



**Full Length Article**

# Internet Usage among Agro-based Entrepreneur: Can it Affect Productivity?

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## ABSTRACT

This study was conducted to evaluate the impact of internet usage on agro-business productivity and factors affecting it. A total of 164 respondents were involved in the study representing agro-based entrepreneurs in Peninsular Malaysia. The respondents involved in agro-business such as food processing, plantation, animal rearing, farming, fisheries and non-food processing. Respondents were chosen based on the list of agro-based entrepreneurs provided by the Department of Agriculture (DOA), Farmers Organization Authority (FOA) and Agriculture Bank of Malaysia. A survey using a questionnaire developed for the study was used to collect data. Mean, percentage, frequency and independent t-test were generated to describe the general trend of the data. From the results obtained, the level of internet applications usage was at moderate level, while all of the eight internet applications listed in the study showed significant difference in term of internet potential contribution to agro-based productivity comparing between the users and non-users of the listed internet applications.

**Key Words:** Internet users; Agro-based entrepreneurs; Agro-based productivity; Internet applications

## INTRODUCTION

Agriculture has played a key role in developing Malaysia economy. This can be proved as we can see in the period of the Ninth Malaysian Plan (RMK9), where agricultural sector will be developed as the third driving force to the economy of this country. One of the ways to achieve this objective is to master Information and Communication Technology (ICT) knowledge. ICT includes a number of components including skills of accessing, recording, arranging, manipulating and presenting data or information using tools and software (Noor Sharifah, 2006). Exposure to ICT, which include internet usage is the answer to produce ICT experts with lot of knowledge. Over the past decade information options available to farmers have changed substantially. During this period the internet has developed to provide a rich mechanism for electronic communication and electronic commerce has emerged in the past two to four years. Farmers that have access to the internet will enjoy greater access to information and can reduce the costs of economic interactions.

Majority of masses in Malaysia nowadays can own internet services at their home. This is based on the recent statistics from the Malaysian Communications and Multimedia Commission (MCMC) that shows there is 16.6% household in Malaysia having internet connection in their house and 15.7% of Malaysian people spent more than

28 h a week on internet, while Musa (2008) informed that there are seven internet providers in Malaysia, which are MIMOS, Telecom Malaysia, Celcom, Digi, Maxis, IT dotcom and Prismanet. Referring more to him, majority of public in Malaysia use internet for e-mail, seeking research information, downloading, reading newspaper, chatting and shopping. A study done by Chan-Ho (2001), concluded that the reason most farmers buy computers is not for their farming, but for their children. However, once they have bought a computer, many of them find it as a useful source of information especially through the services provided by the internet. Chan-Ho (2001) noted that a related government agency is responsible in providing a range of agricultural information services on the web including marketing information system for farmers.

In a research done by Doye (2004), the tasks for which farm computers are used have changed over time. Although financial accounting remains the most often used task of farm computers, use of the internet for communication, for transactions processing or for information retrieval was reported by about 80% of the computer-using farmers. Furthermore, when grouped together, the internet-based applications were identified as one of the three most important computer tasks by 73.5% of computer-adopting farmers. This statistic documents the growing importance of the internet as an important tool in agro-business. Research done by Doye was supported by Burke and Sewake (2008), where they found more than 78% agro-based entrepreneurs

use internet for agro-business purposes. Moreover, they stated that more than 54% have their own web sites and the web sites owner agreed that internet will bring profits to their agro-business.

E-mail and surfing web site are the two most used internet applications among the entrepreneurs (Bamka, 2000), (Aguila Obra *et al.*, 2002) and (Md. Salleh *et al.*, 2009). In spite of this, these studies only discover its data based on the highest frequency of the internet applications used by their respondents, but how about the effect of internet usage on agro-based entrepreneur's perception on what roles of internet can play in increasing their agro-business productivity. This study was conducted to discover the other internet applications such as blog, online forum and chatting. Are they frequently being used by Malaysian agro-based entrepreneurs and is there any difference in term of its usage among the Malaysian agro-based entrepreneurs? The main questions raised here, with the number of initiatives conducted to encourage internet usage and with the available internet accommodation in Malaysia are Malaysian agro-based entrepreneurs applying internet in their work and more importantly are internet application studied contributing to agro-based productivity? Encouragement to utilize internet is important due to fact that some agriculture community still rely on traditional ways such as relying on their neighbors, family and fellow farmers in getting agriculture information (Sadaf *et al.*, 2006) and depending on traditional mass media such as television, newspaper and radio (Irfan *et al.*, 2006) due to this, the aims of this study are to identify level of internet usage among agro-based entrepreneurs and to evaluate the differences between selected internet applications usage and agro-based productivity.

## MATERIALS AND METHODS

Respondents for this study were chosen from all states in Peninsular Malaysia. A total of 164 respondents, who were internet users among agro-based entrepreneurs were interviewed. The respondents were sampled using simple random sampling method based on the list gathered from three sources, which were Farmers Authority Organization (FAO), Agro Bank Malaysia and Department of Agriculture Malaysia (DOA). Data for this research was collected using questionnaire through face to face interview. The questionnaire was pre-tested and improved prior to actual data collection. Trained enumerators were employed to administer the questionnaires. Researchers and enumerators went to the respondent's house, farm or factory to conduct the data collection based on the address given. On average, the enumerators took about 30 min to complete the face to face interview. The data was analyzed using SPSS software. The dependent variable for this study was perception on internet contributions and the independent variables were e-mail, web surfing, blog, bulletin board, Yahoo Messenger, chat and blog.

Data such as percentage and mean were revealed using frequency procedures. Meanwhile, Independent t-test and ANOVA were applied to know the differences on internet usage and whether it influences their perception on what internet can contribute to their agro-business productivity.

## RESULTS AND DISCUSSION

**The respondents profile.** What are the characteristics of internet users among agro-based entrepreneurs in Malaysia? Are most of them male entrepreneurs or female entrepreneurs? Are they older than general farmers found out there? Is interest in agriculture among university graduates has increased or otherwise? Is education in agriculture provided to them? In which part of Peninsular Malaysia are the majority of them coming from? Table I had the answers for all these questions. Table I indicates that agro-based sector is still dominated by male respondents, where by slightly more than three quarter of respondents (75.6%) were male agro-based entrepreneurs. Slightly more than two fifths of respondents (40.9%) were from the age group between 41 to 50 years. Based on the respondent mean score on age (41.98 years), it gives an early picture that majority of respondents were still among those, who are called "senior" farmers.

A total of 40.9% of respondents interviewed had SPM/SPMV (Malaysia Education Certificate/Malaysia Vocational Education Certificate) and matriculation, while almost two fifths of respondents (39.9%) had primary school education. With the combination of 85.2% of respondents, who had education level of SPM/SPMV/Matriculation and primary school, it provides an early prediction that majority of respondents earn low income. A total of 29.9% of respondents had university level of education such as diploma, degree, master science and Ph D. Slightly more than four fifths (80.5%) respondents conducted their agro-business project without formal agriculture education, while only 19.5% of respondents had certificate, diploma and degree in agriculture. A total of 33.5% respondents come from central zone, while only 17.7% respondents come from northern zone.

What type of agro-business is conducted by the respondents? Are they conducting the business by themselves or are they sharing the business? Are the respondents experienced in this field? How much money they have invested and more importantly how much they have gained from the agro-business conducted? Majority of respondents (37.8%) are involved in food processing business, thus giving an early indication that this type of agro-business activity had high potential to be developed based on its popularity. Animal rearing activities also recorded good percentage, where slightly more than a quarter (25.3%) of respondents involved in this activity. Data presented concluded that minority of respondents (1.2%) involved in non-food processing.

**Table I. Respondent profile (n = 164)**

Variables	Frequency	Percentage	Mean
<b>Gender</b>			
Male	124	75.6	
Female	40	24.4	
<b>Age</b>			<b>41.98</b>
≤40 years	66	40.2	
41-50 years	67	40.9	
≥50 years	31	18.9	
<b>Level of education</b>			
Primary school	18	11.0	
SPM/SPMV	67	40.9	
STPM/Matriculation	30	18.3	
Diploma	32	19.5	
Degree/Master science/PhD	17	10.4	
<b>Level of agriculture education</b>			
No formal education in agriculture	132	80.5	
Agriculture certificate	23	14.0	
Diploma in agriculture	6	3.7	
Degree in agriculture	3	1.8	
<b>Zone</b>			
Central	55	33.5	
Southern	48	29.3	
East Coast	32	19.5	
Northern	29	17.7	

**Table II. Business characteristics of respondents (n=164)**

Variables	Frequency	Percentage	Mean
<b>Type of agro-business</b>			
Food processing	62	37.8	
Animal rearing	38	23.2	
Farming	36	22.0	
Fisheries	15	9.1	
More than one agro-based project	7	4.3	
Plantation	4	2.4	
Non-Food processing	2	1.2	
<b>Agro-based project type of ownership</b>			
Individual	127	77.4	
Family	26	15.8	
Group	11	6.8	
<b>Period of involvement</b>			<b>9.95</b>
≤ 5 years	33	20.1	
6-10 years	76	46.3	
≥ 11 years	55	33.5	
<b>Amount of starting investment [Value in Ringgit Malaysia (RM)]</b>			<b>27,441.16</b>
≤4,000	30	18.3	
4,001- RM11,000	51	31.1	
≥ 11,001	83	50.6	
<b>Amount of income gained per year [Value in Ringgit Malaysia (RM)]</b>			<b>182,683.54</b>
≤28,000	26	15.9	
28,001-60,000	74	45.1	
≥60,001	64	39.0	

A large majority of the respondents own their agro-business (77.4%), while a combination of 22.6% of the respondents owned the agro-business project either with their family or with their group. Data given in Table II obviously proved that agriculture is a profitable business activity thus supporting the idea that has been promoted by the Malaysia government, which is "agriculture is a business". Mean score for amount of starting investment was RM27, 441.16, while the amount of income the respondents received per year was tremendous. Results

**Table III. Level of ICT tools possessions**

ICT Tools	Frequency (Having the ICT tools)	Percentage
Mobile phone	163	99.4
Computer	153	93.3
Internet connection	122	74.4
PDA	20	12.2

**Table IV. Level of internet application usage (n = 164)**

Variables	Frequency	Percentage	Mean
<b>E-mail</b>			<b>1.14</b>
None (0)	30	18.3	
Seldom (0.01-1)	81	49.4	
Always (1.01-2)	53	32.3	
<b>Website surfing</b>			<b>1.12</b>
None (0)	43	26.2	
Seldom (0.01-1)	58	35.4	
Always (1.01-2)	63	38.4	
<b>Blog</b>			<b>0.57</b>
None (0)	95	57.9	
Seldom (0.01-1)	45	27.4	
Always (1.01-2)	24	14.7	
<b>Bulletin board</b>			<b>0.51</b>
None (0)	100	61.0	
Seldom (0.01-1)	45	27.4	
Always (1.01-2)	19	11.6	
<b>Yahoo Messenger</b>			<b>0.48</b>
None (0)	104	63.4	
Seldom (0.01-1)	42	25.6	
Always (1.01-2)	18	11.0	
<b>Chat</b>			<b>0.43</b>
None (0)	105	64.0	
Seldom (0.01-1)	48	29.3	
Always (1.01-2)	11	6.7	
<b>Mailing list</b>			<b>0.37</b>
None (0)	112	68.3	
Seldom (0.01-1)	44	26.8	
Always (1.01-2)	8	4.9	
<b>Agriculture forum online</b>			<b>0.35</b>
None (0)	117	71.3	
Seldom (0.01-1)	36	22.0	
Always (1.01-2)	11	6.7	

show that respondents received more from what they had invested, which was RM182, 683.54 equivalent to an average of RM15, 223.62 a month. This fact totally rejected the early indication that majority of respondents will gain low income based on only the big number of respondents, who only have lower education. Majority of respondents (50.6%) had invested ≥RM11,001, while almost half (45.1%) of respondents earned RM28,001-RM60,000 per year. More than two fifths (46.3%) of respondents had involved in agro-business for a period of 6-10 years. The mean score recorded for involvement period is 9.95 years.

**Possessions of ICT tools.** For the purpose of knowing the level of ICT possession among respondents, they were asked whether they have or not internet connection and ICT tools that have internet connection service within it. The ICT tools listed were mobile phone, computer and Personal Digital Assistant (PDA). Result presented in Table III clearly proved that majority of respondents (99.4%) possessed mobile phone and this was in line with studies conducted by Munyua *et al.* (2007), Myhr (2006) and Ofuoku *et al.* (2007), where they found mobile phone to be

**Table V. Distribution of internet potential contribution to agro-based productivity**

Type of Contribution	Percentage (n=164)					Mean
	0	1	2	3	4	
Enhancing networking in getting technical information of agriculture	1.2	4.9	18.3	49.4	26.2	2.95
Getting information every time needed	.6	7.3	22.0	37.8	32.3	2.94
Disseminating new knowledge and technology	3.0	5.5	28.7	43.9	18.9	2.70
Getting updated agriculture information	1.8	12.2	28.7	30.5	26.8	2.68
Saving time in dealing with related parties	1.8	13.4	28.0	32.3	24.4	2.64
Reducing biocracy	1.8	12.8	31.7	28.0	25.6	2.63
Enhancing ability in getting market information	1.8	7.9	36.0	34.1	20.1	2.63
Getting skills and knowledge of modern technology	1.8	9.1	33.5	36.6	18.9	2.62
Assisting more systematically and efficient in agro-business	.6	12.2	35.4	31.7	20.1	2.59
Internet is the effective extension channel	1.2	16.5	29.3	33.5	19.5	2.54
Enabling in offering good price for product	3.0	11.0	31.7	38.4	15.9	2.53
Promote products to wider markets	5.5	15.2	26.8	28.0	24.4	2.51
Motivating in sustaining and enhancing agro-business	3.7	14.0	31.1	30.5	20.7	2.51
Assisting in financial matters	6.1	14.0	32.3	29.3	18.3	2.40
Enabling in creating simulation of agro-business in increasing productivity	4.3	18.9	28.0	34.1	14.6	2.36
Developing web site for the purpose of product marketing	15.2	20.1	20.7	28.7	15.2	2.09

the most popular tool among the agriculture community. Computer possession also recorded good percentage, where a total of 93.3% of respondents possessed it, while nearly three quarter of respondents (74.4%) had internet connection. PDA usage seems to need more promotion among the agro-based entrepreneurs based on the lowest percentage of possession recorded, which was 12.2%.

**Level of internet application used.** In this study, respondents were asked to indicate level of internet application used to gain information. Internet application sources were divided into eight (1) e-mail, (2) yahoo messenger, (3) mailing list, (4) chat, (5) web sites surfing, (6) bulletin board, (7) blog and (8) agriculture forum online.

For each internet application usage, respondents gave response either none (0), seldom (1) and always (2). Value of cumulative mean score was estimated for each media sources. Range for value of mean score resulted were from 0 to 2. Then, level of media usage was categorized as none and always, each for score of 0, 0.01 to 1 and 1.01 to 2 (Table IV).

Based on the mean score of 0.35 to 1.14 from the maximum 2.0, it can be concluded not all of internet applications available were used by agro-based entrepreneurs. However, between the eight internet applications studied, it was found that two internet applications recorded good mean score, which were e-mail (1.14) and web surfing (1.12). Almost one third (32.3%) respondents utilized e-mail at always level and this is in line with the research done by Alampay (2006) and Warren (2004), where they found that e-mail is one of the important internet applications used among the farmers. This study found that a total of 38.4% respondents had surfed web site at always level.

**Potential internet contribution in increasing agro-based productivity.** Based on the pre-test result, a total of 16 potential contributions of internet that can benefit agro-based entrepreneurs were identified. All of the 16 contributions were asked to the respondents. They were asked to indicate the level of each potential contribution

using scale of 0 (no contribution) to 4 (very high). Analysis done for each contribution is shown in Table V. Besides showing percentage distribution for each scale, this table also shows value of mean score for each contribution. Generally, the internet moderately contributed to productivity of agro-based entrepreneurs based on the moderate mean score (between 2.09 to 2.95 from maximum 4.0) recorded for all 16 potential contributions.

Three highest internet contributions to agro-based entrepreneurs were firstly enhancing networking in getting technical information of agriculture (mean = 2.95), second highest internet contribution was getting information every time needed (mean = 2.94) and the third highest internet contribution was disseminating new knowledge and technology (mean = 2.70) and result gained here was in line with the study done by Stricker *et al.* (2003), Meera *et al.* (2004), Rahman *et al.* (2005) and Michailidis (2006). Result gathered concludes that “developing web site for the purpose of product marketing” (mean = 2.09) was the lowest.

**Potential internet contribution comparison with selected internet applications.** Which internet applications have the biggest influence on agro-based productivity? Table VI provides the answer for this query. For this purpose, a cumulative value of potential internet contribution was gained. Independent t-test analysis was done to compare potential internet contribution for the eight internet applications listed for those who used and not used it and the result shown (Table VI).

Result shows that there was significance difference found on all of the internet application listed. Web site surfing may have the biggest impact on respondents, who used it to increase their agro-business productivity. Based on data provided it was found that for those who used it (M=0.755, SD=0.474) and those who didn't use it [M=2.38, SD=0.218; t (164)= -6.767, p=0.000]. This result is not surprising as it is pertinent with research done by Warren (2002) and Zhao (2008), where they found those that use e-mail more on their agro-business will enjoy more productivity.

**Table VI. Comparison between internet applications and potential internet contribution towards agro-based productivity using independent t-test**

Variables	n	Mean	S.D	t	p
<b>Website surfing</b>				<b>6.767</b>	<b>0.000</b>
User	121	0.755	0.474		
Non-user	43	0.238	0.218		
<b>E-mail</b>				<b>6.951</b>	<b>0.000</b>
User	134	0.730	0.463		
Non-user	30	0.129	0.121		
<b>Agriculture forum online</b>				<b>9.095</b>	<b>0.000</b>
User	47	1.064	0.425		
Non-user	117	0.441	0.384		
<b>Mailing List</b>				<b>11.937</b>	<b>0.000</b>
User	52	1.106	0.366		
Non-user	112	0.394	0.350		
<b>Yahoo Messenger</b>				<b>12.071</b>	<b>.000</b>
User	60	1.058	0.400		
Non-user	104	0.367	0.324		
<b>Blog</b>				<b>12.301</b>	<b>0.000</b>
User	69	1.014	0.414		
Non-user	95	0.333	0.296		
<b>Chat</b>				<b>14.129</b>	<b>0.000</b>
User	59	1.100	0.376		
Non-user	105	0.350	0.294		
<b>Bulletin board</b>				<b>14.478</b>	<b>0.000</b>
User	64	1.074	0.388		
Non-user	100	0.329	0.271		

From the independent t-test done, bulletin board application found to have significant difference with potential internet contribution. Thus supported the idea promoted by Yang (2009), where he stressed that bulletin board users will enjoy more benefits compared to the non users. Results show that for those who used bulletin board (M=1.074, S.D=0.388) and for those who didn't use it [M=0.329, S.D=0.271; t (164) = -14.478, p=0.000].

Agriculture forum online usage may have possibility to increase agro-based productivity. Based on the independent t-test done for those who used agriculture forum online (M = 1.064, S.D = 0.425) and for those who didn't use it [M= 0.441, S.D = 0.384; t (164)= -9.095, p = 0.000), there were greater possibility that those who use online forum in their agro-business will gain more profits compared to those who didn't use it. The result presented here is supported with a study done by Golloway *et al.* (2004), where he found that virtual business forums had a potential for increasing productivity and overcoming some of the difficulties faced by business owners.

There were also significant difference between e-mail and potential internet contribution, for those who used e-mail (M = 0.730, S.D = 0.463) and those who didn't use it [M = 0.129, S.D = 0.121; t (164) = -6.951, p = 0.000. There is greater possibility that agro-based entrepreneurs, who used e-mail in their agro-business activity will increase their productivity and this is supported by Muske *et al.* (2004) and Batte (2005), where they emphasized that e-mail will give an opportunity for farmers to market their product and communicate information about their product to customers thus provide opportunity to increase their productivity.

Those who applied Yahoo Messenger may have impact on their agro-business productivity. Yahoo Messenger found to have significant difference on potential internet applications, for those who used it (M = 1.058, SD=0.400) and those who didn't use it [M=0.367, SD=0.324; t (164) = -12.071, p=0.000]. Result of this study is supported by a study done by Kim *et al.* (2007).

From the independent t-test done, usage of online chatting found to have significant difference with potential internet contribution. Results show that for those who chatted online (M = 1.100, S.D = 0.376) and for those who didn't use it [M=0.350, S.D=0.294; t (164)= -14.129, p=0.000), this result fits the data gained by Adesope *et al.* (2007), where he stressed that more ICT training such as using chat room and sending and receiving e-mail should be doubled to agriculture community in order to enhance their productivity.

Mailing list usage may influence agro-based productivity. Based on the independent t-test done for those who used forum online (M = 1.106, S.D = 0.366) and for those who didn't use it [M = 0.394, S.D = 0.350; t (164) = -11.937, p = 0.000), there were greater possibility that those who used forum online in their agro-business will profit more compared to those who do not use it.

There was also significant difference between blog and potential internet contribution, for those who surfed blog (M = 1.014, S.D = 0.414) and those who didn't surf it [M = 0.333, S.D = 0.296; t (164) = -12.301, p = 0.000). There is greater possibility that agro-based entrepreneurs, who wisely used the advantages provided in the blog will increase their productivity.

## CONCLUSION

Majority of internet users among Malaysian agro-based entrepreneurs were among the "senior" farmer in Malaysia based on the mean of the respondent age, which was 41.98 years, while majority of them had lower education. Level of internet application usage among Malaysia agro-based entrepreneurs was at moderate level. E-mail and surfing website will have big impact on agricultural productivity since majority of Malaysian agro-based entrepreneurs use these two internet applications. Malaysian agro-based entrepreneurs agreed that internet was the most contributing factor in enhancing their networking in getting technical information of agriculture. It is suggested that more agro-based entrepreneurs should use the internet applications since it will potentially contributed to their productivity. Training program should be organized by relevant organizations on internet application to the entrepreneurs to improve their internet skill and knowledge.

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