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Facilitating Conditions and Finance Factors to Encourage Farmers to Accept Sustainable Farming Technology

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Abstract: Sustainable farming technology has captured the interest of developing countries and the numbers are growing because it relies on the availability of natural and human resources. Sustainable farming is still a new way or method of farming in the industry. The local farmers here in Malaysia are still not familiar with the sustainable way of farming. Some of the farmers have implemented such technology however failed to achieve success since they are lack of knowledge and expertise. For the last decades, the influence of technology has driven the changes in most of the organization. Trusting in technology or believing that a technology has desirable attributes seems reasonable because we talk about trusting in non-human entitles in everyday discourse. Environmental-related technology has become more important in influencing and shaping organizational strategy and enhances economic returns. Now a days, business culture is moving towards green business initiatives. There are growing attention of entrepreneurs recognize that doing sustainability or anything related to green is good for their business and also to the environment. Specifically, the objective of this study is to identify the factors that encourage farmers to accept sustainable farming technology. Factors for predicting the acceptance of sustainable farming technology is expected to be produced at the end of the study. The research is also aimed to add value to the existing literature in the study of farmers using sustainable farming technology in their business and towards the national agenda.

Key words: Sustainable farming technology, technology acceptance, farmers, green technology, factors

INTRODUCTION

Sustainable farming, environmental-related technology can also be called green technology is an alternative way that can reduces fossil fuels consumption, landfill and industrial wastages that may give a negative impact to human, animal and plant health as well as damage to the world through global warming and climate changes (Kamarudin *et al*., 2011). Many of this so called green technology produces is helpful in conserving energy or reducing waste. Green technologies include such area as renewable energy sources, waste management and remediation of environmental pollutants, sewage treatment, recycling and water purification and improves agricultural systems. Olson (2008) stated that the proposed "green" strategy for enterprise-level is to help enterprises in decision making that will have a positive impact on the environment.

Sustainable farming technology or sustainable agricultural practices also promote to improve the sustainability of agricultural systems (Tey *et al*., 2012). Issues such as food safety and environmental friendliness are crucial and with that the world are moving towards promoting a greener environment by producing or manufacture in that manner.

Sustainable farming is still a new way of farming in the industry. Sustainable farming is defined based on what the input supply and the practices applied by the farmers. It uses natural input and non chemical materials that can be gathered from farms and households (Pattanapant and Shivakoti, 2009). Many local farmers are still not familiar in this kind of farming method. Sustainable farming gives a lot of potential towards our local farmer. It also have a lower environmental impacts compared with conventional farming technology (Tuomisto *et al*., 2012). Some of the farmers have implemented such technology however failed to achieve success since they are lack of knowledge and expertise (Hu *et al*., 2012).

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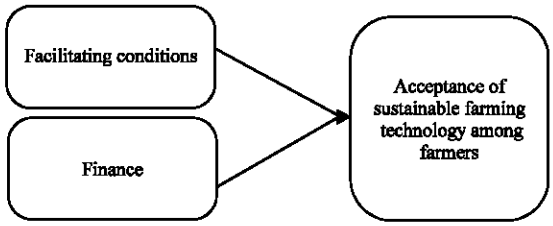

Fig. 1: Research framework

Literature review: "In 2009, high value agriculture, including swift let farming, aquaculture, seaweed, sago, ornamental fish, herbs and spices, organic fruits and vegetables, mushroom and floriculture contributed about 1% to GDP. There is growing demand for these high value products which provide opportunities for farmers to increase their income. However, the growth of these products have been constrained by limited access to suitable land and financing, lack of skilled workers, uneconomic scale operations, inadequate support services, lack of R&D support and weak linkages to the market".

One of the examples in sustainable farming technology is organic farming technology. Organic farming technology is defined as using traditional method and original farming knowledge as at the same time implementing selected modern technologies to enhance diversity into the farming system (Bhatta *et al*., 2009). It is also as an alternative to conventional agriculture that can sustain agricultural development, may avoid much negative effect to the environmental cause by human activities, food safety and can enhance the economic performance (Hu *et al*., 2012; Tuomisto *et al*., 2012; Maffei *et al*., 2013; Patil *et al*., 2014; Ponti *et al*., 2012; Santos *et al*., 2012). A production system that sustains the purity of soil, ecosystems and people can defined as organic farming technology. It combines the traditional, innovation and the sciences to promote a balance atmosphere.

There is low awareness about this sustainable farming technology among Malaysian. Tey *et al*. (2012) suggested based on their findings, the Malaysian vegetable sector has experienced a low adoption rate of sustainable agricultural practices and imply only a few farmers have adopted it. Further, improvement on organic farming technology or organic production system is necessary in the future (Hu *et al*., 2012). In this report, we can determine the acceptance of sustainable farming technology among farmers. Figure 1 shown the research framework.

Facilitating conditions is defined in this study as the degree to which a farmer believes that training in the organization exists to support the acceptance of sustainable farming technology (Venkatesh and Davis, 2000; Venkatesh *et al*., 2003). As for training, it is defined as a learning experience creating a relatively permanent change in an individual that improves their ability to perform on the job. The term training often focuses on technical knowledge, skills and abilities to complete current tasks or as an effort initiated by an organisation to foster learning among its members or employees (Treven, 2003; Snell and Bohlander, 2007).

Finance is defined in this study is to which a farmer believes that when they have better equipped in terms of financial capital and have access to finance, they are more prone in accepting new technology (Doss and Doss, 2006; Noltze *et al*., 2012). A farmer may not be able to accept new technology because of limited resources such as lack of capital (De Graaff *et al*., 2008). A recent study mentioned, that the closer and stronger the relationship built by the small farmers with the banks, it is more assured that the financial support will be given to them in times of needs (Durkin *et al*., 2013). It is specifically recommended by Iacovou *et al*. (1995), heavier financial resources, subsidization and incentives will potentially leading to faster adoption of a new technology.

The farmers and growers, and their acceptance of technology are dependent upon whether their concerns about variety of risks, market acceptance and profitability are satisfactorily addressed (Cook and Fairweather, 2003). Market and customer demand remain the main drivers in accepting technology (Abdullah *et al*., 2012).

MATERIALS AND METHODS

Population and sample selection: Target population in this research study is focused on the farmers that may implement sustainable farming technology in their farm. Farmers registered under Farmers Organization Authority Malaysia (FOAM) a central agency for farmers commissioned by the Malaysian Government to formulate policies and coordinate programs are among the agencies relevant that were selected as the population. A total of 119 respondents participated in this study.

The selection of sample is based on stratified random sampling method. According to Sekaran (2003), stratified random sampling can be employed when there are identifiable subgroups of elements within the population. A sample that is close as possible to being representative of a population can be observed and hold true for the population (Salkind, 2014).

Research instrument, data collection and data analysis: In data collection, this study entailed distribution of self-administered closed-questionnaire survey adapted

from previous researchers. The questionnaire distributed to the Farmers Organization Authority (FOAM) for them to distribute the questionnaire to the farmers. According to the FOAM the list is confidential. As mentioned by Sekaran, 2003 that closed questions help respondents to make quick decisions to choose among the several alternatives before them. Furthermore, they help the researcher to easily code the information for subsequent analysis. As such, this study utilizes the closed questions in the survey.

In addition as this study is a study of perceptions on how strongly the respondents agree or disagree with certain statements, Likert scale is the best to be used (Sekaran, 2003; Kumar *et al*., 2013). The researchers have decided to follow (Sekaran, 2003; Kumar *et al*., 2013) by using 5-point likert scale in the study because it is able to stimulate responses with regard to the object, event or person studied. It is also allow the respondent to be neutral on the question given.

All coded data are keyed into the computer for further analysis by using Statistical Package for Social Sciences (SPSS) Version 20. Both the descriptive and inferential statistical analysis techniques are used in the study. Specifically, percentage, mean, standard deviation, correlation and regression analyses are used to analyze data.

Percentage, mean and standard deviations are to be used in the initial phase. Subsequently, in hypotheses testing, Pearson correlation is to be employed to determine the relationship between independent variables and dependent variables. Meanwhile, multiple regression analysis is to be conducted to examine the simultaneous effects of independent variables on dependent variable.

Data analysis: This study showed the result of data analyzed using the method as explained in previous section. It is divided into three major sections namely demographic profile, reliability analysis and hypothesis testing. Results of the analysis illustrated the list of findings on relationship of farmers determinants towards acceptance of sustainable farming technology among farmers. By running the data through SPSS Version 20, mean value of each of variables indicated the response of farmers on technology acceptance. Correlation and multiple regression analysis were used on variables in order to test the listed hypotheses.

Respondents were sampled as they were directly involved in agricultural industries all over Malaysia that focus on green technology. Their feedback on each of questions recorded in questionnaire booklet. They were also engaged in respond of their views on technology acceptance. Thus, their data to the issues raised in the given questionnaires have credibility for analysis. Out of 300 questionnaires distributed, 119 respondents replied the questionnaires which response rate is at 39.67%. From total replied, all returned in a complete feedback. Questionnaires were distributed only to person who deals directly with farming matters.

Demographic profile of company: Numbers of farmers were selected to response their acceptance of sustainable farming technology in Malaysia. Most of the companies were from 1-10 years of operation (50.4%) followed by companies with 41 years of operation and above (17.6%) 21-30 years (10.9%) and 31-40 years (10.9%) The least respondents came from companies with 11-20 years of operation, which represented by 10.1%. Most of the companies (70.6%) reported number of employees 50 and below, whereas balanced 29.4% of the companies had >50 employees. Respondents taken from companies operated various types of agriculture products. This led by 52.9% of respondents from companies that produced vegetable products, followed by others agriculture products (24.4%) fruit products (14.3%) and meat products (7.6%). Last but not least, the smallest number of respondents came from fish products companies which represented total respondents (0.8%). Majority of companies received financial support from others (40.3%) Agrobank (28.6%) and SME Bank (11.8%). The rest of companies received assistance from various agencies namely SME Corp, MATRADE, MIDA, MIDF, AIM, Tekun, MARA and PNS which each of them represented <10% in this research.

Reliability analysis: To address reliability, Cronbach's alphas were calculated for each independent and dependent variable. This test was applied to verify consistency of variables before proceed to further analysis. All three variables achieved score above 0.7 for their Cronbach's alpha with the highest value represented by acceptance of sustainable farming technology (0.944) followed by facilitating conditions variable results 0.856. The other variable represented by finance (0.837). In conclusion, all variables above were reliable and proceeded to hypothesis testing.

Hypothesis testing: Based on the objective of this study, two hypotheses were proposed. Each hypothesis was reiterated below and then the results of statistical analysis for testing them were reported. All hypotheses were tested by using correlation analysis and multiple linear regression analysis.

Correlation analysis: A correlation coefficient measured the strength of a linear between two variables. In this

study, a Pearson correlation coefficient measured the strength of a linear between the technology acceptance and two farmer's determinants (facilitating conditions and access financing). The correlation between overall independent and dependent variables were positive and significant at the 0.01 level (2-tailed) with all values represented in between of 0.4-0.6 which means moderately strong association. The highest association represented by finance, the correlation was 0.544 ($p = 0.000$) followed by facilitating conditions ($r = 0.499$, $p = 0.000$). Therefore, the study indicated that there were associations among farmer's determinants and technology acceptance.

Multiple linear regression analysis: Multiple linear regression analysis is a statistical analysis that used to examine relationship between independent variables and a dependent variable. There were two hypotheses tested, namely:

- H_1: there is significant relationship between facilitating conditions towards acceptance of sustainable farming technology among farmers
- H_2: there is significant relationship between finance towards acceptance of sustainable farming technology among farmers

In this standard, multiple linear regression analysis, enter method was applied to test relationship between acceptance of sustainable farming technology which is considered as aggregated variable when facilitating conditions and finance act as independent variables. As a result, the independent variables (facilitating conditions and finance) explained 52.1% of the total variances in the dependent variable (acceptance of sustainable farming technology) with R^2 0.521. Thus, the relationship between among farmer's determinants and sustainable farming technology acceptance was strong.

Both determinants emerged as significant factors in explaining the acceptance of sustainable farming technology with facilitating conditions received p-value of 0.003 reported as highly, positively and significantly related to the dependent variable at 1% level of significant. However, finance showed significant at 5% level of significant. Thus, this finding fails to reject H_1 and H_2 of the study.

RESULTS AND DISCUSSION

The statistical analysis found that only two hypotheses were supported in this study. Specifically, facilitating conditions and finance recorded a positive and significant influence on the acceptance of sustainable farming technology among farmers. This indicated that farmers willing to accept sustainable farming technology if they have enough training the farmers are willing to accept sustainable farming technology. As supported by Venkatesh and Davis, (2000) and Venkatesh *et al.* (2003) training in the organizations exists to support the acceptance of technology. Doss and Doss (2006) Noltze *et al.* (2012) have mentioned in their previous research that when the farmers or an organization have better equipped with financial factors, they are prone in accepting new technology.

This study was conducted to identify the influence of two factors on the acceptance factor of sustainable farming technology among farmers. Past literature found that facilitating conditions and finance can influence to accept new technology as in this research refers to sustainable farming technology. Based on the statistical analyses performed, both the influence factors recorded a significant positive relationship on the acceptance factor of sustainable farming technology. As such, it can be concluded that facilitating conditions and access financing play a significant and positive effect on the acceptance of sustainable farming technology.

Farmers are willing to accept sustainable farming technology when they have sufficient support for example training and finance (Venkatesh and Davis, 2000; Venkatesh *et al.*, 2003; Treven, 2003; Snell and Bohlander, 2007; Doss and Doss, 2006; Noltze *et al.*, 2012) thus the government should develop a finance support mechanism and training courses for farmers in encouraging them to accept sustainable farming technology. The government needs to detail out the origin, benefits and advantages of accepting sustainable farming technology to the farmers to boost up number of farmers accepting sustainable farming technology.

As for farmers, they need to inspect before and after they accept sustainable farming technology to verify whether or not it provides the benefits as claimed by the government. In addition, the farmers have to be well versed with the sustainable farming terms and certification in order to implement and accept this sustainable farming technology. Policy maker plays a part in developing sustainable farming technology as well. The government should encourage consumers to consume sustainable farming produce such as organic food. For examples, promotional programs such as campaigns and social outreach activities can be launch to create awareness and increase farmers and consumer's knowledge on sustainable produce such as organic food.

CONCLUSION

Furthermore, research and development activities should also be carefully funded to improve the quality of sustainable farming technology. Close monitoring on the sustainable farming technology and production of their produce is also required to ensure the safety and quality of the claimed sustainable farming technology and its produce. Lastly, future researchers can include other variables additional factors and additional variables such as mediating or moderating factors.

RECOMMENDATIONS

Furthermore, future studies are also recommended to use other types of instruments and include other statistical tests. It is hoped that this study could contribute to the knowledge and literature of technology acceptance and present some information regarding the acceptance factor of sustainable farming.

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