Relationship between Farmer Characteristics and Gadget Using in Rural Area for Improving Regional Development

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Abstract. This research aims to see the relationship between the farmers’ characteristics and their gadgets, such as mobile phone or smartphones in support of agricultural activities. This research used qualitative and quantitative research types namely qualitative research with a survey method of observation and semi-closed interviews. The data from the field survey was processed into useful information in seeing the characteristics of farmers and their relationship in utilizing their gadgets. Analysis of this relationship was analysed using quantitative chi-square methods. The significant value of the significance of the variable age, level of education, and saving ability is 0.001, 0.003, and 0.002. Variable age and education level are internal condition of farmers who are strongly associated with the ability of farmers in operating a mobile phone to search for a variety of agricultural information. The use of a mobile phone can affect the effectiveness and efficiency of farmers in terms of time, cost, and energy. However, the use of mobile phone can also the negative impact when the expenditure to buy credit phone is not controllable, so it can be related to the inability of farmers to save in the bank.

1. Introduction
Subang Regency as one of the Regencies in West Java Province has a strategic location because it is located in the Purwasuka area, which is one of the growing areas in West Java. Besides, the Subang Regency also has a wide range of potential, including agriculture, tourism, fisheries, industrial and energy sectors [1]. The economy in the Subang District is currently dominated by the agriculture sector. Agricultural commodities such as rice, horticultural like pineapple, and vegetables have a huge contribution in contributing to the agricultural sector [1]. Sagalaherang Sub-District is one of the sub-districts that has agricultural potentials, especially vegetable and fruit commodities in Subang District. Vegetable commodities whose high production amount is a vegetable commodity Chinese cabbage with a production amount of 1,325 tons. As for fruit commodities, the amount of production with the highest commodity is durian with a production amount of 7,647.5 tons [1]. The location which is hilly and has a height of 556 MASL makes the Sagalaherang Sub-District has the potential of farming with the main commodity of vegetables. The location of the Sagalaherang Sub-District is close to the Ciater Sub-District, which enters the urban area and becomes one of the Local Activities Centre in Subang Regency integrated with urban area Lembang in West Bandung regency. Geographically, the distance between Bandung City and Sagalaherang Sub-District is close enough, which is 20 km with a distance of about 1 hour 25 minutes. The distance is close to the urban area making the Sagalaherang Sub-District as a rural area that is a suburb of urban areas Ciater and Lembang [1].

The location of the Sagalaherang Sub-District that enters the suburbs of the urban area certainly affects the spread of information technology in every community activity, such as activities in agriculture. Nowadays, there is an increase in penetration using mobile phones, even in rural areas, resulting in the delivery of information for the agricultural field is growing [2]. The development of
information technology through mobile phones, especially today's smartphones can facilitate farmers to access new information quickly and influence in better decision making [2]. Some studies identify that farmers' participation in the use of information and communication technologies has a significant positive impact on agriculture, such as in the purchase of seedlings, fertilizers, and land and labour productivity [3]. Besides, another benefit of using a mobile phone is that farmers do not have to go to the market to sell their crops. However, they can sell their crops directly and inquire about the price to distributors by telephone [2]. The number of agricultural activities assisted by the use of information and communication technology resulted in the facilities of farmers to save energy, time and money [4].

However, the use of information technology should also be supported by the surrounding environment, especially to increase the farmer's bargaining position. Nowadays, farmers who are not supported by information and communication technology are very difficult to get information about the sale price of their crops. The use of information and communication technology, not only facilitates the purchase of seedlings, fertilizer and agricultural equipment only, but also can be a medium of farmers to sell their agricultural products according to the market price. A wide range of empirical studies has been widely analysed about the relationship between personal characteristics and the source of information used for agricultural development, [2] especially in African and Indian countries. Based on the research of [2], the farmers in India not only have one source of information only, but it has a lot of information sources, either with face-to-face information or by utilizing traditional media (television, radio, newspapers) and modern (Tele-centre, mobile phone, and Kiosk/Internet). Research to know the relationship of personal characteristics in the utilization of gadgets, such as mobile phones and smartphones is still rare in Indonesia. Agricultural potentials in Subang Regency, such as in the Sagalaherang Sub-District today need to be supported by information and communication technology (ICT). Considering at this time an era of globalization, so that ICT can be one of the support tools to support the effectiveness of agriculture.

However, it is not yet known how the relationships between the personal characteristics of existing farmers with gadgets, especially the utilization of information technology and communication on mobile phones or smartphones owned by farmers in support of the agriculture activities. The personal characteristics become one consideration the utilization of smartphones by farmers, because it is related to human capital, which is one of the prerequisites for advancing agriculture in rural areas. Therefore, it takes a research on the relationship between characteristics of farmers with the utilization of gadgets (mobile phones and smartphones) owned in obtaining information that supports agricultural activities. To achieve this goal, the target would be achieved are identifying the characteristics of existing farmers in Sagalaherang Sub-District and identifying the characteristic relationship of farmers with the utilization of gadgets (mobile phone and smartphone) that is owned to obtain information about the development of agricultural activities as one form to improve agricultural development in rural areas.

2. Methods

2.1. Study Area
Sagalaverang Sub-District is the location of the study. However, from the 7 (seven) villages in the Sagalaherang Sub-District, Cicadas Village was designated as the location of research and sampling of respondents. Sagalaherang Village was chosen because it is still a homogeneous rural area, but the distance is not too far away from the Central District village, such as Sagalaherang Kaler Village. Besides, based on statistical data of the Sagalaherang Sub-District year 2017, the number of farm laborers in Cicadas Village is relatively few with other villages in the Sagalaherang Sub-district with a total of only 96 people. Therefore, the hypothesis is that most farmers in this village are farmers and owners who have an income on farmworkers, so the ability to buy and utilize mobile phones is higher. Figure 1 is the map of Cicadas Village, Sagalaherang Sub-District, Subang Regency.
2.2. Method of Data Collection
Data collected was a data observation and questionnaire structured with the focus of questions on the socio-economic characteristics of farmers, the ownership and utilization of mobile/smartphone by farmers, and obstacles in the utilization of mobile phones or smartphones. Data collection was conducted on 96 farmer respondents in Cicadas Village by visiting the head of the farmer Group and continued to visit the farmers in the rice fields. Closed questions were used on questionnaires in this study.

2.3. Method of Data Analysis
After the data of observation and dissemination of the questionnaire obtained, then the data processing was done. Once these data were processed, analysis of statistical descriptions such as frequency, percentage, and the average were done. Inferential statistics such as Chi-Square were also used to analyse the data.

3. Results and Discussion
The socio-economic conditions of farmers such as gender, age, level of education and agricultural land area are factors of the characteristics of the farmers that are significantly related to the search of agricultural information through various sources, such as only modern media such as mobile phone [2]. [5]. The use of modern information technology, one of them through the mobile phone has encouraged the opportunity to disseminate knowledge related to agriculture in the farmer community to improve the production system for better. The use of advanced technology such as mobile phones also based on several surveys found that increasing internet use and short messaging service (SMS) to disseminate information on farmers in Punjab, India [6]. It is related to the discussion discussed in this research that the research on the characteristics of internal farmers and their relation to the use of mobile phone gadgets in accessing various agricultural information, such as to purchasing seedlings, fertilizer, planting schedules, harvest schedules, marketing and other important to do.
3.1. Characteristics of Farmers

The explanation of the characteristics of farmers in this research using the socio-economic condition variables of farmers, such as gender, age, level of education, land tenure, income from crops, income outside the harvest, and the ability saving at the bank. The internal characteristics variables of this farmer came from previous literature studies and also the assessment results on variables that may be related based on the outcome of the field survey.

Based on the results of a field survey in Cicadas Village, Sagalaherang Sub-District, there are 51% male farmers and 49% of female farmers who have mobile phones and actively utilize their mobile phone to obtain information on agricultural activities, such as the purchase of seedlings, fertilizers and agricultural equipment and marketing to distributor. For age categories, farmers with age above 40-60 years are groups of farmers who have the most mobile phone with a value of 80.2%. As for the younger group of farmers, aged between 20-40 years old who have a mobile phone of 19.8%. Although mobile phone ownership is dominated by farmers who have a range of older or middle-aged but based on field surveys, the mobile phone ownership is owned not only by 1 family, so 1 mobile phone can be owned by several family members, mothers, fathers, and their children, so the utilization is adapted to the needs of each family member. The intensity of use by farmers with the age group is also not very high when compared to the intensity of use by younger family members, such as their children.

Based on the education level, the average mobile phone owner in Cicadas Village has a level of education equivalent to elementary school with a percentage value of 60.4%. As for the higher education level is 39.6%. The cheap mobile phone price affects the ownership of the phone [6] so that the penetration of mobile phone sales is not only in urban areas but nowadays there are also many in rural areas. Then related to land tenure, farmers who own land that also has a mobile phone is as much as 58.3%. While farmers who only rent land or land workers who also have a mobile phone is as much as 41.7%. It proves that Cicadas village is dominated by landowners which means that the income is higher than farmworkers, so the ability to buy a mobile phone is easier, besides also supported by mobile phone prices are relatively cheap.

Related to the economic character of the harvest income variable, farmers who have an income above IDR 3,000,000.00 as much as 53.1%. As for farmers who have an income less than IDR 3,000,000.00 is as much as 46.9%. It is very related to the profile of farmers as farmer-owners or tenants and farmworkers who are profiles dominated by the owner farmers so that many of his revenues are above IDR 3,000,000.00. There is such a condition that makes farmers need to find alternative income from other workers besides farming.

Based on the results of the field survey, there are labour farmers who also become the driver of the agricultural products to meet the needs of everyday life and open business stall. Therefore, if it is associated with other income obtained by farmers in Cicadas village, as many as 83.3% of farmers who have other income above IDR 3,000,000.00 per month other than farming activities. While the rest or 16.7% only have income under IDR 3,000,000.00 per month from activities other than agriculture. It also implicates the ability to buy mobile phones that can not only be bought by the owner's farmer, but the tenant farmers and workers also have a mobile phone in Cicadas Village.

The variable economic condition of the last farmer is related to the ability to save in banks that are dominated by not many farmers who have savings in the bank because the income gained is up for the expenditure of daily needs. A total of nearly 65.6% of farmers in Cicadas Village do not have savings in the bank. While only a little rest, that is about 34.4% has savings in the bank. It also implicates the use of phone balance and internet data packages by farmers who currently enter into non-principal expenditure, so that farmers should be able to better manage their finances because one of the negative impacts of mobile phone utilization is an expense for uncontrolled purchase credit [2].

Table 1 The following characteristics of socio-economic farmers in Cicadas Village, Sagalaherang Sub-District.
Table 1. Socio-economic Characteristics of Farmers (Respondents) in Cicadas Village.

| Variables                  | Frequency | Percentage (%) |
|----------------------------|-----------|----------------|
| Gender                     |           |                |
| Male                       | 49        | 51             |
| Female                     | 47        | 49             |
| Total                      | 96        | 100            |
| Age group (years)          |           |                |
| 20-40                      | 19        | 19.8           |
| >40-60                     | 77        | 80.2           |
| Total                      | 96        | 100            |
| Level of education         |           |                |
| Primary level              | 58        | 60.4           |
| Above primary level        | 38        | 39.6           |
| Total                      | 96        | 100            |
| Land ownership             |           |                |
| Own                        | 56        | 58.3           |
| Rent                       | 40        | 41.7           |
| Total                      | 96        | 100            |
| Harvest income             |           |                |
| > IDR 3,000,000.00         | 51        | 53.1           |
| < IDR 3,000,000.00         | 45        | 46.9           |
| Total                      | 96        | 100            |
| Annual income              |           |                |
| > IDR 3,000,000.00         | 16        | 16.7           |
| < IDR 3,000,000.00         | 80        | 83.3           |
| Total                      | 96        | 100            |
| Saving                     |           |                |
| Yes                        | 33        | 34.4           |
| No                         | 63        | 65.6           |
| Total                      | 96        | 100            |

Source, Field Survey, 2019

3.2. Relationship Characteristics Farmers with Gadget Utilization

The use of gadgets referred to in this research is a modern information media used by farmers to obtain various kinds of information related to the development of agricultural activities. As previously explained that the modern information media gadget that is the focus of discussion on this research is mobile phone, so in short, the purpose of this research is to see how to use mobile phone to support agricultural activities by farmers and whether there is a connection between the utilization of mobile phones with the social characteristics of internal farmers in Cicadas Village, Sagalaherang Sub-District. Based on the results of the field survey, it is known that the use of the mobile phone to support agricultural activities by farmers in Cicadas Village is dominated by telephone and SMS with a percentage value of 55.2%. However, 44.8% of other farmers in Cicadas Village have started to utilize the internet to support their agricultural activities, such as information retrieval on the Internet related to the eradication of plant pests and diseases, as well as the latest agricultural production technology either through browsing or on social media like WhatsApp and Facebook. The data shows that nowadays the use of the mobile phone by farmers in Cicadas Village has started to grow on the internet and social media use, so not only utilization of applications that are phone and SMS only.

Related to the social characteristics of the internal economy of farmers who have a relationship with the utilization of mobile phone in Cicadas Village, hypotheses of this research are if Ha is accepted and Ho is rejected, then there is a relationship between social characteristics farmer's internal economy with mobile phone utilization. However, if Ho is accepted and Ha is rejected, there is no link between the farmers' internal socio-economic characteristics with the use of mobile phones. Ha is acceptable if the exact value of SIG. (2-sided) is less than 0.05 (< 0.05), whereas if H) received is the opposite, exact sig.
(2-sided) value of more than 0.05 (> 0.05). Then if the value of Chi-square count > Chi-square Table, it means H0 is rejected and Ha is accepted. Conversely, if the value of Chi-square count < Chi-square table, then it means H) is accepted and Ha is rejected.

Based on the results of the analysis using cross-tabulation analysis, it is known that variables of social-economic characteristics internal farmers such as age variables, levels of education and saving ability of farmers have a significance value < 0.05 (less than of 0.05). The significant value of the significance of the variable age, level of education, and saving ability is 0.001, 0.003, and 0.002. Then, the value of the Chi-square count for each variable is also greater when compared to the value of the Chi-square table (3,841). The value of Chi-square calculates variable age, education level, and successive saving capabilities are 11,175, 8,580, and 9,731.

Variable age and level of education are 2 (two) variables that are associated with the utilization of mobile phone information sources by farmers [2]. However, the variable of land ownership has no association with the use of the mobile phone as a modern information media in support of agricultural activities by farmers in Cicadas Village. Other variables such as the variable ability to save up become one of the internal characteristics variables of farmers who have relevance to the utilization of mobile phones by farmers.

Based on the results of the cross-tabulation analysis, it is known that the variable saving ability in this bank has a relation that has a negative impact because the number of farmers who do not save in the bank but make use of mobile phone only for phone and SMS only more dominant, namely 42 respondents. The possibility of using a mobile phone that is only used for telephone and SMS alone can affect the expenditure of non-basic farmers with the ignorance of farmers to the saving of phone packages. This is because it is a habit and psychological, most farmers in Cicadas village more often use the phone application when compared to others, although they also use social media and SMS applications.

As for the variables of other economic characteristics, such as harvest income and routine income has no relation or relationship with the utilization of mobile phone by farmers because despite of having a low routine income (< IDR 3,000,000.00 every month), the average of farmworkers in Cicadas Village also has a mobile phone. Although it is not a mobile phone that is based on Android, but for information needs that can directly utilize the phone. The table 2 is a cross-tabulation analysis hypothesis.

The internal characteristics of farmers who have a relationship with the utilization of mobile phone gadgets in the development of agricultural activities are age and level of education [2]. These internal characters are variables of the farmer's social demographic condition. As for other internal characters, the ownership of land has no connection with the use of a mobile phone. Variable age and education level are internal condition of farmers who are strongly associated with the ability of farmers in operating a mobile phone to search for a variety of agricultural information.

In this research, the information sought by farmers is mainly related to the sale price and purchase of quality fertilizers and the information on the selling price of crops. Besides, there is also an information search through the internet about crop diseases and agricultural technologies. But not all utilize the application through the internet because it is related to the level of education that is still low and the age is mostly more than 40 years. Hence, the utilization of telephone and SMS applications in finding information for the development of agricultural activities is more widely used.

It implicates the next variable, the internal condition of the farmer's economy, where the variable ability to save also has a connection with the utilization of mobile phones by farmers. The use of a mobile phone can affect the effectiveness and efficiency of farmers in terms of time, cost and energy. However, the use of mobile phone can also have the negative impact when the expenditure to buy credit phone is not controllable, so it can be related to the inability of farmers to save in the bank. However, this variable needs to be confirmed again, given that based on the results of the field survey, as many as 10% of the respondent's farmers replied that the average top-up credit phone cost per month for the phone was IDR 50,000.00 per month. The expenditure is relatively smaller compared to the purchase of an internet data package of IDR 100,000.00 per month by other farmers who usually utilize the Internet and social media applications such as WhatsApp, Facebook, and others to get information on the development of agricultural activities. So, with these prices, it needs to be confirmed whether the cost of the credit phone becomes one of the causes of the inability of farmers to save.
Table 2. Results of Hypotheses.

| Socio-Economics characteristics variables | Chi-square value | DF | p-value | Decision |
|-------------------------------------------|------------------|----|---------|----------|
| Gender                                    | 0.000            | 1  | 0.983   | Not significant |
| Age                                       | 11.175           | 1  | 0.001   | Significant * |
| Level of education                       | 8.580            | 1  | 0.003   | Significant * |
| Land ownership                           | 1.474            | 1  | 0.225   | Not significant |
| Harvest income                           | 0.786            | 1  | 0.375   | Not significant |
| Annual income                            | 2.435            | 1  | 0.119   | Not significant |
| Saving                                   | 9.731            | 1  | 0.002   | Significant * |

*Note: * imply level of Significance at 5%.

Source, Field Survey, 2019.

4. Conclusion

Related to the development of agriculture in rural areas, nowadays, farmers are more informed about agricultural activities through chatting activities with fellow farmers in the fields or following groups of farmers. However, the use of the mobile phone by farmers is quite a lot in Cicadas Village and it proves that the current penetration is not only mobile phone sales in urban areas, but it is already up to the rural [7]. Therefore, to support agricultural activities in Cicadas Village, it is necessary to integrate the processing of data needed by farmers and also information about the habit of farmers in utilizing applications that exist on the mobile phone. Integration of farmer knowledge on the development of agriculture through mobile phone is needed. Integration can be created by increasing the literacy of mobile phone usage to get agricultural information, especially for farmers with old age and low-middle education level.

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