The Use of Communication Technology Channel in Agricultural Development by Malaysia Muda Agricultural Development Authority (MADA)

Ahmad Fahmi Mahamood, Rosli Mohammed, Mohd Khairie Ahmad
Department of Communication, School of Multimedia Technology and Communication
Universiti Utara Malaysia

Abstract - *Innovation in agriculture is generally defined as the implementation of ideas, products, practices, processes, new services or apparent improvements in certain environments with attention to benefit the society and the individuals within (Rogers, 1995). The use of communication technology as the innovation in the agricultural information delivery channel among farmers is still low, especially among the developing countries. This phenomenon has sparked researcher's initiatives to study the agricultural information delivery channel, particularly in agricultural development activities among the farmers under the auspices of Muda Agricultural Development Authority (MADA). In soliciting the decision-making phase of accepting the innovation, there are a few drawbacks of the channel as it was shown by Innovation Diffusion Theory. The rapid development of communication technology has led to two-way, interactive and easy-access media channel, which previously dashingly dependent on conventional media and agricultural agency. The study variables include the relative advantages, the trialibility, the suitability, the complexity, and the observability as had been described by Everett. M. Rogers. Additionally, variables such as effort expectancy, performance expectancy, social influences and facilitating condition are taken into account as to facilitate the dissemination of information on the paddy plantation. This study will use quantitative method in which opinions through a questionnaire will be collected. A total of 398 farmers was involved as the respondents of the study. The quantitative data were analysed using SPSS Version 21. The study is expected to improve the use of communication technology channel in paddy plantation to gain better and more knowledge on paddy plantation in order to increase rice production.*

Keywords: *Innovation; channel; paddy plantation.*

INTRODUCTION

Agricultural development in general is one of the most important branches of effort made by the agricultural agencies to disseminate information to the farmers in order to help to improve their productivity and their well-being. Agricultural development can be defined as a system of informal education that provides advices through educational processes to help clients to increase the knowledge and the skills whenever they need or whenever they have problems in the context of socio-economic [1].

Agricultural development is indeed crucial in providing agricultural information such as in the areas seed planting, fertilizer types and appropriateness, harvesting, selling price, advisory, cultivation techniques, crop treatments, agricultural subsidies, weather reports, new market opportunities, new agricultural technologies, electronic markets (e-market), current issues and current affairs in the agricultural sector [2]

The rapid development of communication technology has led many individuals to changing their ways to get information to be more innovative, fast and interactive, regardless of time and global reach. The agricultural development, particularly paddy plantation related activities, the farmers are mostly still practicing the use of the conventional media channels and the interpersonal communication (the development agency) in obtaining information on paddy planting activities, right from the ground-levelling process until the harvesting process. Such

information is crucial to be channelled to the farmers in order to secure a good yield and good quality due to the known status of rice being the staple food of the country. Thus, innovation-embedded channels of communications technology are highly required to be used by the farmers in order to improve their plantation and their productivity[2].

Problem Statement

The research will look into [3] focus which was related to the process of general acceptance of adopting innovations to the society which is based on the Innovation Diffusion Theory. At the persuasion phase of deciding to adopt innovation, there are five innovation characteristics, namely relative advantages, compatibility, complexity, trialbility and observability which are described as the most influential variable in the process to adopt an innovation.

However, there are some typical weaknesses in terms of communication channels that along side the rapid development of communication technology nowadays, information channels on agricultural innovation is no longer confined to the mass media and development agencies [4]. The latest communication technology channel that is more bilateral in nature, combining public communication and interpersonal communication, fast, interactive, easily accessed at all time, is expected to be highly influential in persuading the farmers to receive innovation agricultural information [5].

Meanwhile, the Innovation Diffusion Theory also has a disadvantage as it is not suitable to be used in all conditions and situations, that certain innovations are adoptable by certain individuals and communities only [6].Past studies on adoption of innovations find many useful innovations shortcomings in this theory as there are other factors that also affect individuals in the process to adopt innovations such as age, educational background, computer literacy, social status and economic status [7]. Is the adoption of information innovation in paddy plantation being useful to the farmers in this country as suggested in the Innovation Diffusion Theory? Use of mass media or better known as the conventional media is one-way in nature, uncreative and rigid. With the latest communication technology that is interactive, animated and dynamic, the conventional media's role in agricultural development activities is increasingly challenged for its effectiveness. Publishing materials on agricultural development through the latest communication technology can help to attract the target audience to change the channel of communication technology to become more efficient. Therefore, this study will also use the *Unified Theory of Acceptance and Use of Technology (UTAUT)* to accommodate the shortcomings found in the *Innovation Diffusion Theory*. This theory explains that the acceptance of the innovation or technology is dependent on the performance expectancy, effort expectancy, facilitating condition and social influences [8]. The four variables play an important role in determining the extent of the use of the latest communication technology channel in agricultural development activities among the farmers. The impetus for this research is to find out the extent of information delivery of paddy plantation that can be channelled through the latest communication technology to ensure effective and efficient use of the channel. This focus is particularly important in persuading farmers to use the channel in finding agricultural information. According to [9], the selection of the right channel is an important factor in the process for the farmers to use the agricultural information. Previous studies that focused on the use of new media in agricultural extension studies also suggest that studies on the application and the impact of the growing use of the new media's should be done [9]. Although there are many studies about the innovation adoption in agriculture, but research specifically on the use of channel of communication technology is minimal, especially in the context of agricultural development in Malaysia [10].

Research Questions

1 What is the pattern of the use of communication technology channel in agricultural development activities of the farmers?

2 What is the correlation of the variables such as relative advantages, compatibility, trialibility, complexity, observability, performance expectancy, effort expectancy, social influences and facilitating condition, in the use of communication technology channels in agricultural development activities by the farmers?

3 How does the demographic factor such as social status, economic status, age, education background and computer literacy connect with the use of communication technology channels with agricultural development activities with the farmers?

4 What is the contribution of variables such as relative advantages, compatibility, trialibility, complexity, observability, performance expectancy, effort

expectancy, social influences and facilitating conditions for the use of communication technology channels in agricultural development activities to the farmers?

OBJECTIVES OF THE STUDY

This study aims to identify channels of communication technology usage patterns among the farmers in their agricultural development activities; to identify the relevance of variables such as relative advantage, compatibility, complexity, trialibility, observability, performance expectancy, effort expectancy, social influences and facilitating situation can encourage the use of communication technology channel among farmers in agricultural development activities; to identify the relevance of demographic factors such as social status, economic status, age, educational background and computer literacy, to use communication technology channel in agricultural development activities among the farmers and to identify the contribution of variables - variables such as relative advantage, compatibility, complexity, trialibility, observability, performance expectancy, effort expectancy, social influences and facilitating condition on the use of channels of communication technology in agricultural development activities among the farmers.

SIGNIFICANCE OF THE STUDY

This study is particularly important to identify the relationship between variables such as relative advantage, compatibility, trialibility, complexity and observability as set forth in the *Innovation Diffusion Theory* and variables such as performance expectancy, effort expectancy, social influences and facilitating condition as being presented in the *UTAUT*. This is to identify the contribution of the method or the use of communication technology channel that is efficient and effective in delivering agricultural development information.

Farmers have been regarded as a group of people that is not really tapping into the advance of the current scene of innovation especially in the area of communication technology. Therefore, the findings of this study are significant to the farmers as they will contribute to the acceptance and the application of communication technology. Furthermore, the findings could become the reference point for the agricultural agencies in order to promote better acceptance in the area. Efficient amount of supply, and decent delivery

of agricultural information on paddy plantation, will increase their knowledge, skills, and productivity.
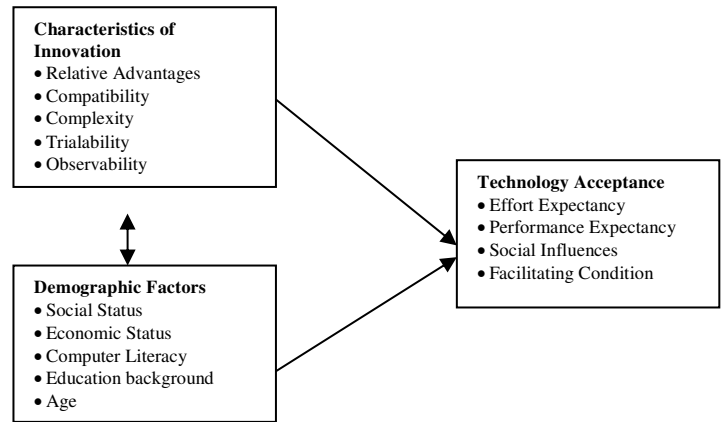
Research Framework

Hypothesis

Ha 1: There is a correlation between the characteristics of innovation and the technology adoption on the use of communications technology channel in paddy plantation.

Ha 2: There is a difference between demographic factors and the technology acceptance on the use of communication technology channel in paddy plantation.

Ha 3: There is an influence between innovation characteristic factors and technology acceptance in the use of communication technology channel in paddy plantation.

METHODOLOGY

This study used quantitative approaches. The method of quantitative approach, a questionnaire was designed based on the adaptation of the suitable instruments that appropriate for this research to find out the relevance of the variables such as the relative advantages, the trialibility, the compatibility, the complexity, the observability, the performance expectancy, the effort expectancy, social influences and facilitating condition for the use of communication technology channel to obtain information for paddy plantation by the farmers. In addition, demographic background such as the social status, the economic status, the age, the education background and the computer literacy are also considered as the factors that contribute to the use of the communication technology channel.

Table 1: Sample

Territory 1		Territory 2	
Big Scale	25	Big Scale	16
Medium Scale	32	Medium Scale	25
Small Scale	43	Small Scale	59
TOTAL	100	TOTAL	100
Territory 3		**Territory 4**	
Big Scale	15	Big Scale	19
Medium Scale	23	Medium Scale	22
Small Scale	62	Small Scale	59
TOTAL	100	TOTAL	100
TOTAL NUMBER OF RESPONDENTS		**400**	

There is a total number of 48730 farmers under MADA, nonetheless based on stratified random sampling technique through below mentioned formula, 385 respondents were acknowledged.

$$no = \frac{(1.96)\ (.5)\ (.5)}{(.5)^2} = 385$$

no	= Sample size
z	= Significant level
p^2	= 0.5
q	=1-p
e_2	= Accuracy

However, the researcher had opted for 400 respondents, and 400 questionnaires were distributed. Bigger number of respondents shall represent the population better [11]. Through stratified random sampling technique, the farmers were divided into 3 main strata or scales which were based on 4 main MADA territories (Table 1).

All 400 questionnaires were returned but 2 of the questionnaires were not completed, which makes only 398 were being analysed for the study.

Validity and Reliability

In order to determine the validity of the instrument, factor analysis was carried out on the questionnaire items to measure the independent variables (characteristics of innovation) and dependent variables (technology acceptance)

Below are the factor analysis of both the independent variables (characteristics of innovation) and dependent variables (technology acceptance) for every item in the questionnaire.

Table 2 has shown the factor analysis on all items in characteristics of innovation based on all 5 factors. Kaiser Mayer-Olkin test has resulted in 0.723 which

more that 0.4. Furthermore, Barlett test has shown total matric correlation is significant. (x = 658.7, df=174, p=0.000).

Based on the results, all 5 factors were retained in the construct of the innovation characteristics which explained the 48.82% from the total variant samples. Varimax rotation and Kaiser Normalisation had shown that most items (v16, v15, v17, v19, v18, v20, v22) has 0.4 factor loading and being categorised in factor 1(relative advantage). Items (v21, v23, v25) are in factor 2 (Compatibility). Items (v24, v29, v26) is being categorised in factor 3(triability). On the other hand, item (v27, v28, v30) are in factor 4(complexity), and lastly item (v31, v34, v33, v32) are in factor 5(observability).

Altogether, there are 20 items that are being inserted as part of the questionnaire to be used in measure the characteristics of innovation.

Table 2: Factor analyses for characteristics of innovation's items (independent variables)

Characteristics of Innovation					
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
V16	0.738				
V15	0.688				
V17	0.611				
V19	0.540				
V18	0.530				
V20	0.499				
V22	0.450				
V21		0.596			
V23		0.582			
V25		0.523			
V24			0.732		
V29			0.732		
V26			0.611		
V27				0.654	
V28				0.651	
V30				0.489	
V31					0.723
V34					0.714
V33					0.712
V32					0.700
Eigen Value	5.168	1.778	1.541	1.568	1.192
% Variance	25.486	7.408	6.012	5.518	3.598
%Cumulative Variance	25.486	32.798	37.808	43.343	48.82

Note: *only factor loading >0.4 considered*

_____

Table 3: Factor analyses for technology acceptance items (dependent variables)

	Factor 1	Factor 2	Factor 3	Factor 4
Technology Acceptance				
V37	0.84			
V36	0.82			
V38	0.71			
V35	0.66			
V41		0.69		
V40		0.65		
V42		0.61		
V43		0.58		
V44		0.55		
V47			0.72	
V46			0.68	
V45			0.63	
V49				0.67
V48				0.65
V50				0.53
Eigen Value	5.788	1.711	1.651	1.292
% Variance	35.612	7.321	4.511	8.865
%Cumalativ eVariance	35.612	6.541	5.781	48.92

Note : *only factor loading >0.4 considered*

The table 3 has shown the factor analysis on all items in characteristics of innovation based on all 4 factors. Kaiser Mayer-Olkin test has resulted in 0.813 which more than 0.4. Furthermore, Barlett test has shown total matric correlation is significant. (x = 712.57, df=102, p=0.000).

Based on the results, all 4 factors were retained in the construct of the technology acceptance which explained the 48.92% from the total variant samples. Varimax rotation and Kaiser Normalisation had shown that most items (v35, v36, v37, v38) has 0.4 factor loading and being categorised in factor 1(effort expectancy). Items (v40, v41, v42,v43,v44) are in factor 2 (performance expectancy). Items (v45, v46, v47) is being categorised in factor 3(social influence). Lastly item (v48, v49, v50) are in factor 4(facilitating condition).

Altogether, there are 15 items that are being inserted as part of the questionnaire to be used in measure the technology acceptance. However there are 35 items in total that are being inserted as part of the questionnaire to be used in measure both variables.

Table 4: Alpha Croncbach analysis

	Variables	Alpha Croncbach (n=100)	Items
1.	Relative Advantage	0.72	7
2.	Compatibility	0.63	3
3.	Triability	0.68	3
4.	Complexity	0.72	3
5.	Observability	0.79	4
6.	Effort Expectancy	0.68	4
7.	Performance Expectancy	0.77	5
8.	Sosial Influence	0.77	3
9.	Faciliting Condition	0.71	3

The questionnaire is reliable as it had been tested through a pre-test that was carried out earlier on 100 respondents. The reliability was confirmed by the results portrayed the table below. The value of Cronbach Alpha was recorded at 0.6 to 0.8 for every item which is being regarded as reliable. Then, the researcher distributed the questionnaires according to the sample which determined earlier in the MADA territories. The data collection took nearly five months to be completed from started February until July 2015. Statistical tests such as correlation,t-test, anova and regression were conducted on the data collected through questionnaires by using Statistical Package for Social Sciences(SPSS)version 21.

Finding and Analyses

The finding and analyses part will present two of the main descriptive analyses and one of the main hypothesis testing which involve hypothesis H1. Below are the results for the particular analyses which has been conducted by the researcher after the data collection has been made.

In this study, the researchers reviewed the communication channels that are commonly used by respondents for the purpose of obtaining information on paddy agricultural innovations as shown in Table 5.. A total of 3 categories of media was classified in the context of this study, which are Interpersonal Media, Traditional Media, and Interactive Media. Generally, interpersonal media, namely MADA officials received more attention than the traditional media and interactive media (235, 59%). However, traditional media are also seen to play a major role as a communication channel for farmers. Agricultural programs on television, (215, 54%) and newspapers (211, 53%) are perceived as the two popular traditional media among them. Agricultural program on radio is next (211, 53%), then magazines (203,

51%), then brochures (125, 31.4%) and lastly the notification letter (100, 25.1%).

Table 5: The Commonly Used Communication Channels to Get Information on Paddy Plantation Innovation

Channel	f	%	n
Interpersonal Media			
MADA Officer (Extension Agent)	235	59.0	398
Traditional Media			
Agricultural Programs on Television	215	54.0	398
Newspapers	211	53.0	398
Agricultural Programs on Radio	211	53.0	398
Magazines	203	51.0	398
Brochures	125	31.4	398
Notices	100	25.1	398
Interactive Media			
Short Messaging Service (SMS)	203	51.0	398
MADA's Whatapps Group	201	50.5	398
MADA's Website	177	44.4	398
MADA's Facebook	167	41.9	398
MADA's TV	167	41.9	398
Youtube	164	41.2	398
MADA's Blog	164	41.2	398
Agricultural Agencies Webpages	160	40.2	398
MADA's Twitter	49	12.3	398
E-Mail	40	10.0	398

In this study, the researchers reviewed the communication channels that are commonly used by respondents for the purpose of obtaining information on paddy agricultural innovations as shown in Table 5.. A total of 3 categories of media was classified in the context of this study, which are Interpersonal Media, Traditional Media, and Interactive Media. Generally, interpersonal media, namely MADA officials received more attention than the traditional media and interactive media (235, 59%). However, traditional media are also seen to play a major role as a communication channel for farmers. Agricultural programs on television, (215, 54%) and newspapers (211, 53%) are perceived as the two popular traditional media among them. Agricultural program on radio is next (211, 53%), then magazines (203, 51%), then brochures (125, 31.4%) and lastly the notification letter (100, 25.1%).

Along with the development of communication technology during the agricultural community, interactive media such as WhatsApp groups (201, 50.5%), MADA's website (177, 44.4%), MADA's

Facebook page (167, 419%), MADA TV (167, 419%), Youtube Website (164, 41.2%) and MADA's blog page (164, 41.2%) have also gained attention among the respondents. In addition, interactive media such as Twitter (49, 12.3%) and emails (40, 10%) are the two least favourite interactive media. Interpersonal media use is more compared to interactive media, is possibly due to the satisfaction of information obtained from interpersonal media which is more face-to-face, compared to information content in interactive media which naturally can be insufficient and not being updated. Furthermore, interpersonal media is widely used by the farmers because it was convenience to them to make extensive discussion with the extension agent. A study also revealed that in developing countries, the role of development agencies are necessary especially to transmit knowledge and skills to farmers in rural areas [16].

However, the benefits of communications technology should also be utilized by farmers to cultivate them further. Farmers should also adapt to technological development around them as it is closely associated with farming life. Current agricultural development scene also shows that agriculture is moving towards modern and digital agriculture.

Table 6 shows information about rice farming innovations that are often required by the respondents. The information is categorized into 5 major phases, namely phase 1, phase 2, phase 3, phase 4 and Whole season phase. The study found that paddy field irrigation schedule is the most important information needed by farmers (332, 83.4%). For phase 2, the Innovation on Hybrid Paddy is recorded as the most necessary information (356, 89.4%). This innovation is likely due to hybrid paddy being deemed to have better quality and more durable. This can save the farmers' operating costs in the field. For the third phase, Innovation on Seedling Machines (Jentanam) is frequently required (320, 80.4%). Researcher feels that this information is important because Innovation on Seedling Machines (Jentanam) would enable them to complete their task faster , and that saves a lot of time and money. For phase 4, the information that is really needed is the innovation on paddy straw (320, 80.4%). The farmers must have felt that this information is important because until now there is still no effective solution to the disposal or recycling process of the paddy straw . Next, the Whole season phase, the weather report is an indispensable information (350, 87.9).

Table 6: The Commonly Required Information on Paddy Plantation Innovation

Information on Paddy Agricultural Innovation	*f*	%	n
Phase 1			
Innovation on Soil Fertilisation	276	69.3	398
Innovation on Field Leveling	279	70.1	398
Geographical Positioning System Innovation	102	25.6	398
Paddy Field Irrigation Schedule	332	83.4	398
Phase 2			
Innovation in Seed Selection	255	64.0	398
Innovation rice three seasons	328	82.4	398
Innovation on Hybrid Paddy	356	89.4	398
Innovation on Paddy Estate 5-10 metric tonnes per season	301	75.4	398
Phase 3			
Innovation on Seeding	256	64.3	398
Innovation on Seedling Machines (Jentanam)	320	80.4	398
Innovation on paddy fertiliser	255	64.0	398
Phase 4			
Innovation on paddy harvesting	301	75.6	398
Innovation on paddy straw	320	80.4	398
Whole Phase (Season)			
Innovation on Paddy Fumigation	280	70.3	398
Innovation on owl cage	180	45.2	398
Weather report	350	87.9	398

This is seen in line with the paddy farming sector itself,where the weather is playing a critical role not only when engaged in the field but also on the quality and quantity of paddy produced at the end of the season. Information on paddy agricultural innovation should be spread systematically according to its season [12]. This makes it easier for farmers to identify the required information according to their needs. The information which is categorized according to the season, also facilitate the farmers to collect and administer specific information that is appropriate to the phase of their farm.

Hypotheses Testing

H1: There is a relationship between innovation characteristics and technology acceptance.

Table 7 shows the Pearson correlation test between relative advantage and the effort expectation towards technology acceptance. Analysis shows that there is a positive correlation between the relative advantage and the effort expectation ($r = 0.113$, $p = 0.024$), the relative advantage of the expected performance ($r = 0.119$, $p = 0.018$), the relative advantage and the social influence ($r = 0.161$, $r = 0.001$), the relative advantage and the facilitating situation ($r = 0.131$, $p = 0.009$). However, these relationship are classified as poor. With high relative advantage, there will also be high facilitating situation, expected performance, social influence and effort expectation in farmers' technology acceptance. Hence, not having or having less communication technology innovation, the use will also be reduced.

The analysis also has found that there is a significant positive relationship between suitability and the effort expectations ($r = 0.082$, $p = 0.102$), suitability and the expected performance ($r = 0.187$, $p = 0.000$), suitability and the facilitating situations ($r = 0.102$, $p = 0.041$). These relationships are also categorized as poor. These show the suitability of using communication technology among farmers. Thus the effort expectation, performance expectation and facilitating situation will also be higher. Equally, having less or having no suitability in communication technology, the use will also decrease.

In addition, a significant positive correlation was also detected in the analysis of trialibility against the expected performance ($r = 0.164$, $p = 0.001$). This relationship was also identified as poor. This shows that the presence of trialibility in the use of communication technology will increase the performance expectation by farmers. Correspondingly, having less or having no trialibility in the use of communication technology, the use will also decrease.

Table 7: Pearson correlation analysis between innovation characteristics and technology acceptance.

Item	Effort Expectation r (p)	Performance expectations r (p)	Social Influence r (p)	Facilitating situation r (p)
Relative Advantage	.113 *	.119 *	.161 **	.131 **
	.024	.018	.001	.009
Suitability	.082	.187 **	.068	.102 *
	.102	.000	.176	.041
Trialibility	.046	.164 **	.063	.063
	.365	.001	.210	.209
Complexity	.111 *	.193 **	.046	.113 *
	.027	.000	.356	.024
Observability	.188 **	.269 **	.247 **	.163 **
	.000	.000	.000	.001
Overall	**Technology Acceptance**			
Innovation Characteristics	0273			
	.000			

**. Correlation is significant at 0.01 level (2-tailed).

In addition, a significant positive correlation was also detected in the analysis of trialibility against the expected performance (r = 0.164, p = 0.001). This relationship was also identified as poor. This shows that the presence of trialibility in the use of communication technology will increase the performance expectation by farmers. Correspondingly, having less or having no trialibility in the use of communication technology, the use will also decrease.

The analysis also found a positive significant relationship but a weak one, involving complexity and the effort expectation (r = 0.111, p = 0.027), the complexity and the performance expectation (r = 0.193, p = 0.000) & the complexity and the facilitating situations (r = 0.113, p = 0.024). These demonstrate that the complexity in the use of communications technology will increase the effort expectation, performance expectation and facilitating situation in the use of communications technology. Likewise, having less or having no complexity in the use of communication technology, the use will also decrease.

Next, The analysis found a positive significant relationship but also weak, comprising observability and the effort expectation (r = 0.188, p = 0.000), observability and the performance expectation (r = 0,269, p = 0.000), observability and the social influence (r = 0.247, p = 0.000) and observability with facilitating situation (r = 0,163, p = 0.000). These reveal that the observability in the use of communications technology will increase the effort expectation, performance expectation and facilitating situation in the use of communication technology. Proportionately, having less or having no observability in the use of communication technology, the use will also decrease.

Nevertheless, the analysis also found that there is no significant positive relationship between suitability and the social influence (r = 0.068, p = 0.176), trialibility and the expected effort (r = 0.046, p = 0365), trialibility and the social influence (r = 0.063 , p = 0210), trialibility and the facilitating situation (r = 0.063, r = 0.209), observability and the social influence (r = 0.046, p = 0356). Overall, the finding of the analysis shows that there is a significant positive relationship between innovation characteristics and technology acceptance (r = 0.0273, p = 0.000). However, the correlation between these two variables are characterized as poor. This study also shows that the higher innovation characteristics in communication technology, translates into higher acceptance among farmers. Conversely, having less or not having these characteristics, will reduce the technology acceptance.

A large part of Pearson correlation test showed a significant relationship between the innovation characteristic variable and technology acceptance variable despite weak relationship. The relationship between dependent variable shows characteristics of

innovation [12], as an innovative feature that is still relevant and necessary to an innovative technology to be used [3].

This is in line with the findings of a study [13], the characteristics of innovation is the main construct in determining the use of innovation. While making decision, the characteristics of innovation would determine whether an individual accepts or rejects the results. Meanwhile, the characteristics of innovation also have positive impact, especially in terms of communication technologies [14]. Thus, the characteristics of innovation is to be maintained in any innovation, particularly involving the use of communications technology so that they can be accepted and widely used. Therefore, this hypothesis is accepted.

CONCLUSION

As from the literatue review, the farmers especially in a developing countries normally has been known of their lack of using communication technology. In Malaysia, especially in northern area like Perlis and Kedah, as time moving on and due to the good infrastructure, opportunities and internet access given to them has contributed a good progress for the farmers in using the communication technologies to access to a valuable information of innovation in paddy plantation. Obviously, the demand of Information on Paddy Plantation Innovation are so important among the farmers.

The findings also showed that the use of communication technology has become a priority channel along with the traditional channel for them to obtain the information on paddy innovation. The hyphothesis testing by using correlation pearson analyses for H1 between the independent variables and dependent variables also showed there are positive significant relationship between them. However, the hyphotesis H1c showed no significant relationship between them.Thus, for further improvement in using commnucation technologies, the variables such as relative advantage, faciliting conditions and social influence should be emphasized more and more by the MADA organization in order to have better usage of communication technology to obtain information on paddy innovation among the farmers in the future.

REFERENCES

[1] Bahaman, A. S., Jegak, U. & Khadijah, A.. (2009). *Media dan Perkembangan Pertanian Ke Arah Memperkasakan Komuniti Luar Bandar.* Penerbit : Universiti Putra Malaysia.

[2] Reta, S. T., Lathan, C. A., Goldberg, E. M. & Balog, K. J. (2011). S*trategic Effect of Information and Communication Technologies on Malawian Smallholder Farmers: A Phenomenological Study.* Capella University, South Africa.

[3] Rogers (1995). *Communication of innovations: A cross cultural approach.* The Free Press. A Division of Macmillan Publishing Co. Inc. New York.

[4] Syenna, M. (2012). *Indonesia dan Masyarakat Informasi, Implementasi Teknologi, Kesenjangan Digital dan Teori Difusi Inovasi.* http://syennamarcista.wordpress.com/2012/11/22/ind onesia-dan-masyarakat- informasiimplementasi-teknologi-kesenjangan-digital-dan-teori-difusi-inovasi

[5] Hudson, H. E. (2014). *Information Technologies for Rural Development in Africa: New Paradigms from Radio to Broadband.* The Economics of Information, Communication, and Entertainment 2014, pp 117-128.

[6] Moore G. C. & Benbasat, I. (1996). "*Development of an instrument to measure the perceptions of adopting an information technology innovation".* Information System Research, 2(30), 192-221.

[7] Montazemi, A. R. & Saremi, H. Q. (2013). *Factors Affecting Internet Banking Pre-usage Expectation Formation.* System Sciences (HICSS), 2013 46th Hawaii International Conference. ISSN :1530-1605E-ISBN :978-0-7695-4892-0. Print ISBN: 978-1-4673-5933-7 Page: 4666 – 4675

[8] Venkatesh, V. M. & Davis, D. (2003). *User Acceptance of Information Technology: Towards a Unified View", MIS Quarterly* 27 (3), pp. 425 – 478.

[9] Gerrit William Gijsbers (2009). Agricultural Innovation in Asia. PhD Series in Research Management: 156. ISBN 978-905892-191-8.

[10] Farah & Bahaman (2013). *Factors Impinging Farmers Use of Agriculture Technology.* Asian Social Science Journal. ISSN 1911-2017.

[11] Jock A., Gershon F. & Deininger, R. B. K. (2010): *Promises and Realities of Community-Based Agricultural Extension.* IFPRI Discussion Paper 00959. International Food Policy Research Institute

[12] Creswell (1998). *Qualitative Inquiry and Research Design: Choosing Among Five Traditions.* Thousand Oaks, CA. Sage Publication

[13] Lambrecht, E., Kühne, B. & Gellynck, X. (2015). S*uccess Factors Of Innovation Networks: Lessons From Agriculture In Flanders.* Proceedings in

System Dynamics and Innovation in Food Networks 2015

[14]   Touzard, J. M. (2015) Innovation systems and knowledge communities in the agriculture and agrifood sector: a literature review.Journal of Innovation Economics & Management. Pg: 208 DOI : 10.3917/jie.017.0117.2015.

[15]   Aubert, B. A., Schroeder, A. & Grimaudo, J. (2015). IT As Enabler Of Sustainable Farming: An Empirical Analysis Of Farmers' Adoption Decision Of Precision Agriculture Technology. Decision Support Systems Volume 54, Issue 1, December 2012, Pages 510–520.