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Farmer's acceptance towards 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. Nowadays, 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.

1. Introduction

Sustainable farming, environmental-related technology can also be called green farming technology is an alternative way that can reduces fossil fuels consumption, landfills 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 (Soosay et al., 2016). Olson (2008) stated that the proposed "green" strategy for enterprise-level is to help enterprises (Keong et al., 2012) 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). There are issues regarding food safety and environmental friendliness is important. Concerned on the matter, the world is moving towards promoting a greener environment by producing or manufacturing in a safe environmental manner (Rezai et al., 2011).

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

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they are lack of knowledge and expertise (Hu et al., 2012).

2. Literature review

2.1. Sustainable farming technology

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 (Lankton et al., 2015; Khalil et al., 2011), food safety and can enhance the economic performance (Hu et al., 2012; Tuomisto et al., 2012; Popiel 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 (Garcia, 2014). In this report, we can determine the acceptance (Murad et al., 2015) of sustainable farming technology among farmers. Fig. 1 illustrates the research framework.

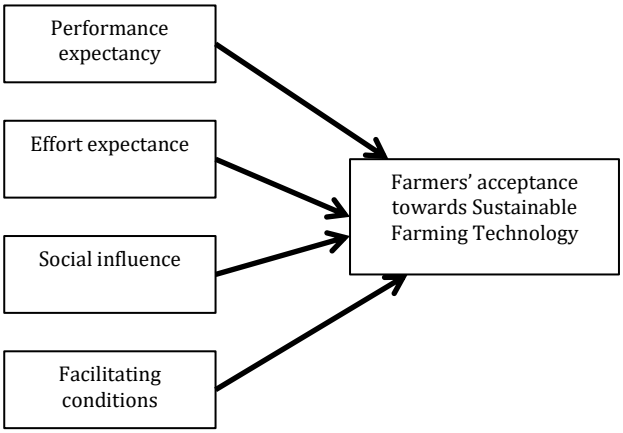

Fig. 1: Research framework

2.2. Performance expectancy

Performance expectancy is the degree to which a person believes that by using the system, it will help him or her to make gains in a job (Venkatesh et al., 2003). This element was derived from the perceived usefulness factor as indicate in the Acceptance Model (Abu et al., 2014). Users believe that the higher the system in PU, to reduce their task ambiguities and eventually increases work related performance (Venkatesh et al., 2003; Davis, 1989; Amaoko, 2007). In addition, a study by Kathiresan (2007) found that one out of six factors reviewed in their study is performance expectancy have positive effect to the end user intention to accept using a new system.

2.3. Effort expectancy

Effort expectancy is defined as the degree of ease associate with the use of the system. This factor was resulting from the perceived ease of use factor proposed in the Acceptance Model. It was found that an application perceived by people which is easier to use is more expected to be acceptable (Davis, 1989). Davis (1989) mentioned in the early stages of new behavior are expected to be more salient when process represents hurdles to be overcome and will later become overshadowed by instrumentality concerns (Murad and Thomson, 2011). Effort expectancy have a significant roles in predicting the intention to accept using a system and significantly one of the factor that explain the behavioural intention to accept to use a technology as mentioned by Carter et al. (2011). Effort Expectancy significantly high correlated with the behavioural intention, have direct effect to accept using technology (Venkatesh et al., 2003).

2.4. Social influence

Social influence was considered as a part of social norm or pressure on the development and activation of personal norms (KlÖckner and Ohms, 2009). Social influence is the degree to which a person feels that it is important for the others to believe that they also should implement the same system (Venkatesh et al., 2003). It is believed that farmers who have the availability of a big family member can be influenced in accepting sustainable farming technology (Garcia, 2014).

2.5. Facilitating conditions

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).

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).

3. Methodology

3.1. Populations and sample selection

Target population in this research paper 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 195 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).

3.2. 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 paper 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) and Kumar et al. (2013) by using five-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.

4. Data analysis

This section 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, 195 respondents replied the questionnaires which response rate is at 65%. From total replied, all returned in a complete feedback. Questionnaires were distributed only to person who deals directly with farming matters.

4.1. Demographic profile of companies

Numbers of farmers were selected to response their acceptance of sustainable farming technology in Malaysia. Most of the companies were from Negeri Sembilan (39%), followed by Melaka (12.3%), Pahang (11.8%), Johor (10.3%), Perlis (10.3%), Selangor (7.2%), Kelantan (2.6%), Kedah (2.1%), Perak (1.5%), Sabah (1.5%), Wilayah Persekutuan (1.0%) and Terengganu (0.5%). Respondents taken from companies operated various types of agriculture products. This led by 50.3% of respondents from companies that produced vegetable products, followed by fruits (16.9%), agro-based industries (16.9%), livestocks (6.2%), others agriculture products (4.6%), agro support services (3.1%) and aquaculture (2.1%).

4.2. 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 five variables achieved score above 0.7 for their Cronbach's Alpha with the highest value represented

by Acceptance of Sustainable Farming Technology (0.934), followed by Performance Expectancy (0.880), Facilitating Conditions (0.867), Effort Expectancy (0.861) and Social Influence (0.806). In conclusion, all variables above were reliable and proceeded to hypothesis testing.

4.3. Hypotheses testing

Based on the objective of this study, four 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.

4.4. 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 four farmers' determinants (Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions). According to Elifson et al. (1990), the strength of relationship between three variables can be determined by the following general guidelines: weak relationship, r = ±0.01 to ±0.30; moderate relationship, r = ±0.31 to ±0.70 and strong relationship, r = ±0.71 to ±0.99. 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 to 0.6, which means moderately strong association. The highest association represented by Social Influence, the correlation was (r = 0.571, p = 0.000) followed by Performance Expectancy (r = 0.550, p = 0.000), Facilitating Conditions (r = 0.537, p = 0.000) and Effort Expectancy (r = 0.521, p = 0.000). Therefore, the study indicated that there were associations among Farmers' Determinants and Technology Acceptance.

4.5. 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 four hypotheses tested namely:

H1: There is significant relationship between Performance Expectancy towards Acceptance of Sustainable Farming Technology among Farmers.
H2: There is significant relationship between Effort Expectancy towards Acceptance of Sustainable Farming Technology among Farmers.
H3: There is significant relationship between Social Influence towards Acceptance of Sustainable Farming Technology among Farmers.
H4: There is significant relationship between Facilitating Conditions 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 Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions act as independent variables. As a result, the independent variables (Performance Expectancy, Effort Expectancy, Social Influence and Facilitating Conditions) explained 40.8% of the total variances in the dependent variable (Acceptance of Sustainable Farming Technology) with R-Square 0.408. Thus, the relationship between among Farmers' Determinants and Sustainable Farming Technology Acceptance was moderate.

Two determinants emerged as significant factors in explaining the Acceptance of Sustainable Farming Technology with Social Influence received p-value of 0.002 reported as highly, positively and significantly related to the dependent variable at 1% level of significant while Performance Expectancy received p-value of 0.015 and showed significant at 5% level of significant. Thus, this finding fails to reject H1 and H3 of the study. As for the other two determinants (Effort Expectancy and Facilitating Conditions), received p-value of 0.108 and 0.099. Thus, this finding rejects H2 and H4 of the study.

5. Discussion

The statistical analysis found that only two hypotheses were supported in this study. Specifically, performance expectancy and social influence 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 the technology will help him or her to make gains and reduce task uncertainty and eventually increases work related performance in their farming activities (Venkatesh et al., 2003). They are also willing to accept sustainable farming technology when it is considered as a part of their social norms on the development of their personal norms (KlÖckner and Ohms, 2009). They feel that it is important for them to accept sustainable farming technology when others also believe it is important (Venkatesh et al., 2003).

6. Conclusion

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

social influence play a significant and positive effect on the acceptance of sustainable farming technology compared to effort expectancy and facilitating conditions.

Farmers are willing to accept sustainable farming technology when they can make gain and reduce task uncertainty on their farming activities. They will also accept it when the technology can increase their work performance. The government should highlight the increasing of work performance to farmers thus will encourage them to accept sustainable farming technology. The influence from other farmers in the community may also influence them to accept sustainable farming technology. The government needs to detail out the benefits and advantages of accepting sustainable farming technology to the farmers to boost up number of farmers accepting sustainable farming technology. The government also should promote the implementation of sustainable farming technology to other farmers through campaigns. According to the 10th Malaysia Plan 2011-2015 (EPU, 2010), this high value agriculture, including one of it is organic fruits and vegetables contributed about 1% to gross domestic products. There is growing demand for these high value products, which provide opportunities for farmers to increase their income.

As for farmers, they need to inspect before and after they accept sustainable farming technology, to verify whether or not it provides the work performance as claimed by the other farmers that have been using sustainable farming technology. 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 consumers' knowledge on sustainable produce such as organic food. 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. Furthermore, future studies are also recommended to use other types of instruments and include other statistical tests. It is hoped that this paper could contribute to the knowledge and literature of technology acceptance and present some information regarding the acceptance factor of sustainable farming (Kathiresan, 2007).

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