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Contribution of Information and Communication Technology in Increasing Agro-based Entreprenuers Productivity in Malaysia

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ABSTRACT

ICT usage has become more relevant in the modern days and agriculture is one of the sectors that benefited from it. ICT without doubt is one of the main instruments in doubling agriculture productivity and agriculture community must be encouraged to utilize it wisely. This paper tends to know the perception of Malaysia agro-based entreprenuers towards the contribution of ICT to their agro-business productivity. Moreover this paper try to discover the factors that affecting this perception. The respondents perceive moderate to high level of contribution of ICT towards their agro-based productivity. Result of the study also highlighted two variables (age & electronic media usage) that significantly influence perceived ICT contribution towards agro-based productivity.

Key Words: ICT; Agro-based entrepreneurs; Agriculture productivity; Electronic media usage

INTRODUCTION

Information and Communication Technology (ICT) includes of number of components including skills of accessing, recording, arranging, manipulating and presenting data or information using tools and software (Noor Sharifah, 2006). It also includes Communication Technology (CT), which consists of tecommunication tools used to disseminate and access information. Literacy technology based on information in printed writing form such as book, journal and newspaper is also considered as ICT. besides these, intermediate technology based on analog data or information such as electron magnetic wave such as radio, television and telephone (including mobile phone) also considered as ICT.

Increase of ICT usage among Malaysian people has brought changes to economic development, while enhancing community quality of life especially agriculture community. A number of efforts have been taken by the government to encourage the ICT usage in sectors such as agriculture and education. Encouragement to utilize ICT is important due to fact that some agriculture community still rely on traditional ways by relying on their neighbours, family and fellow farmers in getting agriculture information (Sadaf *et al.*, 2006).

Majority Malaysians now a days own ICT tools. This is based on the 2008 statistics provided by Malaysian Communications and Multimedia Commission (MCMC) that showed more than 13 million mobile phone subscribers in the country with the penetration rate now surpassing the 50% mark and more than 84 million SMS were sent everyday (Llyod, 2005). According to a report by the local newspaper, Utusan Melayu (2008), there are 500,000 Malaysian blogs that were created, while more than half a million people in Malaysia have access to internet at their home in 2006. This fact shows that millions of Malaysians are able to posses their own ICT tools. The use of ICT particularly the internet will expose farmers to knowledge and new technology in agriculture.

One of the ways to drive agriculture as the third driving force to the economy of this country is to master ICT knowledge. According to a paper prepared by United Nation ICT Task Force (2005), Malaysia is one of the countries that has a high demand for ICT business nevertherless, however the level of ICT usage among farmers in developing country like Malaysia is still at the average level. According to Obiechina (2004), agricultural farmers have the opportunity to access information through ICT and have the opportunity to create networks with development agencies and other farmers, thus increase their chances to strengthen their agriculture productivity.

ICT without doubt has big impact on agriculture. ICT also gives opportunity for farmers to widen their market and gain new customers through internet (Pickerrnell, 2004). An example of successful use of ICT in agriculture development is "mobile telephony". It has been used as a means of accessing market prices, weather and other advice. It is currently the most accessible ICT available, allowing

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access to a broad spectrum of people including marginalized people in remote rural areas (Mangstl, 2008). All of these changes give advantage to farmer in creating cost effective project and provide the opportunities to improve their quality of life. The role of ICT in improving rural livelihood was officially recognized and endorsed at the World Summit on the Information Society (WSIS), 2003-2005. This includes the use of computers, internet, geographical information systems, mobile phone as well as traditional media such as radio and TV (Stienen *et al.*, 2007). According to a research done by Batchelor *et al*. (2005), ICT is one of the tools to overcome poverty. This is strengthened by a study done by Dixon *et al.* (2007), which found that ICT can reduce poverty especially on the rural area.

ICT usage may involve high cost. Due to this agro-based entrepreneur should identify clearly from the start the important things that can help them in increasing their productivity. According to Thysen (2000), farmers will want IT applications that support the operational aspects of farming i.e., real-time decision support on high-bandwidth wireless internet connections e-mail and chat applications enriched by photos, videos and sound will become important elements in a revived agricultural extension service in a future network agriculture.

The main questions raised here with the number of initiatives conducted to encourage ICT usage and with the available ICT accommodation, how far ICT contributes towards increasing agro-based productivity in Malaysia? What are the factors that contribute towards the ICT contribution? This study is focused on identifying level of ICT contribution among agro-based entreprenuers and revealing factors that influence ICT contribution towards increasing agro-based entreprenuers productivity.

MATERIALS AND METHODS

This study employed survey method using questionnaires. Data collection using trained and experienced enumerators were deployed to interview respondents. Prior to the actual data collection, the instruments were pre-tested to determine its validity and reliability. A total of 450 respondents were randomly selected from all states in Peninsular Malaysia. The list of the respondents was gathered from various government agencies like Malaysia Department of Agriculture, Agro-Bank Malaysia and Farmers Organization Authority (FOA). The questionnaire incorporates sixteen potential contributions of ICT towards agriculture productivity. In addition, the questionnaire included questions regarding level of education, type of agro-business, age, electronic media usage, period of involvement in agro-entreprenuership, possessions of ICT tools, computer software usage and printed media usage.

RESULTS AND DISCUSSION

Respondent profile. Distribution of respondent profile is shown in Table I and II. Two thirds of the respondents were male. Slightly more than half if the respondents (54.4%) SPM/SPMV (Malaysia Education Certificate, Malaysia Vacational Education Certificate) and matriculation, while almost one third (30.7%) had primary school education. Only 13.8% of respondents had diploma, degree, master science and Ph.D.

On the type of agro-business the biggest group (41.6%) involved in food prossesing business, followed by farming (27.1%) and animal rearing (21.3%). Only a small percentage was involved in fisheries, plantation and non-food processing representing 8.4%, 3.3% and 2.4%, respectively.

Most of the respondents (72%) were 50 years and below, while only a small portion of the respondents (6.2%) were 60 years and above. Mean age of the respondent was 45.4 years. A total of 41.3% respondents involve in agro-based entrepreneurship more than 10 years, while 9.1% involve less than 3 years. Referring to mean of respondent's involvement (11.5 years), generally the respondents have been involved in agro-based business for a long period of time.

Possesions of ICT tools. Respondents were asked, whether they have these nine ICT tools fax machine, computer, internet, CD, telephone, mobile phone, PDA, radio and television. Data gained showed that three ICT tools that were most possessed are mobile phone (97.3%) and this is pertinent with the study done by Tolero *et al*. (2006), Munyua *et al*. (2007) and Proenza (2007), where they found mobile found was the popular tool among the agriculture community and this is followed by television (94.7%) and telephone (92.7%). Only 54% respondents posses computer and not too many respondents have PDA (5.6%).

Table III displays distribution of respondents level of ICT ownership. Majority of the respondents were (91.1%) posses at least four ICT tools and only 0.2% respondents do not posses any ICT tools. Based on data majority of the respondents able to use the tools available for their agro-business.

Frequency of media usage. In this study, respondents were asked to indicate the level of media usage to gain information. Information sources were divided into (1) printed media (2) electronic media and (3) ICT. Printed media covers magazine, journal, book and newspaper. Electronic media covers radio and television, while ICT includes portal, fax machine, computer, internet, CD, telephone, mobile phone and PDA.

For each media, respondents gave responses as follows, none (0), seldom (1) and always (2). Cumulative mean score was calculated for each media source. The value of mean score range between 0 to 2. The level of media usage was categorized as none (0), seldom (0.01-1) and always (1.01-2). Distribution of frequency of media usage is presented in Table IV.

Table reveals that electronic media showed the highest usage with the highest mean (1.36). The mean score for frequency of printed media usage and ICT usage were .77 dan 63, respectively more than half (56%) of the respondents used electronic media at the always level thus supporting

Table I. Respondent profile

Profile	Frequency (n=450)	Percentage
	Gender	
Male	302	67.1
Female	148	32.9
	Level of Education	
Primary school	138	30.7
SPM/SPMV	42	8.7
Diploma	39	
Degree/Master Science/Ph.D	23	5.1
Others	5	1.1
	Type of Agri-business	
Food processing	187	41.6
Farming	122	41.6
Animal rearing	96	21.3
Fisheries	28	8.4
Plantation	15	3.3
Non food processing	11	2.4

Table II. Age and period of invovement in agro-based business (n=450)

Variables	Frequency	Percentage	Mean	S.D
Age (years)			45.4	9.87
≤ 30	32	7.1		
31 - 40	104	23.1		
41 - 50	188	41.8		
51 - 60	98	21.8		
> 61	28	6.2		
Involvement (years)			11.5	8.82
≤3	41	9.1		
4 - 5	102	22.7		
6 - 10	121	26.9		
11 - 15	68	15.1		
≥ 16	118	26.2		

Table III. Level of ownership of ICT tools (n=450)

Level of Possesion	Frequency	Percentage	Mean	S.D
			5.09	1.57
None (0)	1	0.2		
Low (1 - 3)	39	8.7		
Moderate (4 - 6)	305	67.8		
High (7 - 9)	105	23.3		

Table IV. Frequency of media usage (n=450)

Media	Frequency	Percentage	Mean	S.D
			.77	.46
Print media				
None (0)	49	10.9		
Seldom (0.1-1)	311	69.1		
Always (1.01-2)	90	20.0		
Electronic Media			1.36	.66
None (0)	39	8.7		
Seldom (0.1-1)	159	35.3		
Always (1.01-2)	252	56.0		
ICT			.63	.45
None (0)	36	8.0		
Seldom (0.1-1)	338	75.1		
Always (1.01-2)	76	16.9		

Table V. Number of computer software used (n=243)

Number of software	Frequency	Percentage	Mean	S.D
			1.21	0.99
0	80	32.9		
1	52	21.4		
2	92	37.9		
3	19	7.8		

with what have been identified by Md. Salleh *et al.* (2008a) and Irfan *et al.* (2006), who claimed that electronic media is still the main choice of information sources among agricultural community. Only 20% usage recorded for printed media and 16.9% for ICT. The level of ICT usage among agro-based entrepreneurs is still far from what it is expected.

Number of computer software used. Computer softwares that frequently used were Microsoft Word, Microsoft Excel and Microsoft Access. A total of 243 respondents, who posses computers were asked to indicate, which softwares they used. Result for data analysis is shown in Table V.

The finding unveils Microsoft Word was the most used computer software followed by Microsoft Excel and Microsoft Access. Percentage of usage were 58%, 52% and 9.9%, respectively. In addition 32.9% respondents never used any of the three softwares. It was found that 37.9% of the respondents, who posses computer used at least two of the softwares, while only 7.8% used all the three softwares.

ICT contribution towards agro-based business productivity. Based on the pre test results, a total of 16 potential ICT contributions towards agro-based entrepreneurs were identified. Respondents were requested to response to each of the 16 contributions. They were asked to indicate on the scale of 0 (no contribution) to 4 (very high). Results of the analysis for each contribution were presented in Table VI. Besides of showing percentage distribution for each scale, this table also shows value of mean score for each contribution. Based on the mean score of the 16 potential contributions, the perceived contribution of ICT towards productivity of agro-based entrepreneurs was moderate to high.

The highest ICT contribution to agro-based entrepreneurs were (1) getting information every time needed, (2) enhancing networking in getting technical information on agriculture and (3) getting updated agriculture information with the mean score of 2.73, 2.66 and 2.50, respectively while "developing web site for the purpose of product marketing"(mean=2.04) was the lowest.

Cumulative mean score were computed from the 16 potential contributions. These mean scores were grouped into four levels as displayed in Table VII. A large majority (84.0%) of the respondents perceived the level of ICT contribution as moderate and high. This is pertinent with research done by Abas (2005) and Elijah (2006). On the contrary only 2.2% perceived ICT has not contributed to them. The overall ICT contribution was moderate to high as reflected by the mean score (2.42).

ICT contribution differences by selected variables. In this study, comparisons have been made to determine the differences of ICT contribution based on the level of education and type of agro-business. ANOVA was done and the results are presented in Table VIII.

Table VI. Percentage distribution of ICT contribution

Type of Contribution	Percentage (n=450)					
	0	1	2	3	4	Mean
Getting information every time needed	5.1	11.3	21.3	30.0	32.2	2.73
Enhancing networking in getting technical information of agriculture	4.2	11.1	25.1	33.3	26.2	2.66
Getting updated agriculture information	5.8	15.1	29.1	23.6	26.4	2.50
Enhancing ability in getting market information	4.2	13.8	32.7	28.9	20.4	2.48
Reducing biocracy	6.4	14.4	29.6	23.6	26.0	2.48
Promote products to wider Markets	6.9	15.8	26.9	25.1	25.3	2.46
Saving time in dealing with related parties	6.9	14.4	29.3	24.9	24.4	2.45
ICT is the effective extension channel	6.4	14.7	28.9	27.1	22.9	2.45
Getting skills and knowledge of modern technology	6.2	11.6	35.1	26.4	20.7	2.44
Disseminating new knowledge and technology	6.7	13.3	29.1	31.3	19.6	2.44
Motivating in sustaining and enhancing agri-business	6.4	16.0	30.4	24.7	22.4	2.41
Assisting more systematically and efficient in agro-business	6.7	15.6	30.9	25.3	21.6	2.40
Enabling in offering good price for product	8.2	15.8	28.0	30.2	17.8	2.34
Assisting in financial matters	9.8	19.8	27.1	24.2	19.1	2.23
Enabling in creating simulation of agro-business in increasing productivity	10.7	18.9	28.7	25.1	16.7	2.18
Developing web site for the purpose of product marketing	17.6	20.7	19.8	24.0	18.0	2.04

Table VII. Level of ICT contribution

Level of contribution	Frequency	Percentage	Mean	S.D
			2.42	1.01
None (0)	10	2.2		
Low (.01-1.33)	62	13.8		
Moderate (1.34-2.66)	194	43.1		
High (2.67-4.00)	184	40.9		

Table VIII. Comparison of ICT contribution and selected variables

Variables	n	Mean	S.D	F	P
				4.880	.001
Level of Education Received	138	2.14	1.10		
Primary School	203	2.51	.89		
SPM/SPMV	42	2.69	1.08		
STPM/Matriculation	39	2.65	.85		
Diploma	23	2.66	1.11		
Degree/Msc/Ph.D					
Type of agro business				3.417	.005
Food processing	181	2.30	1.09		
Farming	122	2.42	.86		
Animal rearing	89	2.51	1.05		
Fisheries	33	2.36	.95		
Plantation	14	2.67	.80		
Non-food processing	11	3.49	.59		

(a). Level of education received. ANOVA was employed to compare difference in ICT contribution between five respondents groups based on their level of education. Results of analysis revealed that there were significant difference of ICT contributions among the five groups studied [F (4,440) = 4.880, p < .05]. These results is closely related with those of Daramola (2005) and Papzan and Yaghoubi (2007), who claimed that those with higher education level prefer to own and surf web site for their agro-busines compared to people, who only with lower education.

Mean score for highest contribution was recorded for respondents, who had STPM/Matriculation (2.69), followed by Degree/Master Science/Ph.D (2.66) and Diploma (2.65). While the lowest mean score was recorded for respondents, who only have primary school education (2.14). Analysis of Post Hoc comparison revealed that there were significant differences between respondents with primary school and three other groups [(SPM/SPMV, STPM/Matriculation) & (Degree/Master Science/Ph.D)].

(b). Type of agro-business. The highest mean score recorded was for non-food processing business (3.49). The other five groups indicate mean score less than 3.0. Based on F Value (5,444) = 3.417, p < .05, there were significant differences among the six groups.

Detail analysis to identify difference between groups indicates there were significance differences in ICT contribution between group of non-food processing with farming, fisheries, animal rearing and food processing. However, there was no significance difference between non-food processing and plantation.

Relations between selected variables and ICT contributions. Pearson correlation analysis was done to determine the relationship between the independent variables and ICT contribution. Results of analysis are presented in Table IX. The findings revealed that there were significant correlations between all the independent variables and ICT contribution ($p < .05$).

Table IX. Result of Pearson Correlation of selected variables and ICT contribution

Variables	r	p
Age	-.357	.000
Electronic media usage	.268	.000
Period of involvement	-.247	.000
Ownership of ICT tools	.176	.000
ICT usage	.158	.001
Computer software usage	.157	.001
Printed media usage	.130	.006

Table X. Multiple regression analysis using the stepwise method

Variables	B	Beta	R	R^2	ΔR^2
Constant	3.459				
Age	-.032	-.313	.357	.128	–
Electronic media usage	.307	.198	.404	.165	.038

$F = 44.215$; sig-$F = .000$

The highest correlation was between age and ICT contribution (r = -.357), means that based on the negative correlation, younger respondents tend to receive more ICT contribution compared to the older counterpart. The younger respondents tend to benefit more from ICT. This is not suprising as it is in line with what have been done by M.D. Salleh *et al*. (2009b) and Bollman (2007).

Media usage indicated positive correlation with ICT contribution (r = .268); as expected, those with more media uses tend to receive more ICT contribution, thus this supported what have been done by Hermanrud and Sornes (2009) and Grettan *et al*. (2003). On the contrary, respondents with longer period of agro-based involvement tend to receive less ICT contribution. There is negative correlation between period of involvement and ICT contribution (r = -.247).

Ownership of ICT tools, ICT usage, computer software usage and print media usage also show significance correlation with ICT contribution with the correlation co-efficient ranging between .130 and .176.

The most contributing variables to ICT contribution. Multiple linear regression analysis using the stepwise method was employed to determine variables that most contribute towards ICT contribution. Result of analysis shown in Table X indicates two variables - age and electronic media usage significantly contribute to ICT contribution. Age was found as the highest contributor, it contributed a total of 12.8% variance of ICT contribution. Electronic media usage contributed additional of 3.8% variance. These two variables contributed 16.5% variance of ICT contribution.

Result of regression analysis reveals this prediction equation:

$$\hat{Y} = 3.459 - .032Age + .307PME$$

From the prediction equation, for every unit increase in age, ICT contribution will decrease .032 unit. While for every additional unit of electronic media usage, ICT contribution will increase by .307 units.

CONCLUSION

ICT can be utilized to help agro-based entrepreneurs improve their productivity. Results of the study revealed moderate to high level of ICT ownership. Nevertheless, frequency of ICT usage is considerably low more than 80% of the respondents indicate none and seldom level of usage. In addition the respondents perceive moderate to high level of contribution of ICT towards their agro-based productivity. It seems to be a mismatch between ownership of ICT tools, level of ICT usage and perceived ICT contribution.

Result of the study also highlighted two variables (age & electronic media usage) that significantly influence perceived ICT contribution towards agro-based productivity.

DISCUSSION

Due to less ICT benefits received by the older group of agro-based entrepreneurs, the numbers of courses and trainings should be provided to them. Extension Agricultural officers should play their roles in educating and encouraging this group to utilize ICT wisely in their agro-business.

Since electronic media have high level of usage, agriculture programs should be intensified. Agriculture programs aired in television and radio will have big impact on the audience since majority of the Malaysians are accessible to these two ICT tools. Younger group of agro-based entrepreneurs can further improve their ICT knowledge by exposing them to latest and existing ICT tools. Even though they are the highest group, who received the ICT contribution benefits, the overall usage of ICT among the agro-based entrepreneurs is still at moderate level.

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