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RESEARCH ARTICLE

FACTORS INFLUENCING MALAYSIAN VEGETABLE FARMERS ATTITUDE TOWARDS ICT USAGE

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Abstract

Background: The development of ICT, gadgets and mobile applications has expanded exponentially and hence nobody in the country from children to elderly leave home without a gadget. This development is also being observed among farm producers either for both personal uses as well as in their production. This research attempts to identify the current level of ICT, to explore the types of ICT that Malaysian vegetable farmers used and factors influencing them to use ICT in their farm production.

Materials and Methods: This research employed modified Technology Acceptance Model (TAM) in an attempt to assess Malaysian vegetable farmers' attitudes toward ICT usage. Face to face interviews were conducted on 300 farmers using a standard questionnaire. Descriptive, chi square analysis, factor analysis and regression analyses were employed to obtain the required results and objectives.

Results: The average farmers' age, farm size are 41 years old and 2.0 hectares. The mean farming experience is 12.67 and the ICT use per day is 96 minutes. The majority of farmer have up to secondary school education. Most used ICT tools by vegetable farmers are hand phones, smartphones, fixed line, tablet, computer, and fax machine. They are used to get agriculture information, and sharing knowledge with others. The result have answered the hypotheses that null hypotheses are rejected and directly indicated that perceived usefulness, perceived ease of use, subjective norm and facilitating condition factor have a significance relationship with the attitude of vegetable farmers to use ICT. Also the result of the regression analysis shows that education, area planted and farming experience are significant of ICT use.

Conclusion: In order to increase ICT usage and encourage farmers to used ICT, agencies or related departments should provide them with training in ICT courses. The relevant departments should also facilitate access to information through mobile phones applications such as WhatsApp, Facebook or other social media.

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Introduction:-

The development of ICT usage is basically runs parallel with a nation's economic development. As a country developed, demand for information, fast and efficient communication, either by businesses or individuals, and knowledge sharing becomes necessary in everyday life. Being a dynamic and progressive country Malaysia's internet usage and its penetration rate of 68.6% (http://www.internetlivestats.com) is one of the fastest in Southeast Asia. Large businesses undoubtedly far in front in ICT usage to improve their operation efficiency and save costs, such as transaction cost. The ICT development has shifted to the next level from fixed network to mobile networks and applications.The ICT advancement in Malaysia has been guided and given due attention by the National Information and Technology Agenda (NITA) and Universal Services Provider (USP).

Despite impressive ICT progress, there are segments of population who lagged behind in its applications. Vegetable farmers who are mostly smallholders and dwelling in rural areas are generally poor in terms of access to agricultural production and marketing information services. Hence linking these farmers to markets continues to be a major challenge. This challenge is as a result of poor connectivity, ICT illiterate and unavailable of info-structure. Nevertheless it is observed that the use of internet, mobile phones, tablets and smart phones have gained ground among younger and better education generation of farmers, and commercial farmers.

The benefits of ICT use by farmers in their farming operation are numerous. They include reduction in transaction cost, reduction in costs of information exchange, spurs commercialization which subsequently improve the welfare and livelihood of the farming communities. The availability of market information enables farmers to check on the prices they receive and the prevailing market prices. On top of that, internet networks enable farmers to access to information related to vegetable supply, weather, and training to attend. A more progressive farmer will develop a website as a platform to advertise and market his/her produce.

Based on the above scenario and benefits of ICT, this research attempts to investigate the use of ICT among vegetable farmers in Peninsular Malaysia. As such the study seeks to address the following research concerns: It is uncertain as to the level of ICT use; the purpose of ICT usage; the ICT media mainly used to obtain agricultural and market information; socio-economic characteristics of farmers in the study area; and the relationships between influencing factors towards attitudes of ICT use among the vegetable farmers.

The evaluation of ICT use among vegetable farmers is justifiable as the efforts of the government is to narrow down the digital divide of Malaysian which contribute the nation's economic development. More importantly the final analysis helps policy makers formulate appropriate interventions to promote ICT use among agricultural producers which eventually improve small scale farmers' livelihood and produce good quality produce.

Review of Literature:-

The role of ICT in socio-economic development is emerging significant of late. Batchelor, et al (2005) through their research concluded that ICT is one of the tools to overcome poverty. Dixon, et. al (2007) supported the finding indicating that ICT can reduce poverty especially on the rural areas. The Public Opinion and Customer Research (COMPAS) Canada (2005) research found that ICT usage among farmers has brought lot of changes to the group, The changes include farmers become more competitive, improved the agricultural productivity and farmers became more knowledgeable. On top of those changes, Pickermell (2004) emphasized that ICT provided opportunities for farmers to expand their markets and the internet brought in more customers.

Md Salleh et al (2008) analyzed the status of ICT usage among 450 agri-based entrepreneurs in Malaysia which involved four fields of agri-based industry namely plantation, animal rearing, fisheries and food processing. The study found that the most used ICT tools were phone, mobile phone, television and radio. The most used internet was surfing websites in which a small number of the respondents owned websites. Less than 40 percent of respondents agreed that ICT had positively contributed their productivity. The barriers contributed to the low levels of ICT usage among agri-entrepreneurs were lack of knowledge about the benefits of ICT, lack of skills and time in using ICT.

Okello, J. et al (2012) assessed the drivers of the use of ICT tools in general and mobile phone for agricultural transactions by smallholder farmers. The study found that the decision to use ICT tools was affected by age, primary occupation of the farmer, the cost of transport to the output market, nearness to electricity for charging phone batteries, the number of crop enterprises, farming experience, literacy levels, crop income and asset value. The

decision to use the mobile phone was driven by age, gender, cost of transport to the output market, household size, owning mobile phone, farming experience, literacy levels, crop income and asset value. The intensity of using mobile phones was affected by gender of the household head, fare to the nearest output market, literacy level of the household head, the household size, use of own mobile phone for making calls and endowment with physical and financial assets.

Besides demographic and farm characteristics factors, there are studies looked at factors associated with attitudes towards ICT usage. For instant, D' Silva et al., (2010), focused on four variables that have the potential to influence attitude towards ICT usage and the variables were self-efficacy, perceived usefulness, perceived ease of use, and subjective norm. All of the four factors studied have a positive and significant relationship towards ICT usage. Data were gathered through survey on 240 respondents comprising the Village Development and Security Committee members in the Peninsular Malaysia.

Other researchers who have proven perceived usefulness and perceived ease of use influence ICT usage include Venkatesh and Morris (2000). The study used the Technology Acceptance Model (TAM) to investigate gender differences in adopting and using technology at the workplace. Agarwal and Prasad (1999) employed TAM to assess the relationship between individual differences and IT acceptance. Hu et al.(1999) reported a research work that examined the applicability of the Technology Acceptance Model (TAM) in explaining physicians' decisions to accept telemedicine technology in the health-care context. Results suggested that TAM was able to provide a reasonable depiction of physicians' intention to use telemedicine technology. Perceived usefulness was found to be a significant determinant of attitude and intention but perceived ease of use was not. Due to the diverse applications of TAM albeit some weaknesses this study employs TAM to assess ICT usage among vegetable farmers in the Peninsular Malaysia.

Conceptual Framework:-

The Technology Acceptance Model (TAM) is possibly the most widely – used framework in the field of information system for measuring technology acceptance and its high validity has been proven empirically in many previous studies. The basic TAM was developed by Davis (1986) consisted two constructs, namely Perceived Usefulness and Perceived Ease of Use, which influence Attitude toward using and intern influences Adoption or Use. The current study modified the basic model by adding two more constructs namely, Subjective Norm and Facilitating Condition as shown in Figure 1, hence became the theoretical framework of the study.

Figure 1:- Technology Acceptance Model
Modified from Davis (1986)

Perceived usefulness is defined as the degree to which a person believes that using a particular technology will enhance his or her job performance (Davis, 1986). People tend to use or not to use an application to the extent that they believe it will enhance their job performance. As for this research, Perceived Usefulness is the degree to which a farmer believes that using ICT will help him/her enhance their farm production. The second construct is Perceived Ease of Use which is defined as the degree to which a person believes that using the system would be free of effort. Subjective Norm is the degree to which an individual perceives what important others believe them should use the ICT (Taylor and Todd, 1995). While the Facilitating condition is defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support use of ICT. Attitude in a growing number of researches suggest that attitude towards ICT use have a strong link to behavioural intention and thereafter to actual behavior. However this study will limit to looking at factors influencing vegetable farmer's attitude towards ICT usage.

Methodology:-

The current study used mainly primary data which were gathered through survey on vegetable farmers. A total of 300 farmers were interviewed in soliciting ICT usage using a standard structured questionnaire. Data gathered were analyzed in three stages. Firstly the characteristics of respondents and ICT used among the respondents were analyzed and presented in terms of frequency distribution and percentages. Second, variable reduction and factor scores were obtained and generated, respectively, through principle component analysis (PCA). Lastly, the ranking of factors influencing attitudes towards ICT usage was derived by regression analysis. Based on the modified TAM as shown in Figure 1, it hypothesized that all four constructs have positive correlations with the construct of attitude towards ICT usage.

Results and Discussion:-

Respondent's Profile:-

From table 1, 84.3 percent of the respondents were male and the balance of 15.7 percent female. The large majority of them get certain levels of formal education with only 9 percent received no format education, indicating a decent level of literacy rate among the vegetable farmers. The education levels of respondents would be a good parameter of farmers' capability to use ICT. The age categories of farmers quite evenly distributed with one half of the respondents at 50 years old and below and 50 percent at 51 years old and above, a presentation of producers of generally at productive age. Out of 300 farmers interviewed, about 34 percent had 1 to 5 years of farming experience and 25 percent had 6 to 10 years of vegetable farming experience. The balance 51 percent had 10 years or more vegetable production experience. Farm size might contribute to ICT usage to facilitate farming operations management and marketing. From the total respondents, 75% had 5 hectares and below, indicating small scale farming dominating vegetable production in the Peninsular Malaysia.

Table 1:-Demographic Profile of Respondents.

Variables	Frequency (N=300)	Percentage %
Gender		
Male	253	84.3
Female	47	15.7
Educational level		
No formal education	27	9.0
Primary School	41	13.7
Secondary School	166	55.3
College/ University	66	22.0
Age (years)		
30 and below	30	10.0
31- 40	70	23.3
41-50	50	16.7
51-60	83	27.7
60 and above	67	22.3
Vegetable Farming Experience (years)		
1 -5	103	34.3
6- 10	76	25.3
11 - 20	64	21.3
21 - 30	32	10.8
31 and above	25	8.3

Table 2 depicts ICT devices used and types of communication applications used by the vegetable farmers. The frequency figures illustrate respondents might use more than one devices and applications. Suited to the current trends of ICT development and usage, mobile phones which comprise handphones and smartphones are the most popular devices used by respondents. In terms of communication, mobile applications, internet, email and social media are more relevant as compared to older device such as facsimile machines.

Table 2:- ICT Device and Communication Applications Usage.

Types of ICT Device	Frequency
Fixed Line phones	115
Hand phones	250
Smartphones	142
Tablet/IPad	46
Laptop/ Desktop computers	101
Fax Machine	61
Types of Communication Applications	**Frequency**
Fixed line and mobile phone	339

Mobile apps (Eg. WhatsApp, Telegram) 212
Internet 190
Email 100
Fax machine 78
Social media 152

Principle Component Analysis:-

Principle component analysis was carried out based on the variables of the modified TAM. Prior to undertaking the PCA, the sampling adequacy test was done by Keiser-Meiyer-Olkin (KMO) which provides the score of sampling adequacy index of 0.933. The Bartlett's test of sphericity is significant at 99 percent confidence level indicating the PCA can be efficiently performed. Table 3 shows that the 25 are reduced into four factors that influenced the intention to use ICT by the vegetable farmers. These four latent factors account for about 64.9% of the total variance.

The first factor, Perceived Usefulness is reflected by six measured variables which includes ICT usage enhances communication with both customers and suppliers; improve farming and marketing knowledge; improve productivity; networking; and reduce costs. This factor explains 43.8 percent of the total variance. Second factor is Perceived Ease of Use which is presented by six manifest variables that are facilitate farm record keeping; fast learning on applications; relatively easy to use; user friendly or easy to operate; never disappointed when use ICT; and flexible interaction with ICT. This factor explains 9.12 percent of the total variance. The third factor is Subjective Norm and its xplains 6.59 percent of overall variance. The factor is manifested by seven manifest variables. They are workers' encouragement; family encouragement; agriculture officers' advice; recommended by suppliers; friends; and government's agency support. The fourth latent variable is Facilitating Condition and it explains 5.26 percent of the total variance. The factor is reflected by resources owned by farmers; their ICT related knowledge; electrical supply to their farms; fixed telephone lines; and fit to farmers' working style. The internal reliability for each factor is measured using the Cronbach's alpha scores and they are shown in table 4. The apha scores indicate all variables in each construct are consistent. Table 5 shows measured variables reflecting construct of attitude toward ICT usage. The construct will be the dependent variable for regression analysis as discussed in subsequent section.

Table 3:- Results of Principle Component Analysis.

Factors and measured-variables	Factor loading	Variance (% of explained Eigenvalues)
Perceived usefulness (PU)	43.839	
I use ICT to enhance communication with customers and suppliers	0.815	
ICTs such as the Internet can enhance my knowledge of farming and marketing	0.766	
Using ICT can improve my farm productivity	0.745	
Using ICT can increase my networking	0.744	
ICT can expand my customer network	0.66	
Using ICT can reduce my farm operation costs	0.505	
Perceived Ease Of Use (PEU)	9.21	
Record keeping is easier by using ICT	0.868	
I quickly learned how to use existing applications on the handset / tablet / computer	0.811	
ICT does not give any problem for me	0.759	
My interaction with the ICT would be clear and understandable	0.695	
ICT never disappointed me when I use it.	0.67	
I would find interaction with ICT is so flexible	0.661	
Subjective Norm (SN)	6.591	
My workers encourage me to use ICT in farm management	0.796	
My family encourages me to use ICT in business	0.788	
Agricultural officers advise me to use ICT in farm management	0.756	
My customers suggest that I should use ICT in business management	0.702	
My Suppliers encourage me to use ICT	0.672	
My close friends suggest to me to use ICT in farm operations	0.614	
In general, government and agencies have been supportive to the use of ICT among farmers	0.539	

Facilitating Condition (FC) 5.267
I have the resource necessary to use ICT 0.732
I have knowledge necessary to use ICT 0.642
My farm have an electricity supply 0.636
My farm have fixed phone lines 0.59
I think that using ICT fits well with the way I like to work 0.511

Table 4:-Internal Reliability Analysis of Four Factor

Factor	Number of items	Alpha Scores
Perceived of usefulness (PU)	6	0.906
Perceived of ease (PE)	6	0.910
Subjective Norm (SN)	7	0.895
Facilitating Condition (FC)	5	0.753

Table 5:-Attitude Measurement

Factors and measured-variables	Factor loading	Variance	(% of explained Eigenvalues)
I like to look market information by using the internet	0.827	58.475	
I feel confident using ICT	0.772		
I like to communicate with customers by email	0.743		
I think farmers need to change the traditional way to obtaining the information by using the ICT equipment	0.712		

Relative Importance of Factors Influencing Attitude:-

The relative importance the factors influencing farmer's attitude toward ICT usage was determined using regression analysis. The highest beta coefficient represents the most important factor and the lowest beta coefficient relatively the least important. As shown in table 6, all factors are significantly correlated with attitude of farmers towards ICT usage. Perceived Ease of Use is found to be the most important factor that affecting farmers' attitude toward ICT. Perceived usefulness and Subjective Norm, respectively are the next important factors. Facilitating Conditions was relatively the least important determinant.

Table 6:-Result Regression Analysis.

	B	Std. Error	T	Sig.
Constant	-0.004	0.042	-0.094	0.93
PU	0.240	0.042	5.662	0.00
PEU	0.535	0.043	12.493	0.00
SN	0.150	0.042	3.557	0.00
FC	0.144	0.043	3.379	0.00

Conclusions:-

This study investigated the factors influencing vegetable farmers' attitude towards ICT usage. It was found that the level of ICT use among farmers in Malaysia is considered at average level. The study employed modified TAM model that comprised four factors, namely Perceive Usefulness (PU), Perceived Ease of Use (PEU), Subjective Norm (SN), and Facilitating Condition (FC) to determine the their relationship with farmers' attitude towards ICT usage. The factors were found to positively influencing the attitude of Malaysian vegetable farmers towards the use of ICT in vegetable production. Perceive Ease of Use was the most influential factor followed by Perceive Usefulness, Subjective Norm and Facilitating condition. Provision of ICT related training will most likely able to address the issues of PEU, PU and SN. Since mobile phone and smart phones are gaining popularity and mostly used ICT tools, the responsible agencies or departments should provide them with agriculture information through mobile and create more applications like AgriMaths and others. Improving info-structure and internet access which serve as the facilitation condition would increase internet penetration and attract more user among farmers.

References:-

1. Agarwal R, Prasad J (1999). Are Individual Difference Germane to the Acceptance of New Information Technologies? J. Decision Science, 30(2): 361-391.
2. Batchelor,M.S., Scott,N., Woolnough,D., & Tambo,I. (2005). Good Practice Paper on ICT for Economic Growth and Poverty Reduction. OECD-DAC Members.
3. D' Silva JL, Samah BA, Shaffril HAM, Hassan MA (2010). Factors That Influence Attitude Towards ICT Usage among Rural Community Leaders in Malaysia. Austr. J. Basic. Appl. Sci., 4(10):5214-5220
4. Dixon, N.A., Sallstrom,L., Wasmer,A.L., & Damuth,R.J. (2007). The Economic and Societal Benefits of ICT Use: An Assessment and Policy Road Map for Latin America and the Caribbean. A Study by CompTIA in Association with Nathan Associates and Sallstrom Consulting.
5. Hu PJ, Chau PYK, Liu SOR, Tam KY (1999). Examining the technology acceptance model using physician acceptance of telemedicine technology. J. Manage. Information Systems, 16, 91-112.
6. Md Salleh Hassan, Musa Abu Hassan, Bahaman Abu Samah, Narimah Ismailand Hayrol Azril Mohamed Shaffril[1](2008). Use of Information and Communication Technology (ICT)among Agri – based Entrepreneurs in Malaysia. IAALD AFITA WCCA2008 WORLD CONFERENCE ON AGRICULTURAL INFORMATION AND IT. Tokyo University of Agriculture, Tokyo, Japan, 24 - 27 August, 2008.
7. Okello, Julius J., Oliver K. Kirui, Georgina W. Njiraini and Zachary M. Gitonga (2012). Drivers of Use of Information and Communication Technologies by Farm Households: The Case of Smallholder Farmers in Kenya. Journal of Agricultural Science, Vol. 4, No. 2.
8. Pee LG, Kankanhalli A (2010). Bridging the Digital Divide: Use of Public Internet Kiosk in Mauritius. J. Global Information Management, 18(1): 15-38.
9. Pickernell,D.G., Christie, M.J., Rowe,P.A., Thomas,B.C., Putterill,L.G., & Griffith,J.L. (2004). Farmers Market in Wales: Making the Network? British Food Journal, 106, 194-210.
10. Public Opinion And Customer Research (COMPAS). (2005). Venkatesh V, Morris MG (2000). Why don't men ever stop to ask for directions? Gender, social influence and their role in technology acceptance and usage behavior. MIS Quarterly, 24, 1, 115-139.