concrete and realistic steps to make effective extension media as a means to improve the welfare of farmers.

One of the main drivers is because many agricultural extensions still have *stuttering technology*. Conventional extension patterns, which are communication from government counseling directly to farmers, are still their main choice. This cyber extension will be added to an interactive menu that can connect farmers with local extension. This includes the possibility of *pulse assistance* for farmers who have received farm cards. An IT-based method of counseling will be done if Internet access in farmer area is good. For the area that has no internet, the method of visitation field such as counseling from government expert making a discussion and lecturing information to farmers, involving farmers to know well for new agricultural technology, and others such as internal or external group farmers communication. The research contribution is to support government to design the information media for the farmers.

This research aims to test how Indonesian farmers use the affected information presented on various media with varying knowledge and skills. The research is conducted through surveys in 3 areas: Lembang-West Java (50 respondents), Bangil-East Java (84 respondents), and Manado-Sulawesi Utara (109 respondents).

2. RELATED WORK

Low access to information owned by farmers could impact the degree of farmers' ability to perform agricultural activities. The availability of information for farmers is critical in improving knowledge, uplift in attitude then leads behavioral changes in farmers. In Indonesia, the right to obtain information is a fundamental right for every human being, including farmers and their families in rural areas, secured under the Broadcasting Act No. 32 of 2002. Indonesian constitution No. 32 the year 2004 guarantees the implementation of agricultural development in the area that aims to: (1) Give greater authority to the community in making decisions so that the decisions are taken according to the needs of the local community; (2) Increase the local participation rate in the development of agriculture.

Information media for Indonesian farmers that are considered still widely accessed is television. The television combines audio and visual. The truth of information originating from television is more accountable since the process of disseminating information is sharded by news stations whose credibility has been guaranteed. Dissemination of agricultural information can make comprehensive use of television. Most farmers gave an assessment that the level of effectiveness of television as a source of agricultural information in peri-urban areas was low at 65%. Farmers who rate that the effectiveness of television as a source of agricultural information in peri-urban areas is in the high category of 35% of the total respondents. The low effectiveness of television as a source of agricultural information is due to farmers seeking information which still relies on group meetings and field extension workers. A farmer group meeting is where you can discuss with counseling if

you have problems with farming and get quick feedback. The level of information exposure for farmers is more information to increase knowledge from reading books than other media. The other media are widely used for entertainment [9].

3. METHODOLOGY

The paradigm used in this study is the positivism paradigm with a quantitative approach. A quantitative approach is a method based on a positivist paradigm, used to examine a particular population or sample, data collection using research instruments, quantitative or statistical data analysis, with the aim of testing hypotheses established based on the theory used [11]. The population is a generalization area consisting of objects/subjects with certain qualities and characteristics determined by researchers to be studied and then drawn conclusions.

The population in this study were farming communities in the Lembang, Bangil, and Manado regions. These three areas were chosen purposively. The selection criteria are based on the area chosen by the government because, in these three regions, there is a productive farmer group, get visits and government assistance and have achievements that are considered to support food security in Indonesia.

Lembang area was chosen because they were able to export the crops to Singapore, as mentioned by the informant that in the middle of the favor COVID-19 and when people struggle to earn income because it does not work or only at home, a group of farmers in Cibodas village, Lembang precisely exports their vegetables to Singapore. Vegetables in the form of French bean beans are planted and developed by farmers by developing the management of horticultural-based advantage differentiation, unlike conventional plant planting patterns such as chili, tomato, or other local vegetables. Farmer group Macakal, Lembang, or about 140 farmers, can reap the turnover of Rp. 200 to Rp. 300 million per month. In addition to Singapore, in the near term, there is also an export request to Jeddah Saudi Arabia and Brunei Darussalam. The further narrowing of land in Cibodas Lembang village because of the construction of the Villa and resort does not discourage their farming spirit. In addition to planting baby beans, farmer groups in Lembang also planted other imported crops such as tomato Cery, spinach Kenzo which is also supplied to the modern market.

Bangil area was chosen because the farmer group received help from the government hand tractor. The tractor-assisted program was given to a farmer group of one unit. The delivery of tractors was done in the agriculture office yard, precisely in Raci-Bangil office in the year 2019. The assistance of the tractor aims to enrich the farmers. Assistance is done simultaneously, which is expected to increase agricultural production, especially on rice farmers. Tractor assistance recipients are required to maintain and care for them periodically. The destruction of the agricultural apparatus will be the responsibility of each farmer group.

The Manado area was chosen because of the government's support amid the COVID-19 pandemic. The aid of 30,000 chili seedlings and bisi18-corn seedlings were given to numbers of farmer groups for 566 hectares in Buha Mapanget plantation, Manado, in the year 2020. The submission of the seedlings is symbolically given to Hintakinan farmer group, Hintuhuan, Hinggili, and Kayu Wulan. Meanwhile, chili seedlings are handed over to the farmer group Esa Keter, Mairokang, Makaria, and Singkatuhang farmer group from Bengkol. Donation of corn and chili peppers seedlings are expected to increase the agricultural yield for farmer groups in Manado. Base on the background, the research questions are how the effect of information media on the knowledge and on farmers' skills in Indonesia.

The sampling technique in this study uses the Non-Probability sampling technique without using a certain formula but determined purposively. The type of data used in this study is the type of quantitative data. The type of quantitative data is the value of changes that can be expressed in terms of numbers or categories of data from the parameters used to measure a research variable.

The variables in this study are the Information media and knowledge of farmers—sources of data used in this study sourced from primary data and secondary data. Data collection used in this study uses a quantitative approach, with the type of data collection techniques that is a questionnaire that contains questions relating to the media that related to farmers as farmers' information and knowledge. Data collection methods are part of data collection instruments that determine the success or failure of a study [4]. Therefore the data collection techniques used must be in accordance with the nature and characteristics of the research conducted or based on the method used. Analysis of the data used in this study is a descriptive data analysis technique. Descriptive data analysis is an analysis technique that is used to analyze data by describing or describing data that has been collected as needed

without any intention to make generalizations from the results of research.
Hypothesis of this research are:
H0 1: There is no effect of information media on farmers' knowledge and
H0 2: There is no effect of information media on farmers' skills.

3.1 Data Sources

Data collected through a survey were shared by research coordinators in three regions via the Google form. The distribution of questionnaires was carried out in each city for one month. Interviews were also conducted with the three heads of farmer groups, six farmers from each area, and other sources to complement the study results. The researcher was asking about the implementation of various media in their local area to improve farmers' skills and its relation between conventional communication and media communication. The number of google forms filled out is around 260, but only 243 respondents can be analyzed after checking its validity. The forms were asking around the impact of various media on farmers' skills, knowledge, and improvement.

4. RESULTS

4.1 Data Results

From the distribution of the questionnaire to the three village areas, eleven statements were distributed to farmers to measure their level of knowledge about agricultural management. These statements are grouped into three answers, namely Negative, Positive and Strongly Agree. Statements were ranging from facilities that can support their agriculture to protect the environment from being polluted by the agricultural management process.

The following is the answer composition table to measure Indonesian farmers' knowledge based on the survey's statements (Table 1).

Table 1: Composition Of Indonesian Farmers

No	Knowledge	Negative	Positive Agree	Strongly Agree
1	How to improve help facilities for farming	103	152	15
2	How to access capital for farming	111	121	11
3	How to increase the selling price of profitable crops	81	146	16
4	How to improve agricultural facilities with farmer groups in my village	62	162	19
5	How to increase farming with minimal expenditure	94	131	18
6	How to improve your agricultural business with maximum results	83	141	19
7	How to get information on sales and purchases of needs and agricultural products easily	100	118	25
8	How to use farm tools appropriately	29	189	25
9	How to manage money in a farmer's business	70	161	12
10	How to manage seedlings, fertilizers, soils, and water properly.	35	189	19

A total of 162 farmers out of 243 farmers studied, or equal to 66.7%, agreed with their knowledge of agricultural facilities in their villages. Farmers already know how to improve agricultural facilities with farmer groups in their villages. This means that agricultural facilities in the village have been informed well from media to farmers. Better infrastructure and facilities will increase market expansion, increase economies of scale, and increase market factor operations. The development of rural facilities and infrastructure helps to expand markets because of greater access to production factors. The economic impact of agricultural facilities can increase as follows:

1. Increased Planting Intensity: an increase in mechanization and the introduction of short-term commercial plants.
2. Changes in Planting Patterns: As facilities increase, changes in cropping patterns become commercial plants. Commercial plants can be easily taken and sold in a place, increasing the harvest area because of tractors' availability in the village.
3. Increased Yield: Adequate facilities can maximize the use of fertilizers and seeds.
4. Savings in Marketing: Road facilities can reduce waste in marketing because of the reduction in distance and time in transporting agricultural products, especially on perishable crops such as vegetables [7].

189 people from the population know how to use agricultural tools. The application of agricultural machinery that is most often used in food crops, especially rice, is tillage and harvesting equipment, which is developing rapidly [12]. However, the use of agricultural machinery at the farm level is still limited. Farmers generally still use manual and

simple ways to process their agricultural products. This condition shows that many factors affect farmers' readiness in the absorption and application of mechanization technology. Hand tractors, power threshers, pedal threshers, pest sprayers are machines that all of its components can almost be created and developed locally. The choice of type and size of agricultural machine tools (called *alsintan*) is generally related to the area and plant type. Among the benefits that can be obtained by using *alsintan* are a decrease in labor wages which is a component of considerable production costs, increased land productivity with the achievement of perfect tillage, acceleration of time in planting, maintenance, and harvesting, as well as reducing losses due to yield losses at harvest.

The results of the study prove that the use of tractors does not have a negative impact on labor and positively affects the level of wages (10,2 %). The use of threshing machines and rice mills can improve rice quality by reducing physical damage (grain damage <1%). The leasing services system through the *alsintan* service business can overcome the limited funds to own or commercialize the *alsintan* so that mechanization technology can be demanded for agribusiness development.

Furthermore, 77% of the farmers studied already knew how to manage seeds, fertilizer, soil, and water. The good seed is a seed that grows fast, healthy, and uniform. By supporting the growth of seedlings properly, it is important to pay attention to the requirements for establishing seedling locations, namely: the area must be level, close to water sources, not inundated, and easy monitoring. Nurseries can use a nursery system with two stages (Double Stage System). The advantages of using this system include easy fertilization, watering, pest control, and the possibility of dying of illness when transferring.

Fertilization is done when the seeds have the perfect first leaf, and usually, the age of the seedlings is 3-4 weeks. Fertilizers given to seedlings are urea and compound fertilizers dissolved in water with concentrations of 0.3 and 0.2% intermittently (30 g / l water for 10 st seedlings), and the compound fertilizer used is C 12. 12 17. 2 or C 15. 15. 16. 4 (2 g / liter of water) for 50 seedlings. Usually, the fertilizer given is compound fertilizer that contains nutrients NPK and Mg, but can also be given a single fertilizer. Provision of compound fertilizer is recommended because the provision of appropriate fertilizer doses according to the nutrients they contain and fertilization costs are cheaper in terms of transportation and labor recruitment. How to apply this fertilizer is spread evenly around the seeds, with a distance of 40 cm from the seeds. Fertilization in the main nursery is carried out with a rotation of two weeks, using a spray tool. After fertilizing through the leaves is carried out, the leaves must be watered with clean water to prevent the occurrence of plasmolysis in leaf cells due to the remaining fertilizer solution attached to the leaves. This fertilization can be done with rotation once a week.

Soil treatment is carried out in order to get an optimal efficiency system called minimum tillage, which is minimal processing but produces good soil and optimal plant growth at a low cost. The tillage work can be divided into the first tillage and second tillage. The first tillage equipment is called piracy. Land management is not only a field activity to produce crop yields but also relates to other activities such as seed distribution, fertilizing, crop protection, and harvesting. Tillage can also be done in conjunction with fertilization as a method of controlling weeds. Land management can change and or improve soil structure and eradicate weeds. Improvement of soil structure with tillage is thought to have a good effect on plant growth, but certainly, eradicating weeds provides benefits for plant growth. To overcome the fact that land is limited, one technology that is feasible as an alternative is hydroponic technology, so agriculture can be used as an adequate source of income [10]. Hydroponic cultivation is usually carried out in a greenhouse (greenhouse) to maintain plant growth optimally and truly protected from the effect of external elements such as rain, disease pests, climate, and others.

Knowledge of the waters is very important for farmers. Agricultural waste can contain insecticide pollutants or organic fertilizer. Insecticide can kill river biota. If the river biota does not die then is eaten by animals or humans, the people who eat it will be poisoned. To prevent this, try to choose an insecticide that is narrow-spectrum (specifically kills the target animal) and is biodegradable (can be decomposed by microbes) and spraying according to the rules. Please do not throw the remaining obese into the river. At the same time, organic water-soluble fertilizers can fertilize the water environment (eutrophication). Since water is rich in nutrients, algae and aquatic plants thrive (bloom). This will threaten the sustainability of the dam. The dam will quickly become shallow and aquatic biota will die from it.

The three types of knowledge above could support the agricultural production process. How about the marketing process and selling of

agricultural products? It can be seen in the picture below. Less than 50 percent of farmers know these and even tend to doubt them. They do not know how to sell their agricultural products. Among farmers' knowledge surveys, marketing knowledge is the lowest level of their agreement. Therefore, it is necessary to look for problems in the field of selling agricultural products. Only 118 farmers agreed, or 48% of farmers stated that they easily knew how to get information on the sale and purchase of goods and agricultural products.

The factors that cause marketing are constrained because farmers' time to reach customers is too short because of the nature of their products that wither quickly, so they need to be integrated and informed with market knowledge such as price fluctuations, demand, and supply laws [6]. Also, farmers' problems in marketing their products are product quality. Many farmers do not realize the importance of quality seeds and fertilizers. Low-quality seeds and fertilizers will produce poor-quality products. Market Information: farmer literacy rates in developing countries such as Indonesia are relatively low compared to developed countries. Farmers in developing countries have no knowledge of market trends and activities. Therefore they cannot reach the actual price of their products. Product Quantity: an incorrect amount of product still occurs, which results in losses for farmers when buying or selling agricultural products. Functional Participation: Officials who monitor the marketing process have a big part in the selling price of agricultural products. Lack of Transportation Facilities: Many people in rural areas do not have adequate road facilities. This creates obstacles in transporting agro produced to the market. Inadequate Storage Facilities: Inadequate storage facilities can cause unwanted product waste.

With this condition, then there should be education for rural farmers in order to increase their knowledge in improving agricultural yields and the marketing process of their crops. Programs must be able to help educate farmers in the use of quality inputs, online educational assistance to increase productivity, etc. Rural development programs with the aim of developing infrastructure such as road facilities, communication facilities, electricity, etc. This will help in the easy transportation of agricultural products to the market. Creating a network of direct contacts between farmers and customers will help reduce unnecessary brokers or commissions for functionaries who do not have a real role, if possible, can create local outlets in the villages. It is important to provide subsidized electricity supply and loans to farmers as a cost for electricity that requires a lot of investment.

In addition to marketing and purchasing agricultural equipment, the percentage included below 50 percent is knowledge of access to capital to manage agriculture. That access and capital for farming is a problem in their knowledge, because only 121 people from 243 studied or 49.7 percent of farmers agree that they have that knowledge. When starting their farming, farmers need input in the form of capital, both in the form of money and agricultural production facilities. Capital is the most basic problem that farmers often face. Limited capital also makes the quantity and quality of the results obtained by farmers not optimal. This capital problem is also a major cause of many farmers living below the poverty line. According to 2016 data, 27.7 million people are classified as poor in Indonesia, and 21.8% of them work as farmers. Around 6.05 million farmers are living below the poverty line. The nature of cultivation is still dependent on nature; crop failure experienced by farmers certainly becomes a very serious problem. Poor farmers often do not have savings to cover their farming losses. The problem arises how farmers get capital to restart their farming, starting from the purchase of seeds, fertilizers, pesticides, and other agricultural production facilities. Small or poor farmers have many obstacles to accessing capital to formal institutions such as banks, including Farmers do not have collateral for land certificates; Payments on a monthly basis do not match farms that provide seasonal production cycles; Small farmers are generally not familiar with complicated administrative procedures.

Background can come from low levels of education, advanced age, lack of information. Farmers who own large or medium land are more likely to choose BRI (Bank of Indonesian's Government) because it is supported by ownership of land certificates. While farmers who have narrow land are more likely to choose cooperatives, farmer groups, and agricultural shops on the grounds of a fast process, the procedure is considered easy, does not require land certificates as collateral. Financial institutions should provide credit schemes, different methods of channeling credit to farmers, to avoid negative farmers' perceptions. In addition, financial institutions should increase the promotion of credit, especially in rural areas.

4.2 Test Results

Before the survey was conducted, the validity of the questions that had been compiled and tested was given to 30 farmers in Lembang. Previously,

there were seven statements about information media (Table 2). Refer to the table below.

Table 2: Validity Test Of Information Media

Information media (Variable X)	Pearson Correlation	Status	Transformation of Statement
X1	0.345	Invalid	Deleted
X2	0.396	Valid	X1
X3	0.731	Valid	X2
X4	0.878	Valid	X3
X5	0.680	Valid	X4
X6	0.748	Valid	X5
X7	0.746	Valid	X6

And there are 12 statements for farmers' knowledge (Table 3).

Table 3: Validity Test Of Farmers' Knowledge

Farmer's knowledge (Variable Z)	Pearson Correlation	Status	Transformation of statement
Z1	0.289	Invalid	Deleted
Z2	0.563	Valid	Y1
Z3	0.609	Valid	Y2
Z4	0.803	Valid	Y3
Z5	0.725	Valid	Y4
Z6	0.697	Valid	Y5
Z7	0.694	Valid	Y6
Z8	0.593	Valid	Y7
Z9	0.606	Valid	Y8
Z10	0.811	Valid	Y9
Z11	0.810	Valid	Y10
Z12	0.504	Valid	Y11

All Pearson Correlation coefficients must be greater than 0.361 (based on $\mathbf{r}_{table}$). The value below 0.36 must be deleted. This indicates that there is no association between question and variable of research.

TABLE 4: RELIABILITY TEST OF INFORMATION

Variabel	Cronbach's Alpha	Status
Information media (X)	0.786	**Reliabel**
Farmers' knowledge (Z)	0.865	**Reliabel**

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The reliability test results showed that items in this questionnaire from variable information media and farmers' knowledge were reliable with Cronbach's alpha value, respectively 0.786 and 0.865 (>0.600) (Table 4).

Previously, it is necessary to test normality with the aim to assess whether the distribution of data in a group of data or variables are normally distributed or not. Because there are so many samples in this study, the Kolomogorov-Smirnov test is used with the Monte Carlo method, which has a significant level of 99% and a sample size calculations of 1000 (default setting), and this value can be changed according to research needs.

Table 5: One-Sample Kolmogorov-Smirnov Test

			Unstandardized Residual
N			243
Normal Parameters[a,b]	Mean		243
	Std. Deviation		0,0000000
Most Extreme Differences	Absolute		0,34263275
	Positive		0,067
	Negative		0,050
Test Statistic			0,075
Asymp. Sig. (2-tailed)			,001[c]
Monte Carlo Sig. (2-tailed)	Sig.		,200[d]
	99% Confidence Interval	Lower Bound	0,189
		Upper Bound	0,210

a. Test distribution **Normal**.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. Based on 10000 sampled tales with starting seed 2000000.
e. Using Monte Carlo – Sig 0,200 > 0,05 –this is normal data

From the table above, you can see the significant value of 0.200 and exceeds the 0.05 reference. Thus, the data taken in the study has been normally distributed (Table 5).

Information media affects farmers's knowledge by 22.8% percent. The $\mathbf{t}_{count}$ is then compared with the $\mathbf{t}_{table}$ number. For a degree of error of 5% or 0.05, and a degree of validity or dk = n-2 (243-2 = 241), a $\mathbf{t}_{count}$ of 4.090 is obtained. So it is found that H0 is rejected and Ha is accepted. This means that there is an effect of information media (X) on farmers' knowledge (Z). Thus it is necessary to explore which of the biggest Information media is approved by Farmers. Statement number 3 with Cronbach's alpha is 0.878, and statement number 6 with Cronbach Alpha is 0.746 (Table 6). This statement concerns: Information media, helps farmers know how to market their crops and benefit financially, and the media is the main source of information for developing agricultural businesses. It is clear that the media used recently are more about marketing and the main source of

information, but the survey results also show low numbers about farmers' knowledge about marketing their crops.

Table 6: The Effect Of Information Media (X) On Farmers' Knowledge (Z)

Variable	Unstandardized Coefficients		Standardized Coefficients	t_{count}	Sig.
	B	Std. Error	Beta		
Information media (X)	0,228	0,056	0,241	4,09	**0,000**

5. DISCUSSION

The right marketing strategy for farmers will shorten the trading system or chain so that profit lost due to the length of the trade can be avoided. Before reaching consumers, these agricultural products are almost always through intermediaries. The path taken by agriculture agribusiness products, with or without intermediaries to reach consumers, is known as marketing channels or trade channels. Millennial farmers can use social media for marketing. There are many social media with their respective abilities. For example, we discuss about Facebook. Until this moment, the supremacy of Facebook as the most widely used social media has not been rocked. Contrary to Facebook, Instagram, which 300 million people worldwide currently use, can position itself as a social media with the unique ability of social media, which is used as a reference for online transactions for its users.

Based on the observations of researchers, making Instagram as a media to expand the market network requires special ways that must be understood by farmers to expedite their farm products. Among them: farm products sold must be unique. Prices must be realistic. Agricultural products for sale are posted with maximum image quality. And by connecting farm products with things that are trending so as to attract the attention of followers. If possible, use a brand ambassador who is willing to pay for free or at an affordable cost.

In addition to Instagram, farmers can predict trends in society through social media accounts such as Twitter. As the question arises, Can Twitter data complement or increase the size of economic confidence? Researchers expect and find the greatest correspondence when Twitter data is used to predict perceptions about recent economic changes in society, not on an aggregation of economic experience. They find evidence that the correspondence that appears varies greatly over time and appears to be induced in the presence of economic volatility, indicating that consistent long-scale trends may not be driven by consistent small-scale mechanisms. Table 7 shows famers' response about the effect of information media.

Mass media and social media should be able to increase the amount of information with a large volume. The use of new media could be understood through three levels. The first level, new media is understood as a tool or artifact used by humans to transform nature, increase social interaction, and develop potential human capacity [14]. The second level, new media, is understood according to its creator's context and purpose related to the content offered or presented in the new media. The third level, new media as a knowledge system and in its development or use, will form new social and cultural meanings as well.

The utilization of new media at the farm level is still at a low level due to various conditions such as infrastructure, ownership, community culture, and human resources. Some factors that are suspected to affect the use of new media by farmers are information quality, system quality, ease of use. For this new media to be accepted and used by agricultural, human resources, it is necessary to have media literacy, and information literacy regarding the use of new media carried out by various parties such as the government, media managers, and developers as local community leaders.

According to Amin (2014), the effectiveness of cyber extension is influenced by farmers' characteristics and technology perception [3]. Other success factors include the facility of technology and motivation from farmers to find information related to their needs. There are six factors that influence the use of cyber-extension counseling media and communication media in adopting farmer inovation in Nganjuk: 1). Open to communication media, 2). Farmers interactions in cyber extention, 3). Farmers perception in the cyber extention, 4). Types of media/communication channel, 5). Motivation, and 6). A positive attitude of farmers toward technological innovation [13]. While the research figured out that the use of new media by farmers also has an impact on creating an succesfully cyber extension into farmers' lives. Information and media literacy are factors that make cyber extension able to implement in the farmers. The other factor is the ease of technology used by farmers in daily works.

The government needs to be aware of the importance of media for farmers to have the

knowledge and skills that are in line with disruptions era.

Furthermore, information media is the lowest, with only 118 farmers 48.5 percent agreeing that the media has become the main source of information for developing agricultural businesses. The low level of farmers' ability to open up information relating to renewal elements further worsened the conditions of farmers in making decisions to reject or accept innovation [8]. Survey results on access and use of ICT by households and individuals in Indonesia in 2014 showed that the majority of ICTs (such as the use of radio and television) are still more widely used for entertainment purposes. The internet is also more widely used to access social media. The use of ICTs for entertainment purposes, the greater the respondents with low education (Ministry of Communication and Information Republic of Indonesia, 2015). ICTs offer solutions to reduce information gaps by providing appropriate information for rural farmers.

The use of television every day is 65 respondents (86.7%), 2-3 times a week as many as seven respondents (9.3%), at least once a week as many as three respondents (4.0%) [15]. Utilization of internet access by respondents is very minimal, which is more than once a week as many as eight respondents (66.7%), every day as many as three respondents (25%) and at least once a week as much as one respondent (8.3%). 5) Interest in reading newspapers from as many as 100 respondents (100%) only 16 respondents (16%) and buying newspapers, only six respondents (6%). That is, the use of newspaper media is not optimal for agricultural business households. Based on the findings of this study, it can be interpreted that the use of ICTs (television, radio, Internet media) in fulfilling information for low-income farming households. In this research, the Manado region is quite high. Hopefully, this research will contribute to an increase in the market for their products so that farmers have the power to negotiate, increase their income, and thus improve their standard of living. Efforts should be made to change agricultural development from the process of technology transfer to the process of facilitating various communication, information, and advocacy services, with the ultimate goal of improving the living standards of all rural communities. ICT empowers farmers with productive assets and marketing, increasing their production capacity to reduce their poverty status. Affordable ICT services in rural communities have played a very strong role in improving the population's economic conditions that contribute to the rural economy. ICTs have the potential to be effective instruments in supporting poverty alleviation.

Before proceeding with the research process, a survey of 30 farmers was conducted to test the validity and reliability of the five statements about the researchers' skills, and the five questions were valid and reliable(Table 7) (Table 8).

Table 7: Validity Test Of Farmers' Skills (Y)

Farmers' skills (Y)	Pearson' Correlation	Status
Y1	0.895	Valid
Y2	0.819	Valid
Y3	0.914	Valid
Y4	0.913	Valid
Y5	0.896	Valid

All Pearson Correlation coefficient is greater than 0.361 (based on $\mathbf{r}_{table}$). This indicates that all are valid.

Table 8: Reliability Test Of Farmers' Skill (Y)

Variable	Cronbach's Alpha	Status
Farmers' skills	0.932	**Reliable**

The reliability test result showed that items in the questionnaire from variable farmers' skills were reliabl with Cronbach's Alpha value (0.932 >0.600).

Table 9: The Effect Of Information Media (X) On Farmers' Skills (Y). Dependent Variable Is Farmers' Skills

Variable	Unstandardized Coefficients		Standardized Coefficients	$\mathbf{t}_{count}$	Sig.
	B	Std. Error	Beta		
Information media (X)	0,228	0,056	0,241	4,09	**0,000**

Information media has affected farmer skills of 56%. The $\mathbf{t}_{count,}$ then compared with the $\mathbf{t}_{table}$ number. For a degree of error of 5% or 0.05, and a degree of validity or dk = n-2 (243-2 = 241), a $\mathbf{t}_{count}$ of 4.090 is obtained. So it is found that H0 is rejected and Ha is accepted (Table **10**). There is a positive effect of information media (X) on farmers' skills (Y). The more effective information media management is, the more skilled the farmers are in producing crops.

Table 10 shows farmers' responses to the five statements about farmer skills. All statements are valid and reliable.

Table 10: The Effect Of Information Media On Farmers' Skills

No	Knowledge	Negative	Positive Agree	Strongly Agree
1	Mastering how to plant and harvest agricultural products	37	176	30
2	Mastering the use of appropriate agricultural support equipment	38	178	27
3	Mastering how to fertilize appropriately	22	186	35
4	Mastering how to use pesticides appropriately	30	188	25
5	Mastering how to make higher quality farm produce	36	163	44

It can be seen those high (positive) skills are in the use of appropriate pesticides, and the most negative skills are in the use of supporting tools for agricultural tools and how to make better agricultural yields. This fact can be assumed that agricultural products produced are less competitive compared to other country agricultural products. In addition, the potential for environmental pollution due to improper use of fertilizers.

How farmers produce competitive advantage in developing and implementing value creation strategies on crops not owned by competitors. Sustainable competitive advantage is a competitive advantage that is not easily imitated by others.

In assessing these resources' strategic relevance, investors look at the uniqueness, scarcity, value, ease of substitution, and degree of duplication. The value-added initiative must focus on developing strategies that include strategic resources that demonstrate these characteristics to ensure that its competitive advantage is sustainable. If a company has a proprietary technology production process that is very efficient, it can enjoy a competitive advantage until competitors find a way to copy or duplicate the technology. However, the supply of key inputs such as efficient production allows farm produce to differentiate their value propositions in the market.

Table 11: The Effect Of Information Media(X)And Farmers' Knowledge (Z) On Farmers' Skills (Y)

Variable	Unstandardized Coefficients		Standardized Coefficients	t_{count}	Sig.
	B	Std. Error	Beta		
Information media (X)	0,294	0,044	0,338	6,747	**0,000**
Farmers' knowledge (Z)	0,452	0,048	0,473	9,448	**0,000**

The results showed that information media (X) and farmers' knowledge (Z) had affected farmers' skills (Y). This is evidenced by the significance value of the two variables, each 0,000 smaller than the 0.05 significance standard. It can be seen that farmers' skills (Z) are very dominant in correlation with farmer knowledge (Y) compared to information media (X) since $\mathbf{t}_{count}$ of variable **Z** (9.448) is greater than $\mathbf{t}_{count}$ of variable **X** (6.747) (Table 11).

Both of hypothesis (H0 1 and H0 2) are rejected. So, the results showed that there is effect of information media to knowledge and skills of farmers in Indonesia.

According to the survey results in (Table 12), it is evident that the majority of farmers still rely on information from agricultural extension workers, especially in the Bangil region. While the Manado Region still relies heavily on Television and Youtube. From the table below, this can also be affected by farmers' age characteristics in each region. Farmers in Bangil are 45 years and older, Lembang is younger, and Manado is 30 to 50 years old.

Table 12: Composition Of Source Information That Are Trusted By Farmers

Type of information media	Region	Number of farmers
WhatApps Group	Bangil	1
	Lembang	16
	Manado	12
	Total	**29**
Village Office/ Agricultural Facilitator	Bangil	72
	Lembang	9
	Manado	13
	Total	**94**
News Paper	Bangil	**3**
	Lembang	3
	Manado	8
	Total	**14**
Television	Bangil	**3**
	Lembang	13
	Manado	50
	Total	**66**
Youtube Channel	Bangil	**5**
	Lembang	9
	Manado	26
	Total	**40**
Grand Total		**243**

Data shows that the information media used by farmers is different in each farmer's area. This data becomes a consideration for the government to determine which types of media are considered effective for disseminating agricultural information that can be considered to increase farmers' knowledge and skills. This can also be affected by the age of the farmers in the three areas studied. The age composition of farmers can be seen below:

a. The number of farmers who have ages with a range of 20 to 30 years is 19 people (8%).
b. The number of farmers who have ages with a range of 31 to 40 years is 27 people (11%)
c. The number of farmers who have ages with a range of 41 to 55 years is 116 people (48%).
d. The number of farmers who have ages with a range of 56 to 78 years is 81 people (33%).

There are some age of farmers who have passed the age of retirement in Indonesia, which is over 55 years as many as 33%. Many factors that remain them as a farmer. Age, education, and cosmopolitan were in a low category, which showed that farmers in conducting farming activities did not consider the status. Still the most important is that farmers were given the ability to work based on experience to be able to meet basic needs [9]. It could be because there is no other choice in undergoing activities to finance his life. It could also because they remain healthy and continue their profession as farmers. But most are in the productive age that is as much as 48%. Being a farmer is because of life choices or because of inheritance of his parents. Millenials are also seen as much as 8% [5].

The farmers profession in Indonesia is also not a profession that promises an adequate life. Table 13 shows the farmers' income level as describe below:

Table 13: Composition Of Farmers' Earning Per-Month (In Rupiahs)

No	Earnings per-month (in Rupiahs)	Number of farmers	Percentage
1	Under 2 million rupiahs	88	36%
2	>2 – 4 million rupiahs	118	49%
3	>4 up to 10 million rupiahs	29	12%
4	Upper of 10 million rupiahs	8	3%

Most of farmers are in the economic line, just barely living. Even 36% are in the line of prosperity, only 12% are well off, and 3% live in prosperity. This is also a matter of concern if the community does not want to become farmers. So that the appeal of the government to join the corporation needs to be made stronger so that farmers become a promising choice for the next generation.

Discussion on limitations of the work is there are various plants of farmers that can be discussed in separation topic with special plants such as rice or chili.

6. CONCLUSION

The process of educating information will succeed if it is directed according to the age and availability of technological facilities. The younger, more productive farmers are easier to form knowledge and skills for certain objects. The use of ICT will be maximized if accompanied by the recipient of the message's ability to adapt and be equipped with motivation and perception of the information they received. Skills in one particular field will not survive if the knowledge possessed is incomplete for that field. The more complete the knowledge of something, the more sustainable and developied skills a person has. Farmers whose have agedt retire and can motivate their offspring to develop farms with high educational capital and access to sufficient information. For farmers who are still productive, they can continue their farming business by developing themselves in knowledge to support the production and marketing of their crops so that farmers can become more prosperous, and the profession of farmers becomes a pride. Millennial age farmers can focus on developing superior production and branding activities of their crops.

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AUTHOR CONTRIBUTIONS

UY has designed the research, contributed to the data analysis, developed the experiments, and wrote the paper. MR and AA has realized the experiments and the data analysis. YT has contributed to written the paper and to the analysis of the data. SA has proofread and suggested corrections to the paper.

All the authors have discussed the results and have approved the fnal version of this manuscript.

COMPETING INTERESTS

The authors declare no competing interests.

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