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A special issue devoted to the
Agribusiness Supply Chain Systems

Guest Editor
Zainal Abidin Mohamed

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Preface

This special issue of the Pertanika Journal of Social Sciences and Humanities (JSSH) comprises 8 papers originally presented at a workshop organized by the Department of Agribusiness and Information Systems, Faculty of Agriculture, Universiti Putra Malaysia from 8 – 9th December 2011. With the theme "**Agribusiness Supply Chain Systems**", the workshop was aimed to inculcate the culture of writing quality manuscripts and to increase scholarly publications and citations for the said department. Papers published in this special issue of Pertanika JSSH underwent stringent editorial process as evident from its status of being the leading research-based internationally recognized journals in Malaysia.

Agribusiness is a sector that is currently being given more emphasis by the Malaysian government. Agribusiness refers to the complete cycle of business of agricultural production, which includes inputs for agricultural production, food production, supply chain, marketing, retailing until it reaches the final consumers. The issues of food security and self-sufficiency have led to stronger effort being taken in reducing the negative balance of trade in the food sector. In addressing this issue, the supply chain system in the agriculture-related industry is scrutinized in order to increase the efficiency, reduce wastage, and boost its competitiveness in the world market. Agribusiness supply chain systems include all the stages from the production at the farm to the consumers' plate. Among the contributions featured in this special issue are a collection of papers discussing various parts of the supply chain systems in several sectors in the Malaysian agribusiness industry, namely the beef production, food processing, shrimp cultivation, palm oil industry, paddy cultivation, herbal-based products as well as consumer behaviour.

Special thanks goes to the Faculty of Agriculture, UPM, specifically to our Dean, Prof. Dr. Abdul Shukor Juraimi, and the former Dean, Prof. Datuk Dr. Mad Nasir Shamsudin for their continued support given in ensuring the success of publishing this special issue. The full commitment given by the Journal Division, UPM Press, under the lead of its Chief Executive Editor, Dr. Nayan Kanwal is also highly appreciated.

Last but not the least, heartfelt gratitude to all the editors, Prof. Datuk Dr. Mad Nasir Shamsudin, Prof. Dr. Md. Ariff Hussien, Assoc. Prof. Dr. Eddie Chiew Fook Chong, Assoc. Prof. Dr. Jamil Bojei, and Assoc. Prof. Dr. Alias Radam for their vigorous efforts rendered in ensuring the successful publication of this special issue.

Zainal Abidin Mohamed
Guest Editor

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Analysis of Malaysian Beef Industry in Peninsular Malaysia under Different Importation Policies Scenarios and Rate Management Systems

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ABSTRACT

In Malaysia, the production of fresh beef is inadequate to meet the people's demand. The major problem is that the beef sub sector of Malaysia has remained uncommercialized due to low productivity and the private sector has been silent on the beef sub sector development. Malaysia imported 75-80% of her beef requirement from different parts of the world in order to meet the domestic demand. Thus drastic policies need to be formulated to terminate dependency on others while developing beef industry domestically as an import substitution strategy. Thus the objective of this study is to develop a beef production system modeling for policy analysis via a model known as the Vintage approach simulation matrix model (VASIMM). VASIMM has the ability to determine the effect of the importation of the breeding stock policy and calculate the benefit and cost of implementing such policy to the government in the long run. The VASIMM method uses aggregate data to bring the new breeding stock into the model. Among the data feasible include reports that derive the reproduction of existing breeding stocks, determine the culling rate, and derive a theoretical slaughter system based on different rates of calving, replacement, mortality, and slaughter in the past. In addition, the method is able to determine reduction rates for system simulation, simulate final results of female and male breeding stocks, iv) female and male calves, ,rate of slaughter, and production of beef from beef cattle, dairy cattle, and buffalo . The ex-ante simulation analysis was developed by examining different policy variables, and report issues on mortality, slaughter, and calving rate, importation of female breeding stocks, and importation of animal for slaughter, in 9 different Policy Scenarios. Result from these 9 Scenarios indicate that only Scenario 3 is economically applicable in the long run which can fulfill the targeted level of self-sufficiency (40%) by 2020.

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INTRODUCTION

The Malaysian agriculture sector plays an important role in the country's economic development, functioning as a food supplier, employment provider, export earner and provider of raw materials for the agro-based industries. The share of the agriculture in the country's economy, in terms of GDP, was reduced from 29.0% in 1970 to 7.7% in 2007. The agriculture share of employment and export earnings has also declined from 55.7% and 55.0% in 1970 to 12.2% and 8.6% in 2007 respectively. During the 8MP , the agriculture sector recorded an average annual growth rate of 3.0% exceeding the target of 2.0% for the 8MP. During the 9MP period (2006-2010), the agriculture sector is expected to become the third engine of growth to the economy. The agriculture sector is expected to grow at a higher average annual rate of 5.0% during the 9MP. With the inclusion of agro-based industry, the growth rate is expected to be 5.2% (Government of Malaysia, 2006). The agricultural value added grew at an average rate of 3.0% per annum during the 8MP Period, higher than the targeted rate of 2.0%. The value added in the agricultural sector is estimated to improve from RM 18,662 million in 2000 to RM 27,517 million in 2010. The value added for food commodities is also expected to increase from RM 7,629 Million in 2000 to RM 11,996 Million in 2010 .state why is this sector important to the economy..eg, Thus, the value added from the said market is a significant contributor to the GDP.

Livestock industry in Malaysia

The Malaysian livestock industry is an important and integral component of the agricultural sector. It provides gainful employment and produces useful animal protein food for the population. In 2005, the livestock industry alone contributed 0.8% to the GDP and around 9.6% to the value added in agriculture (Government of Malaysia, 2006). In fact, the livestock sector is the largest food industry in Malaysia in terms of output value at the total value of RM 6,992 million in 2006. On the other hand, the state of the ruminant industry paints a fairly depressing picture. The ruminant industry is not well developed and it has had little growth in meat production. (what exactly does ruminant industry refer to).

Currently, more than 90.0% of the ruminant population in Malaysia is still in the hand of small farm holders. This group of farmers do not grow pastures for animals traditionally compared to the larger commercial and government farms where there are proper infrastructures and established pastures. However they produce only 5.0% of the total ruminant in Malaysia. The policy objectives of provide full termNAP3 for the livestock sector are to increase production of all livestock products, raise the nutritional status of the human population and provide rural employment.

As stated earlier, in terms of Gross Domestic Product (GDP), livestock industry

is expected to contribute about 9.0% to agriculture value added which is equivalent to total production value of more than RM 2,483 million in 2010. The sector value added grew steadily at an annual average of 4.0-6.0% over the period of 2005-2010. In the 8MP, the value added for the livestock as food commodities, grew at a rate of 6.6% per annum and its contribution to GDP for agriculture was 8.14%. In 9MP it is targeted that the livestock industry will continue to contribute about 9.0% to the GDP for agriculture.

In 1960, the production of beef, mutton, pork and poultry were recorded at 11 ,570, 1,280, 38,450, 21,273 metric tons, but increased to 26,513, 1,556, 168,356, 944,840 metric tons in 2006, respectively . In 2006, beef production (2.3%) was lower than poultry (82.9%) and pork (14.8%), but it was slightly higher than mutton production (0.1%). The beef production trend shows fluctuations from 1960 to 1996, but in general, the beef production depicts an increasing trend from 1990 to 2006. In spite of the rising beef production, it could only cover about 20% of the domestic demand.

The trend of consumption for all meat is increasing over the years. The quantity of consumption of beef, mutton, pork and poultry in Peninsular Malaysia in 1960 were 14,030, 3,380, 30,170, and 23,636 MT , respectively, whilst in 2006, their consumption were 136,056, 17,150, 155,884 and 721,230 MT, respectively. Beef consumption increased steadily from 1990 to 2006 and it is higher than mutton, but lower than poultry and pork. In 2006, beef consumption growth was 13.2% which is higher than mutton (1.7%) and lower than poultry (70.0%) and pork (15.1%). Beef consumption increased from 14,030 MT in 1960 to 136,056 MT in 2006.

In 2006, the self-sufficiency level (SSL) of beef (22.11%) and mutton (9.07%) were lower compared to pork (108%) and poultry (131%). Although, the beef production grew steadily from 1960–2006, the self-sufficiency rate in beef decreased from 82% in 1960 to 22% in 2006 and even with given priority in the livestock development plans over the years, it was unable to meet the local demand. The rapid decrease in self-sufficiency level could possibly be attributed to lack of efficiency in the performance of the beef and mutton subsectors.

Thus, there is a need to formulate a policy to enhance sufficient beef production in order to prevent Malaysian dependency on imported meat and livestock. The implementation of this provision will not only attain the goal of the livestock industry to meet the local demand, but it could also be a response to the food security issues. The low performance of the beef animals along with strong competition from other agricultural activities especially palm oil on one side and cheaper prices of imported beef on the other side, make beef cattle rearing a costly business to operate locally. Besides this, the consumption of beef is subjected to the price of its competitors such as fish, poultry, mutton and pork. The fish and chicken are close substitutes to beef and in terms of elasticity as it is considered to be very elastic.

Therefore, the main purpose of this study is to develop a model for beef policy analysis in order to formulate a policy implication for local fresh beef production and the future trend of beef self sufficiency level in Malaysia via biological and mathematical simulation beef model.

Under NAP3, it was expected for the Malaysian beef sub- sector to fulfill 30% of self-sufficiency by the year 2010. The production of fresh beef, mutton and milk are expected to increase for the domestic market. Private sector led commercial production was actively encouraged to adopt modern approaches and farming on large-scale basis. Smallholder livestock activities with potential would continue to be transformed into larger commercial operations to improve efficiency.

The main problem facing the local beef industry is the slow growth rate of the local beef supply in relation to the growth rate of its demand. Even though the efforts have been made by the government to boost the industry through consecutive Malaysian plans, the slow growth rate of the beef supply still persists. At present, the level of support given to the ruminant sector is still too small to yield any measurable impact . Beef consumption is expected to increase in the near future. With the Malay population (the major consumers of beef) growing at an annual rate of 3.1% which is substantially in excess of the national average of 2.5%, the demand for beef is anticipated to increase .

METHODOLOGY

The self-sufficiency level of beef in Malaysia has been declining over the last few decades . Although efforts have been made to increase beef production, it still cannot cope with the increasing population and demand for beef and beef products. Having adopted a system approach as a method to analyze the beef enterprise, simulation has been chosen as a technique for the beef production system analysis in solving the beef productions issues. Such a technique is used to test the effect of beef production decision-making and government policy options on the behavior of the system model. Simulation has also been selected because it offers the greatest potential with the understanding and solving the model of the process involved in the production of beef. Therefore, in this research the system simulation analysis via vintage approach is used for analyzing a beef enterprise.

Simulation defines a technique that involves setting up a model of the real situation and then performing experiment on the model (Naylor *et al.*, 1966). A simulation model is a mathematical model that calculates the impact of uncertain inputs and decisions we make on outcomes that we care about, such as profit and loss, investment returns, environmental consequences, and the like (Meier *et. al,* 1969).

Model Specification (The Formulation of a Mathematical Model)

This study developed a simulation model for beef in Peninsular Malaysia using a vintage approach simulation matrix model (VASIMM). This model is considered to be more efficient, since it allows a separate analysis on the beef population,

beef production, self-sufficiency level of beef and investment cost in enhancing beef production . In this study, the system being considered is both biological and economical. It is biological because it involves beef cattle, dairy cattle and buffalo population life cycle and their production process. On the other hand, it is economical because it includes the economic framework of supply and demand embodied in beef production decisions as presented in the Fig.1.

Consequently, Smit (1984) used the following deduction method, which we adapt as slaughter system in equations (1) and (2).

$$r_K = r_{K-1} - (100 - \rho)/k$$
for K= 1,….., k (years) (1)

$$P_K = \delta^{\delta/K} \quad (2)$$

Where,

r_K = percentage of original animal population remaining after k years

p_K = percentage of remaining animal population deducted in year k

ρ = total remaining percentage to be reached after k years

k = number of years for constant annual decrease in percentage not yet deducted

δ = the rate of change of slaughter or culled or death animal

Fig.1 illustrates that the distribution of vintage in each year was derived using rates, such as mortality, slaughter and calving. For instance, X_1 female breeding stock entered to the system in 1960, and therefore to be assumed in year one in 1960, Z% was deducted resulting in mortality and slaughter rate, and as can be seen, x_1 breeding stocks will be available in year 1961 (year 2), and x_1 will also be available in 1962 (year 3),

	1961	**1962**	**1963**	**1964**	**1965**	**1966**	**1967**	**1968**	**1969**	**1970**	**…**
1961	X_1										
1962	X_2	x_1									
1963	X_3	x_2	x_1								
1964	X_4	x_3	x_2	x_1							
1965	X_5	x_4	x_3	x_2	x_1						
1966	X_6	x_5	x_4	x_3	x_2	x_1					
1967	X_7	x_6	x_5	x_4	x_3	x_2	x_1				
1968	X_8	x_7	x_6	x_5	x_4	x_3	x_2	x_1			
1969	X_9	x_8	x_7	x_6	x_5	x_4	x_3	x_2	x_1		
1970	X_{10}	x_9	x_8	x_7	x_6	x_5	x_4	x_3	x_2	x_1	
1971	X_{11}	x_{10}	x_9	x_8	x_7	x_6	x_5	x_4	x_3	x_2	
. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .

Fig.1: The Flow Diagram of Distribution of Vintage Approach

1963, etc. The number of xwill be lesser than the previous years, due to deducted rate of slaughter and mortality. For 1961, X_2 new breeding stock will be entered into the system, while x_1 which is the deducted number of breeding stocks in 1960 also exists in the system. Again, X_2 will be deducted by Z% of rates of mortality and slaughter, and x_2 amount of breeding stock will go to year 1962.

In the last column of the matrix, the vintage distribution of the total simulated value in terms of number of breeding stocks can be obtained by adding up the deducted values in each column in front of each year, for example, the total number of breeding stocks in the year 1971 can be calculated like this: $X_{11} + x_{10} + x_9 + x_8 + x_7 + x_6 + x_5 + x_4 + x_3 + x_2$. At the same time calving rate will be inducted into the vintage to generate steers and heifers which will go into the male/female breeding stock less than 3 years old. Steers that reach 3 years old will be put back into the FBS>3 years old, given specific replacement rate.

The system simulation model includes cow-calf operation model with four major components of the system which includes I: population distribution component, II: slaughter and beef production component and III: beef production and consumption component and IV: management decision-making component. The three physical components have been shown to involve beef population life cycle, beef production and beef-self-sufficiency level. Financial component has been shown to involve management decision. The simulation model is designed to be useful in analyzing various management policies to increase beef production. These four components represent realistic simulation of the system behavior through time.

Beef Population Distribution Component

Female Breeding Stock (FBS)

Equation (3) determines the current female breeding stock (FBS) level using the previous level, slaughtered female breeding stock (SFBS) and Mortality of female breeding stock (MFBS). The rates of slaughter female breeding stock (S_1) and death of female breeding stock (M_1) are also used in this equation.

$$FBS_{(t+Dt)} = \int_{t}^{t+Dt} \left[FBS_t - SFBS_t - MFBS_t \right] dt \quad (3)$$

Where,

Dt = Increment of time

$FBS_{(t+Dt)}$ = Current number of female breeding stock for each age

FBS_t = Previous number of female breeding stock for each age

$SFBS_t$ = Previous number of slaughtered female breeding stock for each age

$MFBS_t$ = Previous number of death female breeding stock for each age

The following equations define the structure of the system:

$$SFBS_t = S_1 \times FBS_t \quad (4)$$

Where,

S_1 = Slaughter rate for each age

Total slaughter female breeding stock is generated by multiplying previous number of female breeding stock at annual slaughter rate (S_1).

$$MFBS_t = M_1 \times FBS_t \quad (5)$$

Where,
M_1 = Mortality rate

Total number of death of female breeding stock is generated by multiplying previous number of female breeding stock at annual mortality rate (M_1).

The equation:

$$TFBS_{(t+Dt)} = \sum_{Dt=1}^{n} FBS_{i(t+Dt)} \quad (6)$$

Where,
Dt = 3, 4…, 10 (years)

The reason that Dt is 1 to 10 years is that, the productive age of a cow is normally 10 years, so after this time the breeding stocks will be culled.

$TFBS_{(t+Dt)}$ = Total simulated female breeding stock of different ages in a current year

The grand total number of female breeding stock is the sum of three sources of beef, dairy and buffalo for the current year.

The rest of population components such as male breeding stock, female breeding stock, male calves and female calves would be calculated as such.

Slaughter

The total slaughtered (SLT) number is calculated from the sum of number of slaughter breeding stock (male and female), calf-crop (male and female) of beef cattle, dairy cattle and buffalo.

Equation (7) determines the slaughtered female breeding stock, male breeding stock, female calves, and male calves, for beef cattle, dairy cattle and buffalo population combined.

The equation:

$$SL_{(t+Dt)} = SFBS_{(t+Dt)} + SMBS_{(t+Dt)} + SFC_{(t+Dt)} + SMC_{(t+Dt)} \quad (7)$$

Where,
$SL_{(t+Dt)}$ = Current number of beef population (beef /dairy/buffalo) come to slaughter
$SFBS_{(t+Dt)}$ = Current number of slaughtered female breeding stock
$SMBS_{(t+Dt)}$ = Current number of slaughtered male breeding stock
$SFC_{(t+Dt)}$ = Current number of slaughtered female calves
$SMC_{(t+Dt)}$ = Current number of slaughtered male calves

From VASIMM model, total slaughter is the sum of slaughtered beef cattle, dairy cattle and buffalo.

The following equations define the structure of the system:

$$SFBS_{(t+Dt)} = S_1 \times FBS_{(t+Dt)} \quad (8)$$

Where,
$FBS_{(t+Dt)}$ = Number of female breeding stock
S_1 = Slaughter rate

The total number of slaughtered female breeding stock is generated by multiplying number of female breeding stock at annual slaughter rate (S_1).

$$SMBS_{(t+Dt)} = S_2 \times MBS_{(t+Dt)} \quad (9)$$

Where,
$MBS_{(t+Dt)}$ = Number of male breeding stock
S_2 = Slaughter rate

The total number of slaughtered male breeding stock is generated by multiplying number of male breeding stock at annual slaughter rate (S_2).

$$SFC_{(t+Dt)} = S_3 \times FC_{(t+Dt)} \quad (10)$$

Where,
$FC_{(t+Dt)}$ = Number of male breeding stock
S_3 = Slaughter rate

The total number of slaughtered female calves is generated by multiplying number of female calves at annual slaughter rate (S_3).

$$SMC_{(t+Dt)} = S_4 \times MC_{(t+Dt)} \quad (11)$$

Where,
$MC_{(t+Dt)}$ = Number of male breeding stock
S_4 = Slaughter rate

The number of slaughtered male calves is generated by multiplying number of male calves at annual slaughter rate (S_4).

Fresh Beef Production Component

To calculate the production of fresh beef from buffalo, the recorded number of buffalo for slaughter is multiplied by 1.20 as a correction factor for unrecorded slaughtering and by 0.181 for the meat conversion factor. The correction and conversion factors have been put forward and used by Department of Veterinary Services (DVS) for estimating the fresh beef production from cattle and buffalo (Sarmin, 1998).

The total amount is calculated from the sum of the three sources such as beef cattle, dairy cattle and buffalo for current year.

The equation:

$$PROD_{(t+Dt)} = (SLC + SLD) \times 1.23 \times 0.114 + (SLB \times 1.2 \times 0.181) \quad (12)$$

Or

$$PROD_{(t+Dt)} = (SLC + SLD) \times 0.14 + SLB \times 0.22 \quad (12)$$

Where,
$PROD_{(t+Dt)}$ = Total fresh beef from beef, cattle and buffalo
SLC = Slaughtered beef cattle
SLD = Slaughtered dairy cattle
SLB = Slaughtered buffalo

Data Collection

The actual data from 1960-2006 on the number of beef population, slaughter, production, consumption and import of live animal and beef, and beef price have been collected from various secondary sources.

These sources are as follows:

i. The Livestock Statistics published by the Veterinary Services Department,
ii. The Statistical Year Book of Malaysia
iii. Eight Malaysian Plan (2001-2005)
iv. Ninth Malaysian Plan (2006-2010)
v. Internet: http://agrolink.moa.my/jph

RESULTS AND DISCUSSION

In this study, Vintage Approach Simulation Model (VASIMM) was developed by applying different policy variables (i.e. calving, slaughter, replacement and mortality rate). The ex-post VASIMM simulation analysis was developed and verified by statistical tests (RMSE, RMSPE, and U-Theil's inequality coefficient). Nine Scenarios were defined using different policy variables, in order to examine the level of self-sufficiency under each Scenario. The Scenarios are summarized in Table 1.

Table 1 shows the range of different rates that was applied to each Scenario and the number of imported female breeding stock and cattle in each year. Scenario 1, describes the current situation of Malaysian fresh beef production without any policy intervention to increase beef production. The production and level of self- sufficiency would remain low and the Scenario would result in a loss in the long run. However, by importing female breeding stock in Scenario 2 and by applying the same rates of calving, mortality, and slaughter as like in Scenario 1, the total fresh beef production and self-sufficiency level can be improved, but it cannot reach the optimal level expected by 2020. Therefore it is not economically feasible.

Scenario 3 discusses improvement in the management system of fresh beef production, by reducing slaughter and mortality rate, and improving calving rate. The results showed that under Scenario 3, many countries (eg) including Malaysia will be able to hit the targeted level of 40% self-sufficiency in beef production. In addition, this Scenario is economically accepted.

In Scenario 4 the impact of weak management system is examined, via the decrease in calving rate and increase in mortality and slaughter rate. The result was crystal clear, meaning that the self-sufficiency level will decrease to 10% and the production would also remain very low.

Scenario 5, Scenario 6, Scenario 7, and Scenario 8 are similar to Scenario 1, Scenario 2, Scenario 3, and Scenario 4 with the adding of imported live animals for slaughter in each scenario. The results of Scenario 5 to 8 show that none of the Scenarios are economically feasible although Scenario 6 and Scenario 7 can reach and exceed the optimal level of self-sufficiency (40.07% and 58.57%, respectively) as expected by 2020.

Scenario 9 examines the impact of sudden large number of importation of beef cattle female breeding stock in fresh beef production and the level of self sufficiency. The results indicate that in spite of reaching the 40% self-sufficiency level by 2020, the Scenario is not economically feasible.

TABLE 1
The Assumptions of Ex-Ante simulation Analysis for Different Scenarios in Peninsular Malaysia, 2010-2020.

	Mortality Rate (%)	Slaughter Rate (%)	Calving Rate (%)	Replacement Rate (%)	Importation (Heads/Year) From 2010-2020
Scenario 1	5-10	10-20	70-75	80	—
Scenario 2	5-10	10-20	70-75	80	10,000 BFBS 500 DFBS 500 BUFBS
Scenario 3	3-4	5-10	75-78	80	10,000 BFBS 500 DFBS 500 BUFBS
Scenario 4	5-10	10-20	55-60	80	10,000 BFBS 500 DFBS 500 BUFBS
Scenario 5	5-10	10-20	70-75	80	10,000 Beef cattle for SL 500 Buffalo for SL
Scenario 6	5-10	10-20	70-75	80	10,000 BFBS 500 DFBS 500 BUFBS 10,000 Beef cattle for SL 500 Buffalo for SL
Scenario 7	3-4	5-10	75-78	80	10,000 BFBS 500 DFBS 500 BUFBS 10,000 Beef cattle for SL 500 Buffalo for SL
Scenario 8	5-10	10-20	55-60	80	10,000 BFBS 500 DFBS 500 BUFBS 10,000 Beef cattle for SL 500 Buffalo for SL
Scenario 9	5-10	10-20	70-75	80	50,000 BFBS only in 2010, 2011, 2012 500 DFBS 500 BUFBS

However, Scenario 9 is estimated to have the lowest negative value of NPW as compared to other Scenarios, meaning that with the improvement in management system (i.e. reducing slaughter and mortality rates), this Scenario appears to be most acceptable economically.

As stated earlier, the consumption amount of beef in terms of metric tons for each year from 2007 to 2020 was calculated by applying the 2% increase rate of the population growth to the consumption of its previous year.

Table 2 describes the amount of fresh beef production in different Scenarios. As can be seen in all Scenarios except Scenario 4, the fresh beef production of beef has increased. The highest increase in the total

TABLE 2
Total Fresh Beef Production Under Different Scenarios in Peninsular Malaysia, MT, 2007-2020.

Year	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9
2007	24,937	24,937	25,590	22,927	24,937	24,937	25,590	22,927	24,937
2008	25,920	25,920	26,707	21,869	25,920	25,920	26,707	21,869	25,920
2009	27,304	27,304	28,294	20,812	27,304	27,304	28,294	20,812	27,304
2010	26,548	26,548	30,371	18,640	28,681	28,681	32,504	20,773	32,220
2011	27,623	27,828	33,540	17,425	31,888	32,091	37,803	21,689	45,588
2012	28,272	28,871	35,665	17,246	34,667	35,266	42,061	23,642	51,655
2013	26,985	28,002	37,109	15,433	35,513	36,529	45,637	23,961	58,197
2014	29,670	31,736	43,242	16,436	40,329	42,395	53,901	27,095	55,820
2015	31,552	34,711	48,966	16,417	44,342	47,502	61,756	29,208	58,607
2016	32,712	37,162	54,387	16,711	47,634	52,085	69,309	31,634	60,812
2017	32,874	38,706	59,209	16,295	49,927	55,761	76,264	33,349	62,949
2018	31,465	38,169	61,074	15,489	50,651	57,356	80,261	34,674	65,531
2019	35,229	44,772	73,701	17,117	56,547	66,090	95,019	38,435	68,110
2020	36,648	48,484	81,698	17,917	60,098	71,935	105,147	41,368	71,833

TABLE 3
Level of Self-Sufficiency and Net Present Worth (NPW), Under Different Scenarios in Peninsular Malaysia, (%), 2007-2020.

Year	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8	Scenario 9
2007	17.97	17.97	18.44	16.52	17.97	17.97	18.44	16.52	18
2008	18.31	18.31	18.87	15.45	18.31	18.31	18.87	15.45	18.31
2009	18.91	18.91	19.6	14.41	18.91	18.91	19.6	14.41	18.91
2010	18.03	18.03	20.62	12.66	19.47	19.47	22.07	14.11	21.9
2011	18.39	18.53	22.33	11.6	21.23	21.36	25.17	14.44	30.35
2012	18.45	18.84	23.28	11.26	22.63	23.02	27.45	15.43	33.71
2013	17.27	17.92	23.74	9.87	22.72	23.37	29.2	15.33	37.24
2014	18.61	19.91	27.13	10.31	25.3	26.59	33.81	17	35.02
2015	19.4	21.35	30.11	10.1	27.27	29.21	37.98	17.96	36.04
2016	19.72	22.41	32.79	10.08	28.72	31.4	41.79	19.07	36.7
2017	19.43	22.88	35	9.63	29.51	32.96	45.08	19.71	37.21
2018	18.24	22.12	35.39	8.98	29.35	33.24	46.51	20.09	38
2019	20.02	25.44	41.87	9.73	32.13	37.55	53.99	21.84	38.7
2020	20.41	27.01	45.51	9.98	33.48	40.07	58.57	23.04	40.01
NPW RM '000	-1,874,176.2	-1,026,994	740,363.4	-2,345,943	-1,324,631.9	-917,157	-591,355.5	-1,625,436	-381,088

fresh beef production belongs to Scenario 3 and Scenario 7 with 81,698 and 105,147 metric tons productionwhile the least is dedicated to Scenario 4 and Scenario 1 with 17,917 and 36,648 metric tons production, respectively.

Table 3 illustrates the level of self-sufficiency under different Scenarios of this study. It can be inferred that in all Scenarios, the self-sufficiency level has increased except for Scenario 4. Only Scenario 3, Scenario 6, Scenario 7 and Scenario 9 can reach the targeted levels of self sufficiency by 2020, which are 45.51%, 40.07%, 58.57% and 40.01%, respectively.

Table 3 also depicts the value of Net Present Worth (NPW) for the 9 Scenarios. The only economically acceptable Scenario would be Scenario 3 in which the value of NPW is positive (RM 740,363.4 thousand). In Scenario 6 and 9 despite the 40% level of self-sufficiency, the Scenarios are not economically feasible since the NPW is negative (RM -591,355.5 thousand and RM -381,088 thousand, respectively). Moreover, as indicated in Scenario 7 in spite of exceeding the targeted level of self-sufficiency (i.e. 58.57%) by 2020, the Scenario would not be accepted economically.

The above discussion is based on different assumptions and scenarios as a key policy or decision variables and there is no preference toward any one scenario. We can thus simulate several other scenarios that could generate results which may be either favorable or unfavorable to the targeted self-sufficiency level.

SUMMARY AND CONCLUSION

The VASIMM model used in this study is a dynamic model which represents the real system. It can be also applied for any different Scenario, based on the decision or policy variables that have been put forward, assuming that the management system is in place. The key policy variables employed as a management decision tool in the VASIMM model dynamic system are mortality rate, calving rate, culling rate, breeding stock importation rate, slaughter rate, and replacement rate. It depends on the policy makers where the industry should head from here in targeting the level of self-sufficiency and food security issues. Given the right assumption based on the real situation and effective management systems, and by improving the key policy variables, there is a possibility for Malaysian beef industry to be at least 50% or more self-sufficient in fresh beef production in the near future.

To conclude, based on the achieved results in this study, it can be understood that Malaysia would be able to reduce its dependency on beef importation if the proper policy actions are taken by the government. This study recommends the following solutions for policy makers in order to boost fresh beef production and as a result, the self-sufficiency level.

Firstly, the importation of the female breeding stock should be increased in order to save foreign exchange in importing frozen beef from other countries. On the other hand, the female breeding stock importation would increase the cattle population for slaughter

and ultimately fresh beef production. Secondly, the management system must be improved by lowering the rate of mortality and increasing calving rate. This would necessitate the improvement in training programs and level of education of farmers. Also the cattle rearing activity should be diverted to integrated farms instead of smallholders. Finally, the Government should reduce fresh beef importation, especially from the low cost countries such as India, in order to encourage local producers to enhance their production, and as a result there must be a consistent pricing policy so that the benefit gained by local producers becomes considerable.

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Partial Productivity and Technical Efficiency of Small and Medium Enterprises in the Malaysian Food Processing Industry

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ABSTRACT

The objective of this study is to investigate the partial productivity and technical efficiency (TE) of small and medium enterprises (SMEs) in the Malaysian food processing industry. A non-parametric approach data envelopment analysis (DEA) was employed on panel data of 35 sub-industries during the period 2000 to 2006. The result shows that capital productivity was relatively unchangedand material productivity shows a declining trend during the period of observation. In 2000, material productivity (value added per material) was recorded at 0.22, and it stood at 0.18 in 2006. Higher cost of labor was found in the manufacturing of alcohol, palm oil, refined palm oil, palm kernel oil, and sauce . Five sub-industries were technically efficient (TE is equal to unity) during the estimation periods. These industries are refined palm oil, kernel palm oil, feed, alcohol and soft drink. In contrast, five sub-industries experienced lower TE: canning of pineapple, sugar, glucose, coconuts and other flour, with the TE scores varying between 35.9 percent up to 48.1 percent. Labor cost and labor productivity increased from 13.65 to 13.95.

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INTRODUCTION

Malaysia is one of the fastest growing consumer markets in the Southeast Asia region. The population from middle to upper-income groups constitutes 61 percent

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of these consumers. During 2000-2008, the country showed an impressive and consistent economic growth at an average of 6.7 percent per annum. Financial crisis in 1997-1998 which swept many Asian countries impacted on many industrial sectors including banking, tourism, textile and heavy industry. Food processing industry (FPI) may be one of the least affected sectors during the economic crisis. Despite the economic downturn, the demand for processed food is relatively stable.

Demand for food has increased over the last two decades in Malaysia in view of the growth of population, higher income, higher education level of consumers, and information about health nutrition. The phenomenon brings the country to become a net importer of food products.Value of importing food grew from RM8.2 billion in 1996 to RM17.9 billion in 2005, which in turn spawn ed a larger trade deficit of RM7.2 billion, compared with RM4.2 billion in 1996 (MIDA, 2007). To reduce this deficit, in the Ninth Malaysia Plan , the government has introduced new programs and policies for the agricultural sector. One of the most prominent agendas of this plan is the transformation of the agricultural sector into a modern and vibrant industry. Modern agriculture is capitalized on the adoption of advanced technologies and highly-tuned production processes.

With the help of this new policy, the agricultural development is aimed at balancing ag ricultural growth in relation to the industrial growth; specifically, to maximize the agricultural value addition by utilizing national resources efficiently. In this context, the higher value added of agricultural commodities is obtained by processing the products to be a closer to consumers needs and wants. Through food processing industry, raw materials from the agricultural sector are transformed into more appetizing food products that satisfy consumer needs and desires. The products should also be marketable and transportable to remote places, and most importantly they should be able to have longer expiration date. Many developed countries have benefited from their modern food industry. The consumers are willing to pay more for their satisfaction leading to a positive growth for the demand of processed foods. The linkage of the agricultural and the manufacturing sector is crucial in the food chain and in the agribusiness system.

Small and medium enterprises (SMEs) play an important role in the Malaysian food processing industries and the nations' economic growth as well. This industry provides jobs, generates value added for primary agricultural commodities, and produces more edible foods for inhabitants, both in rural and urban areas. This study aims to investigate the partial productivity and technical efficiency (TE) of SMEs in the Malaysian food processing industry. Detail of sub industries in the Malaysian FPI is presented in the Appendix.

LITERATURE REVIEW

Generally, FPI is classified into two types of industries. Firstly, there are the traditional food industries. These are dominant in

most developing countries and constitute as high as 70 percent or more of the total FPI companies and family owned industries, employing approximately 50 or fewer workers in each company to cater to domestic consumers. This type of industry is characterized by manual and batch type processes or labor-intensive with minimal complexity. Such companies usually utilize equipments which are manufactured locally and have low productivity and efficiency. Moreover, there is limited quality control and little research and development executed on the efficiency of such companies . The second type is large scale food industry, which constitutes about 10 percent or less of the total establishment. However, this type is more capital intensive, uses modern technology and often operates as a multinational corporation (Hicks, 2004).

Data released by the Department of Statistics Malaysia reveals that small and medium scale enterprise encompass 97 percent of total food companies in the country. The top five sub-industries with the larger number of firms are those which manufacture bread, cake and other bakery products (1132 establishments), crude palm oil (344), snacks and chips (323) other food categories (361) and processing/preserving fish and fish products (262 establishment).

National Productivity Corp. (NPC) reports that during 1987 and up to 2007 the FPI in Malaysia has an average productivity growth of 10.4 percent, value added growth of 16.6 percent, labor cost growth of 4.9 percent and its contribution of value added to GDP has a growth progress of 3.5 percent per annum (Table 1).

The FPI is important to the Malaysian economy, firstly as the engine of economic growth and secondly as substitution of some imported food products. Hence intensive research to increase the performance of the industry has been widely conducted. Two important indicators to evaluate the performance of an industry are partial productivity and technical efficiency.

Consumers in the countries that have rapid economic growth, tend to transform their dietary behavior from primary cereal meals to more animal protein, fruit and vegetables. For instance China, with an average growth of 10.8 percent a year within the last five years, has increased its meat consumption, mostly pork,by as much as 50.63 percent (Ortega *et al.,* 2009). In the Netherlands, Reijnders (2004) noted the same conclusion that the higher the income level of consumers, the higher the demand and willingness to pay for health, functional and processed foods. As

TABLE 1
Performance of the Malaysian Food Processing Industry 1998-2007

Performance	Percentage growth
Productivity growth	10.4
Value added growth	16.6
Growth in labor cost/worker	4.9
Contribution to total manufacturing value added	3.5

Sources : NPC, 2008

the population increases and the country becomes more affluent, the demand for processed food grows, as well. Abott *et al*. (2008) concurred that this transformation eventually contributes to higher global demand on agricultural commodities than ever before. A rising world income causes higher consumption of primary-food products including cereal, vegetables and animal protein. Meanwhile, with the emergence of bio-fuel as a source of energy, grains and vegetable oil consumption has been increasing since 2004. Currently, Malaysia is on its path to reach the new status of an industrial country, with its GDP of over US$12,000.00 per capita in 2010, thus having a direct impact on the dietary pattern of its inhabitants that correspond to economic changes.

The present study estimates partial productivity and technical efficiency of the SMEs in the Malaysian FPI for the period of 2000-2006. The partial productivity includes labor, capital and material productivity. Empirical study about partial productivity in the manufacturing industry has been broadly reported in the literatures. For instance, Ismail and Jajri's (2000) study on large scale industry in Malaysia, highlighted labor productivity growth using OLS method. They calculated the contribution of physical input and efficiency to labor productivity growth rate. To measure the labor productivity, they divided total value added by the number of laborers.

In the industrial economic and statistical analysis, labor productivity is important as one pointer for performance evaluation. At a firm level, labor productivity is essential when labor cost represents a large proportion of the total cost (Freeman, 2008). Most of the food processing industries are labor intensive, thus making the observation of the labor productivity a vital task. At the industrial level, Smith (1973) argues that it is rather difficult to define labor productivity because its relationship with the output is obscured by other factors. Increased labor productivity may not automatically reflect the more productive labor in that industry, but it is possible that it is generated by higher productivity of other inputs.

Labor productivity in the U.S. industrial sector has been studied by Holman *et al*. (2008), and reveals that the information, manufacturing and retail business sectors are those with higher labor productivity. Meanwhile the lower labor productivity sectors are found in the mining and food services. During the period of 2000-2005, labor productivity increased as high as three percent per annum and most of the sectors were challenged with weaker output growth, yet they continued to improve efficiency and maintain productivity growth. Mahmood (2008) investigates partial productivity (labor productivity) of SMEs manufacturing in Australia during the period of 1994-2000 and reports that there was a significant independent effect of labor productivity to the business cycle. Labor productivity of SMEs varies among each sub sector; food, beverage and tobacco showing lower labor productivity than other sectors. However, the study cannot establish any definite relationship between labor productivity growth and employment.

An empirical study on 30 food enterprises in Guangdong province China (?), Mok (2002) identified the proportion of temporary workers as the important variables affecting productivity in the total labor force. He also found that flexibility in the use of temporary workers can produce a positive effect on enterprise productivity. This finding strongly supports the need for flexibility in employment policies. Meanwhile, Morrison (1997) analyzed capital investment and productivity in the US food processing industry, and concludes that rapid investment in high-tech capital observed in the food processing industry has a clear motivation in terms of cost savings. One capital source in the industrial sector is foreign direct investment (FDI). Multinational food industries tend to make a joint venture operation to process the local raw materials and establish marketing under their brand. Through FDI, local firm is benefited by capital and technology spillover (Khalifah & Adam, 2009).

Besides labor and capital, in the FPI, material has the greater proportion of input factors. About 60 percents of production cost go to material purchasing, 30 percent for cost of energy, and the remainder for labor and other costs. Adelaja (1997) investigated the productivity growth and input mix changes of New Jersey food processing, and finds that material productivity growth is probably more relevant than labor productivity growth, and higher efficient materials are likely to have a greater effect on total factor productivity growth than do gains in labor efficiency.

Studies on efficiency level of the Malaysian FPI has been widely reported. Most of the studies reveal similar findings that the efficiency of the industry are low. Kalirajan and Tse (1989) report that the average technical efficiency of the Malaysian FPI stand at 0.73, which means the industry is only producing about 73 percent of its potential output. Mahadevan (2002) and Isa (2005) calculated the total factor productivity (TFP) of the Malaysian manufacturing sector and found that the TFP in the food processing industry was declining from 0.78 to 0.69 during the period of 1987-1996. Radam (2007) shows a consistent conclusion that the food industry in Malaysia has operated at 0.74 of TE level.

DATA AND METHOD

Data Envelopment Analysis

Modern method of efficiency measurement in the manufacturing and services sector has been inspirited by Farrell's idea (, 1957) in his article entitled "Measurement of productive efficiency". Lately, the idea has developed into two distinguished methods namely Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA). A primary assumption in the concept is, if a given firm, A, is capable of producing Y(A) units of output with X (A) unit inputs, then other producers should also be able to do the same if they are operating efficiently. Similarly, if another firm, B is capable of producing Y(B) units of output with X(B) inputs, otherfirms should also be capable ofthe same production schedule. Firms A, B, and others can then be merged to

form a firm with a combination of inputs and a combination of outputs. Since this combined firm does not necessarily exist, it is sometimes called as a virtual firm. Avkiran and Thoraneenitiyan (2010) use d a non-oriented DEA to purge the inefficiency attributable to measurement error, and simultaneous adjustment of data for input and output slacks.

Charnes, Cooper and Rhodes (1978) have developed a basic model of DEA, known as CCR model. There are *n* decision making unit (DMU) each producing *s* different outputs by consuming varying amount of *m* different inputs. A particular DMU_j using x_{ij} of input *i* to produce y_{rj} of output r, x_{ij} and y_{rj} is greater than one. Each DMU at least has one input and one output respectively. Based on this assumption, we can go to CCR DEA model by the ratio of outputs and inputs to measure a relative efficiency of DMU_j. DMU_o to be evaluated relative to the ratios of all n DMU, j = 1,2….n. The CCR model is constructed as reduction of multiple outputs divided by multiple inputs to a single virtual output and virtual input. According to Fare, Grosskopf and Lovell (1994), a maximization mathematical equation will form the objective function for the particular DMU:

$$\max h_o(u,v) = \sum_r u_r y_{ro} / \sum_i v_i x_{io} \quad (1)$$

Where u_r's, v_i's and x_{io}'s are observed as outputs and inputs of DMU that will be evaluated. This equation's constraint is that the virtual outputs to the virtual inputs ratio is less than or equal to one, so that (1) can be re-written:

$$\max h_o(u,v) = \sum_r u_r y_{ro} / \sum_i v_i x_{io}$$

Subject to

$$\sum_r u_r y_{rj} / \sum_i v_i x_{ij} < 1 \; for \; j = 1,....n$$
$$u_r, v_i \geq 0 \; for \; all \; i \; and \; r. \quad (2)$$

Dual problem of this linear programming is:

$$\theta^* = \min \theta$$

Subject to

$$\sum_{j=1}^{n} x_{ij}\lambda_j < \theta x_{io}, ...i = 1,2.....m$$
$$\sum_{j=1}^{n} y_{rj}\lambda_j \geq y_{ro}, ...r = 1,2.....s$$
$$\lambda_j \geq 0, ...j = 1,2.....n \quad (3)$$

The implicit in dual theorem of a linear program enables one to measure the efficiency by (3) because it can be set $\theta = 1$ and $\lambda_k^* = 1$ with $\lambda_k^* = \lambda_o^*$ and all other $\lambda_j^* = 0$, however, this solution implies that $\theta \leq 1$. The θ is an efficiency score (the optimal solution) for a particular DMU and the process to (transform)to each DMU. If the value is close to unity it means more efficient DMU, vice versa, if equal to unity it means that the DMU is operated at its bound efficiency.

In the efficiency literatures, the nonparametric nature of DEA allows it to concentrate on revealed best-practice frontiers rather than on central-tendency properties frontiers. DEA can provide information on technical efficiency without the need for price data (Mahadevan, 2002).

Data envelopment analysis (DEA) measures the relative efficiencies of a decision making unit (DMU) with multiple inputs and multiple outputs. DEA can analyze a DMU without the requirement of relating the inputs to outputs and the comparisons are directly against the peers. However, there are some drawbacks in the use of DEA where the measurement error can cause significant problems, DEA does not measure a real efficiency of the DMU and there is no statistical test (Coelli, 2003).

Partial Factor Productivity

Partial productivity is defined as the ratio of output to one selected factor input. This concept is simple and easy to be implemented if the quantitative data is available. Although the modern productivity analysis focuses on total factor productivity, in particular, partial productivity is popular to describe the firm's performance. Commonly, the three input factors selected for partial productivity analysis in the manufacturing sector are labor, capital and material. The model of traditional productivity measurement is constructed on these three factor inputs. Value added is usually proxy to the output rather than the gross output.

Data

Data is obtained from the Department of Statistics Malaysia in five-digit level data for the period of 2000-2006. The data refer to the Malaysian Standard Industrial Classification (MISC). One output and nine inputs have extracted from the data to be used as variables for the analysis. Output is total value added in Ringgit Malaysia (RM) for each sub industry for one year, and inputs consist of labor (number of worker), wages, total labor working hours, total over time working hours, capital, material and energy (including water, electricity, fuel and gas).

According to the Malaysia SMEs Corp., a general definition of SMEs in manufacturing sector (including agro-based) is an enterprise with full-time employees not exceeding 150 or with an annual sales turnover not exceeding RM 25 million. Meanwhile the large scale enterprise is defined as a firm which has more than 150 employees and or annual sales turnover of more than RM 25 million.

RESULTS AND DISCUSSION

Partial Productivity

Partial productivity discloses information about how a single input contributes to generate the output while it takes no notice of the contribution by other inputs. The measurement of partial productivity is simple. However, it can distinguish how each input contributes to gain the output in production. This concept is identical to the concept of marginal physical products that is the change of the output by hiring one additional input.

Traditionally, in the manufacturing sector there are three factors of inputs used for partial productivity analysis namely labor, capital and material. Labor productivity usually is defined by valued added per worker (VA/L) and cost of labor is defined by wage per worker. Labor productivity explains the contribution of

one unit of labor to generate output; it can be measured on a company level, for a processing on the production level or on a national level. However, it may possibly rise the labor productivity pursuant through a more intensive use of other inputs such as capital and material. For example, new investment in automation will increase output, and then the measuring output per unit labor is also increasing, where as it is in fact an effect of capital intensity rather than higher labor productivity.

Therefore, it could be implied that labor productivity is really a productivity of one specific input and does not provide a complete evaluation of the overall productivity in the production process. However, the partial productivity measurement has its advantages; it is helps to see the trend of time variant input, it is easy to understand and simple to interpret.

Table 2 presents labor cost and partial productivity in the SMEs of Malaysian food processing industry during 2000-2006. The mean of annual partial productivity of the SMEs Malaysian FPI varies over time except for the capital productivity. During the period of 2000-2006, labor cost and labor productivity increased from 13.65 to 14.03 with a mean of 14.03. Increasing labor cost means that the company pays a higher amount to the employees, and it reveals better welfare for the workers. In contrast to the decreasing labor force, the labor productivity seems to increase over the years. Overall, our result shows that labor productivity is higher than the result of Radam (2007) that reports labor cost and labor productivity of Malaysian FPI as much as 11.6 and 46.65, respectively.

Capital productivity stays relatively unchanged during the period of observation. This capital productivity is congruent with the average growth (4.05 percent) of the total amount of capital as much as RM 7.045 billion in 2000 to RM 8.895 billion in 2006. Meanwhile a declining productivity trend appears in the material used. In 2000 the material productivity (value added per material) was 0.22 and stands at 0.18 in 2006. Low material productivity may indicate a low material efficiency or that a

TABLE 2
Labor Cost and Partial Factor Productivity in the SMEs

Year	Labor cost (W/L)	Labor productivity (VA/L)	Capital Productivity (VA/K)	Material Productivity (VA/M)
2000	13.65	47.05	0.60	0.22
2001	13.42	45.03	0.59	0.22
2002	13.68	50.31	0.61	0.17
2003	14.52	52.67	0.70	0.16
2004	14.67	54.83	0.63	0.17
2005	14.30	50.59	0.61	0.17
2006	13.95	54.48	0.67	0.16
Mean	14.03	50.71	0.63	0.18

Source: calculated data from the Department of Statistics, Malaysia

high proportion of the material goes quietly to waste.

Fig.1 and Fig.2 show labor cost, partial productivity of labor, capital and material for each sub industry in the SMEs Malaysian food processing industry. Figure 1 enlightens that there is not a significant difference for the cost of labor (W/L) among sub industries in the SMEs. Higher cost of labor is found in the manufacturing of alcohol, palm oil, refined palm oil, palm kernel oil and in the manufacturing of sauces. In contrast to the labor productivity (VA/L), it is more varying among the sub industries. The sub industries with higher labor productivity are those manufacturing of alcohol, palm kernel oil, refined palm oil, flour and the ones manufacturing other vegetable oils. The manufacturing of alcohol shows remarkable labor productivity, presumably due to the industry employing a small number of workers but the products achieve higher value added by using advanced biotechnology.

One phenomenon disclosed from the Fig.1 is that the industries with higher labor productivity tend to show a higher cost of labor. This phenomenon may be due to the firms enjoying a higher production per worker, leading to better revenues, which are distributable to all stakeholders, including their worker. This happens in the industry of refined palm and kernel palm oil, alcohol and sauces.

Technical Efficiency in the SMEs

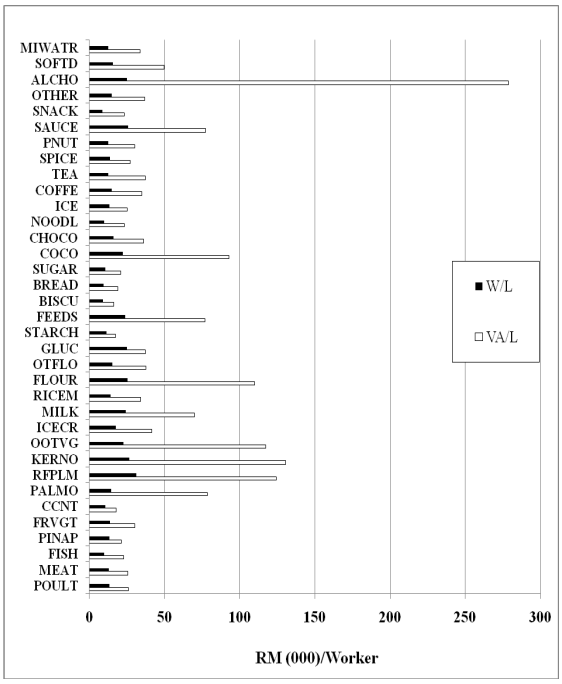
Efficiency is important as an indicator for the management to evaluate the firm or organization's performance. Companies having higher efficiency find it easier to achieve the management goals because the firm creates competitive products, cheaper production costs as well as stronger brand equity and higher profits. A better performance creates better sustainaince and competitive edge for such companies. Table 3 shows the score and the growth of technical efficiency (TE) in the SMEs of the Malaysian FPI from the DEA method.

Based on constant return to scale (CRS), TE in the SMEs shows an average score as

TABLE 3
Technical Efficiency in the SMEs of Malaysian Food Processing Industries, 2000 - 2006

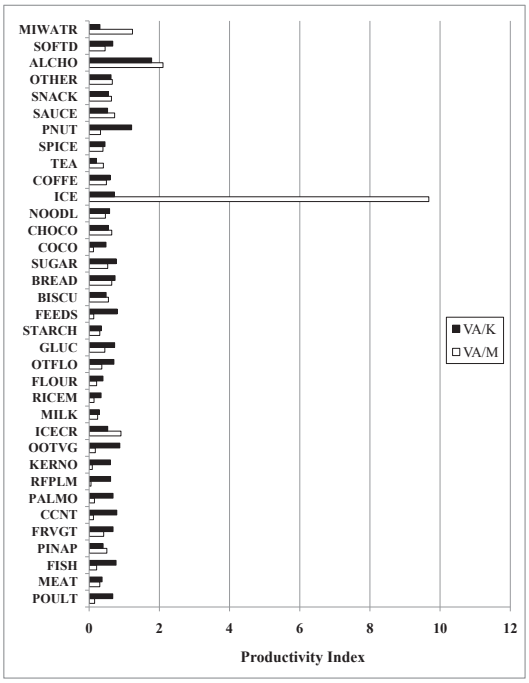
Year	CRTS		VRTS	
	TE	Growth	TE	Growth
2000	0.725	-	0.970	-
2001	0.795	9.655	0.938	-3.299
2002	0.779	-2.013	0.959	2.239
2003	0.690	-11.425	0.919	-4.171
2004	0.794	15.072	0.935	1.741
2005	0.777	-2.141	0.960	2.674
2006	0.734	-5.534	0.935	-2.604
Mean	**0.756**	**0.602**	**0.945**	**-0.570**

Source: Results from DEA method



Note: VA/L = value added per labor, W/L = wage per labor

Fig.1: Labor Productivity and Cost of Labor per Employee in the SMEs



Note: VA/M = added per material, VA/K = value added per capital

Fig.2: Material and Capital Factor Productivity in the SMEs

much as 0.756 (75.6 percent). This score is higher than TE of the food manufacturing sector in Spain as reported by Marcos and Gavez (2000), by as much as 0.44 percent. TE of SMEs in Chile was as much as 65 percent, reported by Alvarez and Crespi (2003). Meanwhile TE based on variable return to scale (VRS) shows a higher score at average 0.945 (94.5 percent) during the period of observation. The CRS efficiency measurement is weighed against the linear possibility production function (PPF) of a decision making unit which may form a longer distance to the PPF. Meanwhile the VRS is weighed against a non linear PPF which forms a closer distance to the function. Referring to the TE score of CRS, the SMEs Malaysian food processing industries have the potential ability to increase their outputs by almost 24 percent.

Growth of the TE fluctuates over the year. CRS technical efficiency has a positive average growth at the rate of 0.602 percent and VRS technical efficiency has a negative growth rate of -0.570 percent per annum. Looking by time trend, the TE trend is declining from 2001 and reaches the lowest score in 2003 at 69 percent. Amazing improvement occurs from 2003 to 2004 to reach 79.4 percent and again there is a decline in the following period to record a TE score of 73.4 percent in 2006.

Our finding is consistent with the TE score found by Zahid and Mokhtar (2007) at 72.9 percent for the SMEs Malaysian food industries. The question to ask is why the TE score shows a non linear trend over the year. To answer this, it is necessary to look at the theoretical framework of the TE where its ability to to catch up with the production frontier is influenced by the management practice (controllable factor) and exogenous factor (uncontrollable factor).

Organization practices such as fewer rejected products, low quantity of waste, on time delivery, good quality of input, effective promotion and employing more skilled workers are factors that can be controlled by the management. Meanwhile economic downturn, demand trend, interest rate and inflation are factors which uncontrollable by the management. These factors jointly influence the ability of a firm to catch up with its out boundary of production function being where the TE is calculated.

CONCLUSION AND IMPLICATIONS

This article analyzes partial productivity and technical efficiency of the SMEs in the Malaysian food processing industry during 2000-2006. One phenomenon which is disclosed from the partial productivity analysis is that industries with higher labor productivity tend to show a higher cost of labor. During the period of observation, labor productivity shows an increasing trend, meanwhile capital and material productivity remain relatively unchanged.

Technical efficiency is estimated by using the non parametric method data envelopment analysis (DEA). The SMEs in the Malaysian food processing industry has a technical efficiency score of 75.6 percent. It means that the industry can increase its output by as much as 24.4

percent using the same amount of input. This information reveals that there is no significant improvement of the technical efficiency level compared to the results reported by the previous study that the TE of the Malaysian FPI was 73%.

Therefore, the SMEs need to focus on how to manage all organizational resources, including the tangible and intangible assets such as increasing labor skill, maintain the supply of raw material and use a modern production technology. Competition in the domestic and global market forces has led policy makers to focus on encouraging SMEs to operate efficiently. Merger among firms of the same products is a possible choice in order to obtain economies of scale.

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APPENDIX

SUB INDUSTRIES IN THE SMES OF MALAYSIAN FOOD PROCESSING INDUSTRIES

Code	Sub Industries	Abbre
15111	Processing and preserving poultry & poultry products	POULT
15119	Processing and preserving meat & other meat products	MEAT
15120	Processing and preserving fish and fish products	FISH
15131	Canning of pineapples	PINAP
15139	Canning and preserving fruits and other vegetables	FRVGT
15141	Manufacturing of coconut oil	CCNT
15142	Manufacturing of crude palms oil	PALMO
15143	Manufacturing of refined palm oil	RFPLM
15144	Manufacturing of palm kernel oil	KERNO
15149	Manufacturing of oil and fat from other vegetables	OOTVG
15201	Manufacturing of ice cream	ICECR
15202	Mfg. of condensed, flour milk, other milk products	MILK
15311	Rice milling	RICEM
15312	Flour milling (excluding sago and tapioca)	FLOUR
15319	Manufacturing of flour products of other beans	OTFLO
15322	Manufacturing of glucose, syrup and maltose	GLUC
15323	Manufacturing of sago, tapioca and others starch	STARCH
15330	Manufacturing of animal feed	FEEDS
15411	Manufacturing of biscuit and cakes	BISCU
15412	Manufac. of bread, cake and other bakery products	BREAD
15420	Sugar refinery	SUGAR
15431	Manufacturing of coco products	COCO
15432	Manufacturing of chocolate and sugar confectionary	CHOCO
15440	Mfg of macaroni, noodle and similar products	NOODL
15491	Manufacturing of Ice (excluding dry ice)	ICE
15492	Manufacturing of coffee	COFFE
15493	Manufacturing of tea	TEA
15494	Manufacturing of spice and curry powder	SPICE
15495	Manufacturing of peanut and peanut products	PNUT
15496	Manufacturing of sauce and flavor include MSG	SAUCE
15497	Manufacturing of Snack	SNACK
15499	Manufacturing of food other category	OTHER
15510	Alcohol from fermentation, drugs and wine	ALCHO
15541	Manufacturing of soft drink	SOFTD
15542	Processing of mineral water	MWTR

Adapted from: Department of Statistics Malaysia

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Export Barriers to Halal Food Processing Small and Medium Enterprises (SMEs) in Malaysia

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ABSTRACT

The aim of this research is to examine the factors obstructing the Malaysian halal food processing SMEs in their exporting efforts. Enhancing the export performance of halal food processing industry is crucial in materializing Malaysia's dream of becoming global halal hub envisaged in Third Industrial Master Plan (IMP3), 2006-2020. The data was generated from 181 randomly selected SMEs from 12 states of Malaysia engaged in exporting halal processed foods through a structured questionnaire. Factor analysis, Kaiser- Myer- Olkin (KMO), and Reliability tests were conducted in order to derive perceptions of SME exporters about export barriers. The results indicate that procedural barriers are more obstructive than internal and external barriers. Non recognition of food quality assurance certificate, high tariff, inadequate tax incentives to encourage export, lack of government assistance to overcome export barriers, very high standards for export products, delays in payment, inadequate market information and need of excessive documentation and paper work were viewed as crucial procedural barriers to export. The result of the study will help halal food manufacturers and exporters to be more serious in attaining competitiveness and setting suitable business strategies to sustain their presence in competitive international markets. It will also help the support providing agencies of public and private sectors to modify the existing policies or formulate new ones in favor of halal food processing SMEs.

Keywords: Export, export barriers, Halal Food Processing, SMEs, Malaysia

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INTRODUCTION

Exporting activities can bring manifold favorable outcomes for countries and

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exporting firms. At a national level, an economy may realize an accumulation in its foreign exchange reserves, witness an increase in the number of jobs available in its labor market, and ultimately enjoy a spillover effects of its societal prosperity (Marin, 1992; Sharpe, 1995). At the enterprise level, on the other hand, the exporting firms can achieve benefits in the form of improved innovation and performance, development of managerial skills, and better utilization of resource capacity (Bertschek, 1995). Exporting, in the case of small and medium enterprises (SMEs), gains particular relevance because it is the most common foreign market entry mode for these types of firms. As a consequence of these favorable externalities, effective export management is critical for the development of firm competitiveness and macro-level economic performance (Morgan, *et al.*, 1998). Agricultural sector worldwide is one of the important contributors in the development process of many countries. However, this sector continues to face numerous challenges; among the critical challenges are implementation of policies to make agricultural activities sustainable and a sound income provider for those who venture into it. Despite these challenges, many countries still faithfully believe that this sector is important as evidenced by the huge national budget allocations for the upgrading of the agricultural sector. In Malaysia, the government acknowledges that this sector is relevant and allocated almost USD1.6 billion in the 2011 budget for agricultural activities as well as set up more agriculture agencies and programmes that was hoped would boost the development of the agriculture sector.

Globalization has further opened up the world market for business firms. But all firms, especially in SME sector, do not have the ability to initiate and sustain business operations in competitive foreign markets. In most countries governments have designed programs to reduce export barriers and improve domestic firms' capabilities to compete internationally. Malaysian Government has a range of programs to promote SMEs' contributions to the national goal of internationalization.

Barriers to exporting can be associated with all those obstacles that limit the firm's ability to initiate, to expand, or to sustain business operations in foreign markets. Export barriers can be broadly classified into two groups of internal and external barriers (Leonidou, 1995a). Leonidou (1995b, 2000) classified internal export barriers into functional and informational, and external barriers into procedural, governmental, task, and environmental barriers. Seringhaus, *et al*. (1990) classified export barriers into operational, motivational, informational, and knowledge barriers. Ramaswani, *et al.* (1990) grouped export barriers into four categories: lack of export knowledge, internal resource constraints, procedural barriers, and exogenous variables .

Halal products, acceptable products for Muslim consumers from the religious view point, are fast gaining worldwide recognition not only as a new benchmark for safety and quality assurance but also the hygiene,

sanitation and safety aspects (SIRIM,2004). The Third Industrial Master Plan (IMP3), 2006-2020, encompasses government's intention to develop Malaysia as the global halal hub for the production and trade in halal goods and services (GOM,2006). This measure is intended as the average global halal food trade is estimated to be worth RM 600 billion per year (SIRIM,2004). The presence and intensity of export barriers to Malaysian SMEs involved in manufacturing and exporting of halal processed foods will negatively influence export performance and prevent them from utilizing their export potential.

Limited research has been conducted on …Export related issues in the halal food trade have received limited research attention in the Malaysian small business literature and this study was conducted to address the issue. The study reported in this article attempted to provide an insight into the nature of the exporting problems faced by halal food exporting Malaysian SMEs. Understanding these issues will assist in tailoring the existing and new public and private initiatives aimed at encouraging effective halal food export promotion.

THE PROSPECT OF HALAL FOOD INDUSTRY IN MALAYSIA

Food is one of the basic survival needs of human beings. Muslims adhere to strict dietary laws whereby the consumption of food is subject to the observance of preparation procedures as specified by the Holy Quran. 'Halal' is an Arabic word meaning lawful or permitted (IFANCA, 2007; Agriculture and Agri-Food Canada, 2006; JAKIM , 2007). The Muslims are prohibited from consuming pork and alcohol because they are regarded as unclean or termed as *Najis* and therefore are both considered Haram. Meat products must be certified as Halal and must come from certified slaughterhouses that follow strict Islamic slaughter practices (Talib *et al*., 2009).

Estimates have been made on the size of the global market for halal products and services since demand statistics are not readily available. There are some realities that indicate high prospects of halal food:

1. The Muslim population is about 2.1 billion in 2012 and is increasing at 1.84% each year.
2. Halal products and services are also gaining acceptance among non-Muslims.
3. The global market value for trade in halal food and non-food products is estimated at US$ 2.1 trillion annually (GOM, 2006).

Very favorable and congenial entrepreneurial environment exists in Malaysia for the development and promotion of halal food industry. As a modern Islamic country with an open economy and a well developed physical and institutional infrastructure, Malaysia has the edge in the development of the halal industry and is capable of supporting initiatives and programs to develop and promote the said industry (GOM, 2006). In fact one of the objectives of the the Third

Industrial Master Plan (IMP3) 2006 -2020, is to make Malaysia the global halal hub for the production and trade in halal goods and services (GOM, 2006). Some positive factors, listed below, would help Malaysia realize the desired objective:

1. Malaysia is viewed as a progressive Islamic and business friendly country by both Muslim and non-Muslim world communities;
2. The country possesses raw materials, supporting infrastructure, and processing technologies to produce and market halal products;
3. It has established a solid industrial base and is progressive towards a higher level of industrialization;
4. There is worldwide recognition of its halal certification due to its stringent criteria and sought after by other countries;
5. Malaysia is strategically located within the Asia Pacific region, with potential benefits from the presence of major areas of production and consumption;
6. It has created very conducive operating environment, in particular necessary policies and an efficient institutional infrastructure, to support the development of the industry; and
7. There is strong commitment from the government (GOM, 2006, MoA, 2004).

Malaysian companies, especially halal food manufacturing companies, are offered a wide range of incentives to support their efforts towards exporting. The incentives include:

i. Grants for business planning and development, product and process improvements, productivity and quality improvements and certification, market development and brand promotion;
ii. A special grant for the development and promotion of halal products;
iii. Investment Tax Allowance (ITA) of 100 percent on qualifying capital expenditures for five years for companies which produce halal foods; and
iv. Double tax deduction on expenditures for obtaining halal certification and accreditation (GOM, 2006).

In spite of all government incentives and favorable entrepreneurial environment, the halal food production in Malaysia is relatively small compared to other countries in the region. Today the country is dependent on import of both processed foods and almost 70% of agricultural raw materials.

RESEARCH METHODS

Sample and Data Sources

The study is based on small and medium-sized enterprises (SMEs) operating in halal food manufacturing sector in Malaysia. The data was collected from 185 small and medium-sized enterprises that are engaged in export. The study employs the definition of SME recommended by the National SME Development Council (NSDC). According to NSDC "an enterprise with annual sales

turnover not exceeding RM25 million or full time employees not exceeding a total of 150 is an SME (NSDC, 2005). Following the definition of an SME, we referred to the SMIDEC (Small and Medium Industries Development Corporations) directory to identify potential respondents in the food processing industry of Malaysia .

The study used a quantitative methodology. The survey instrument was a structured questionnaire and consisted of 10 sections and 76 questions. Prior to mailing, the questionnaire was pilot tested with 20 expert academics and processed halal food exporters. Nine questions in section one and six questions in section ten were designed to gather demographic information of randomly selected firms and individual respondents (owners/ managers) respectively. In order to measure perceived barriers which firms faced during the exporting process, the respondents were asked to rate three questions relating to internal, external, and procedural factors in section five on a six-point scale ranging from (1) I disagree a lot to (6) I agree a lot.

The purpose of the study was explained in an accompanying cover letter and the recipients were strongly encouraged to participate in the survey. To encourage them further, they were promised a copy of the survey report.

A total of 600 questionnaires were mailed to firms included in SMIDEC directory from May-to December 2007. Respondents who did not respond after a two-week period were reminded by telephone and were requested to complete the questionnaire. Enumerators were hired and sent to firms to collect the questionnaire once confirmation was received acknowledging that the SME owners agreed to provide response to the questionnaires. To ensure that the questionnaires were answered by the SME representatives. The enumerators were tasked to collect their business cards or to get the firm's endorsement. The number of participants who completed the questionnaires were 185 which attributed to a response rate of 30.83 percent.

Instrument Development

We developed a survey questionnaire to collect information from SME owners or managers to recognize the factors that significantly influence the export operations of halal food processing SMEs in Malaysia. The research process for this study includes four main steps:

1. Formulation of research problems that include reviewing related literature, understanding the concepts of halal foods, export process, common barriers to SMEs export efforts and formulating research propositions;
2. Questionnaire development, which includes selecting items for questionnaire, designing survey questionnaire and then interviewing academics and practitioners in SMEs or entrepreneurs area;
3. Data collection and analysis, including survey administration, data collection, factor analysis and reliability test; and

4. 4. Identification of the factors which influence SMEs' halal food export activities.

DATA ANALYSIS AND RESULTS

Fitness for Factor Analysis

A correlation analysis was conducted to find out whether the variables are fit to factor analysis. The result showed that the 51 variables are correlated with each other. Furthermore, most correlation coefficients are over 0.3 and these coefficients are statistically significant at the significant level of 0.05.

Measure of Sampling Adequacy

The Keiser-Meyer-Olkin (KMO) sampling adequacy test and Bartlett's test of Sphericity were used to measure sampling adequacy. Interpretive adjectives for the KMO measure of sampling adequacy are: marvelous (in the 0.90's), meritorious (in the 0.80's), middling (in the 0.70's), mediocre (in the 0.60's), and unacceptable (in the 0.50's) (Rezai, 2008). Bartlett's test of Sphericity and KMO test of sampling adequacy were initially performed on the data to confirm the appropriateness of conducting factor analysis (Tabachnick, 2001). KMO test for the set of predetermined variables reached values of at least 0.855. Upon confirmation of sampling adequacy factor analysis was carried out. Table 1 shows the results of KMO and Bartlett's Test.

Factor Analysis

Exploratory factor analysis was used to reduce the number of variables measuring 'Internal' 'External' and 'Procedural' exporting barriers into a meaningful and smaller number of subsets or factor groups. The factor analysis of the internal exporting barriers is presented first. Factor analysis was conducted on the internal, external and procedural exporting barriers independently. This approach gave a better result than the other approach where the three barriers were combined and factor analyzed.

In carrying out exploratory factor analysis, it is recommended to perform a principal components analysis (PCA) for factor extraction, since the objective is to summarize most of the original information (variance) in a minimum number of factors for prediction purposes. In addition, we used the varimax rotation method in the study to make the factor structure more interpretable. The factor solution of perceived internal exporting barriers was obtained using PCA for factor extraction and varimax rotation method. The factor loading was set at (0.50).

TABLE 1
Results of KMO and Bartlett's Test

Test Type	Result
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.855
Bartlett's Test Sphericity, Approx. Chi-Square	5892.279
Significance	.000

(Source: Survey, 2007)

Factor Analysis of Perceived Internal Export Barriers

A total of 28 variables were considered for measuring internal export barriers. Of the 28 selected variables two variables with factor loading less than 0.50 were discarded. The results of the varimax rotation PCA are given in Table 2 . It is observed that the internal exporting barriers are grouped into five factors. The factors have been labeled as: 1) Resource and Capacity Constraints; 2) Market and Knowledge Constraints; 3) International Linkage Constraints; 4) Supply Chain Constraints; and 5) Financial Constraints.

The First Factor

Consisted of 13 variables, **'**Resource and Capacity Constraints' has appeared as number one factor with a total variance of 42.063 percent. The variable "Our firm is unable to meet the packing/labeling requirements of the overseas markets" has the hig hest factor loading (.809).

This is followed, by "Our firm does not have the capacity to develop new products for foreign markets" (.800); "Our firm does not have the product range required by the overseas markets" (.723); "Our firm does not have a good quality assurance system" (.718); "Our firm cannot meet product quality standards demanded in overseas markets" (.709); "The quality of the raw materials our firm receives is too unreliable to sustain exports" (.701) respectively. The variable with the lowest factor loading (.509) of this factor is "Our firm is too small to sustain exports."

The Second Factor

With 7 variables 'Market and Knowledge Constraints' is recognized as the second factor of internal barriers. This factor has a total variance of 7.524 percent. "Our firm does not have trained and experienced personnel for export marketing" has the highest factor loading (.716). This is followed by "We lack knowledge about export markets and exporting" (.678), "We were unable to locate a reliable export agent" (.654), "The domestic market consumes all our output" (.632), "It is too expensive to export our products" (.611), "The domestic market is more profitable for our firm" (.583), and "Our firm does not have an internationally recognized brand name" (.567).

The Third Factor

'International Linkage Constraints' is the third factor which has a total variance of 4.612 percent and consists of 4 variables. Of the four variables "Our firm is unable to control foreign middlemen" has the highest factor loading (.796). It is followed by "There is too much conflicting international market data" (.743), "Our firm has no warehousing facilities abroad" (.625), and "Our firm lacks foreign market connections" (.584).

Supply Chain Constraints and **Financial Constraints** emerged as the fourth and fifth factors respectively with single variable each. Only variable of fourth factor- "Our firm lacks in alternative supply of Halal raw materials" has the factor loading of .712. On the other hand, the only

TABLE 2
Rotated Component Matrix for Internal Export Barriers

Factor Groups	1	2	3	4	5
Resource and Capacity Constraints					
Our firm is unable to meet the packing/labeling requirements of the overseas markets	.809				
Our firm does not have the capacity to develop new products for foreign markets	.800				
Our firm does not have the product range required by the overseas markets	.723				
Our firm does not have a good quality assurance system	.718				
Our firm cannot meet product quality standards/ specs demanded in overseas markets	.709				
The quality of the raw materials our firm receives is too unreliable to sustain exports	.701				
There is not enough demand from overseas buyers for our products	.666				
Our firm unable to offer technical/after-sale service	.649				
Our firm is not committed to the development of export activities	.579				
Our firm is not interested or willing to export	.542				
Our firm lacks production capacity to dedicate to foreign to foreign markets	.538				
Our firm lacks the financial resources necessary to conduct market research in overseas markets	.531				
Our firm is too small to sustain exports	.509				
Market and Knowledge Constraints					
Our firm does not have trained and experienced personnel for export marketing		.716			
We lack knowledge about export markets and exporting		.678			
We were unable to locate a reliable export agent		.654			
The domestic market consumes all our output		.632			
It is too expensive to export our products		.611			
The domestic market is more profitable for our firm		.583			
Our firm does not have an internationally recognized brand name		.567			
International Linkage Constraints					
Our firm is unable to control foreign middlemen			.796		
There is too much conflicting international market data			.743		
Our firm has no warehousing facilities abroad			.625		
Our firm lacks foreign market connections			.584		
Supply Chain Constraints					
Our firm lack in alternative supply of Halal raw materials				.712	
Financial Constraints					
Our firm has insufficient resources to finance exports					.832
Eigenvalues	**11.778**	**2.107**	**1.291**	**1.254**	**1.114**
Explained Variations	**42.063**	**7.524**	**4.612**	**4.479**	**3.979**
Cumulative Variations	**42.063**	**49.586**	**54.199**	**58.678**	**62.657**

(Source: Survey 2007)

* Note: Words in bold refer to Latent factors

variable of the fifth factor "Our firm has insufficient resources to finance exports" holds .832 factor loading.

Factor Analysis of Perceived External Export Barriers

A total of 8 variables were considered for measuring external export barriers. The results of the varimax rotation PCA are given in Table 3. The external exporting barriers are grouped into two factors. The factors have been named as: 1) Location, Culture and Image Constraints; and 2) Competition and Demand Constraints.

The First Factor

'Location Culture and Image Constraints' appeared as the first factor of perceived external export barriers with a total variance of 55.595 percent. This factor is comprised of six variables. "Overseas customers are too demanding" variable has the highest factor loading (.85). This is followed by "Foreign markets are too politically instable" (.82), "Malaysia is too far from the markets" (.81), "Our products are not used in foreign markets" (.77), "Culture and language barriers made it difficult for our firm to conduct business in foreign markets" (.64), and "The image of Malaysian food products in foreign markets is poor" (.60).

The Second Factor

'Competition and Demand Constraints' is the second factor of external export barriers. This factor is composed of two variables and has a total variance of 14.314 percent. The variable "The competition is too fierce in export markets" has the factor loading of (.92) followed by "There is in sufficient demand for our products in foreign markets" (.91).

TABLE 3
Rotated Component Matrix for External Export Barriers

Factor Groups	1	2
Location, Culture and Image Constraints		
Overseas customers are too demanding	.85	
Foreign markets are too politically instable	.82	
Malaysia is too far from the markets	.81	
Our products are not used in foreign markets	.77	
Culture and language barriers made it difficult for our firm to conduct business in foreign markets	.64	
The image of Malaysian food products in foreign markets is poor	.60	
Competition and Demand Constraints		
The competition is too fierce in export markets		.92
There is in sufficient demand for our products in foreign markets		.91
Eigenvalues	**4.448**	**1.145**
Explained Variations	**55.595**	**14.314**
Cumulative Variations	**55.595**	**69.909**

(Source: Survey 2007)

Factor Analysis of Perceived Procedural Export Barriers

A total of 15 variables were considered for measuring procedural export barriers. Of the selected variables one variable with factor loading less than 0.50 was discarded. It is seen from the results presented in Table 4 that the procedural exporting barriers are grouped into four factors labeled as:1) Recognition and Support Assistance Constraints; 2) Risk and Complexity Constraints; 3) Information, Documentation and Payment Constraints; and 4) Standards and Market Regulation Constraints (Table 4).

The First Factor

For procedural export barriers 'Recognition and Support Assistance Constraints' was rated as number one factor with five variables and a total variance of 44.06 percent. The variable "Our foreign customers do not pay debt received" has the highest factor loading (.78). The factor loadings of other four variables vary from .70 to.76.

TABLE 4
Rotated Component Matrix for Procedural Export Barriers

Factor Groups	1	2	3	4
Recognition and Support Assistance Constraints				
Our foreign customers do not pay debt	.78			
Our food quality assurance certification is not recognized by overseas buyers	.76			
High tariff barriers will make our products too expensive	.74			
Malaysia lacks in tax incentives to encourage export	.71			
Lack of Malaysian government's assistance to overcome export barriers	.70			
Risk and Complexity Constraints				
It is too risky to grant credit to foreign customers		.83		
It takes too much time to get our product to market		.82		
Foreign distribution channels are too complex		.73		
We loss too many goods in transit		.63		
Information, Documentation and Payment Constraints				
We have inadequate market information			.84	
Delays in payment made export unattractive			.78	
There is too much documentation and paper work associated with exports			.56	
Standards and Market Regulation Constraints				
Malaysia sets the standard too high for its export products				.89
Foreign market regulations are too difficult				.73
Eigenvalues	**6.17**	**1.64**	**1.20**	**1.08**
Explained Variations	**44.06**	**11.70**	**8.57**	**7.68**
Cumulative Variations	**44.06**	**55.76**	**64.33**	**72.01**

(Source: Survey, 2007)

The Second Factor

'Risk and Complexity Constraints' is the second factor of procedural export barriers. It has a total variance of 11.70 percent and includes four variables with factor loading from .63 to .83. The variable "It is too risky to grant credit to foreign customers" has the highest factor loading (.83).

The Third Factor

'Information, Documentation and Payment Constraints' has a total variance of 8.57 percent. It includes three variables with factor loading from .56 to .84. "We have inadequate market information*"* has the highest factor loading (.84).

The Fourth Factor

The fourth and the last factor of procedural export barriers is 'Standards and Market Regulation Constraints'. This factor is comprised of two variables and has a total variance of 7.68 percent. The variable "Malaysia sets the standard too high for its export products" is with higher factor loading (.89).

Reliability Test

Reliability is an assessment of the degree of consistency between multiple measurements of variables (Rezai, 2008). In this study, the Cronbach's Alpha was used to measure the reliability of 51 relevant variables that have been used in factor analysis. The reliability of the resulting factors was tested by Cronbach's Alpha score.

The internal reliability for all the factors have been tested and the alpha scores for each factor are presented in Table 5. The reliability tests for the factors show that all factors excepting "Standards and Market Regulation Constraints*"* and "Information, Documentation and Payment Constraints" have alpha scores of more than .70, the benchmark for exploratory research (Alam *et al.,* 2011).

DISCUSSION AND CONCLUSION

The overall objective of the study was to identify the exporting problems encountered by halal food processing SMEs in Malaysia. The empirical information resulted from this

TABLE 5
Internal Reliability Analysis on Factors that Create Barriers to Exporting

Factor	Cronbach Alpha Scores	Number of Item
Resource and Capacity Constraints	.851	13
Market and Knowledge Constraints	.865	07
International Linkage Constraints	.843	04
Location, Culture and Image Constraints	.868	06
Competition and Demand Constraints	.720	02
Recognition and Support Assistance Constraints	.834	05
Risk and Complexity Constraints	.740	04
Information, Documentation and Payment Constraints	.682	03
Standards and Market Regulation Constraints	.640	02

(Source: Survey, 2007)

study indicates that food processing SMEs of Malaysia confront more or less problems of the same nature though with different intensity, in selling their halal processed foods in overseas markets.

The activities of the exporting firms are obstructed by three broad categories of barriers. These are Internal Export Barriers or firms' internal limitations; External Export Barriers or general external conditions over which firms have little or no control and Procedural Export Barriers or limiting conditions which can be minimized through collaborative efforts among exporters, importers and export supporting agencies of exporting country. Inadequate production capacity, lack of financial resources, lack of high commitment and willingness to export, inability to meet overseas market standards and providing after-sale services, inability to develop new products and increase product range required for overseas markets, absence of good quality assurance system, lack of knowledge of export markets and exporting process, lack of reliable export agent, demand for recognized brand names, foreign market connections and warehousing facilities abroad emerged as important obstructing variables to export from the results of factor analysis.

With regard to external barriers poor product image, cultural and language difference, distant market locations, politically instable markets, insufficient demand and high competition in export markets were perceived as important obstacles to exporting. Results indicate that procedural barriers are more obstructive than internal and external barriers. Non recognition of food quality assurance certificate, high tariff, inadequate tax incentives to encourage export, lack of government assistance to overcome export barriers, very high standards for export products, delays in payment, inadequate market information and need of too much documentation and paper work were viewed as crucial procedural barriers to export.

It is understood from the study of literature that the Government of Malaysia is highly concerned about the development of food industry, especially halal food industry. The role of SMEs in the economy has been rightly recognized. Favorable policies and strategies are incorporated in national plan documents. Several governmental departments namely: 1) The Small and Medium Industries Development Corporation (SMIDEC); 2) The Malaysia External Trade Development Corporation (MATRADE); 3) The Malaysian Industrial Development Authority (MIDA); 4) The Malaysian Export Credit Insurance Berhad (MECIB); and 5) The Export-Import Bank of Malaysia Berhad (EXIM Bank) are working with sixty export assistance programs to support government policies. These programs require a wide and comprehensive publicity so that SME owners become aware of these programs and take advantage of them. Attempts may be taken to simplify exporting procedures, attractive incentives may be offered to motivate SMEs for higher volume of exports and preferential treatments may be given to SMEs for market development and fund raising.

Critical barriers as perceived by the halal processed food exporters may be overcome by enthusiastic and collective efforts of policy makers, public and private sector support agencies, and the SME halal food manufacturers and exporters. The standards of quality of exportable processed foods should not be under graded. Moreover technical, infrastructural, financial, and marketing support should be provided by the Government to halal food processing SMEs so that they can attain and maintain international halal standards and help the Government in establishing Malaysia as a 'Global Halal Hub'.

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Mangrove Conservation Awareness amongst Shrimp Culturist in Malaysia

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ABSTRACT

Shrimp farming is an important industry in Malaysian agriculture. The growing domestic and export demands for the commodity have made shrimp farming expand over the years. However, intensive shrimp farming in Malaysia may result in substantial mangrove forest destruction as shrimp farms are mainly established in coastal mangrove forests. Thus, the objective of this paper is to ascertain the awareness of shrimp culturists in Peninsular Malaysia on the importance of mangroves conservation. Questionnaires were prepared using a 5-likert scale response option designed for a series of statements pertaining to the hypothetical environment and mangrove expected conditions in order to examine the understanding and perspective of the respondents toward environment issues. The data were analysed by exploratory factor analysis. The analysis uncovered four underlying environmental issues that are related to aquaculture production perceived by shrimp culturists. The shrimp culturists showed consistent attitude pertaining to the needs of conserving natural resources. Data on responses to this issue illustrated higher percentage on the importance of safeguarding the natural environment. The shrimp culturists, however, believed that aquaculture farming would not destruct mangrove area. The majority of shrimp culturists perceived that the introduction of new species into wild population would not harm natural food chain. As expected, farm waste was perceived to pollute areas surrounding the aquaculture farms. The study finds that, in general, the awareness among shrimp culturists on environment conservation issues is still low.

Keywords: Shrimp, mangrove, conservation, environment, factor analysis

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INTRODUCTION

Shrimp farming is an important industry in the Malaysian agricultural sector. The growing domestic and export demands for the commodity have made shrimp farming expand over the years. The growth of the industry is also due to the government's promotion and support programmes in view of the vast market potential for the commodity. However, the intensity of shrimp farming in Malaysia might result in the destruction of mangrove forest as shrimp farms are mainly established in coastal mangrove forests. Thus, the objectives of this paper are to highlight the interaction between shrimp farming activities with mangroves in Malaysia, and to ascertain the awareness of shrimp culturists in Peninsular Malaysia on the importance of mangroves conservation.

This paper discusses the importance of mangrove forests to the coastal ecosystem, and also farmed shrimp to the agricultural sector as well as the economy. The study also discusses the status of the establishment of Malaysian shrimp farms in brackish water environment. The primary data collection process is outlined in the methodology section. The awareness on the importance of mangrove forests among shrimp culturists and factors affecting their perceptions towards environmental issues in aquaculture production are interpreted in the following section. Finally, the paper discusses the relevant policies needed to maintain the productivity of the shrimp farming sector and also to minimize the mangrove forest destruction.

MANGROVE FOREST IN MALAYSIA

Mitsch and Gosselink (1993) defined a mangrove forest as an association of halophytic trees, shrubs, palms, ferns and other plants growing in brackish to saline tidal waters on mudflats, riverbanks and coastlines in tropical and subtropical regions. The United Nations Environment Programme (UNEP) (2006) outlined that a 400 square kilometre managed mangrove forest in Matang, Perak, supports a fishery worth USD 100 million a year. Hence, removing the mangrove species would lead to economic loss .

World Resource Institute (1996) shows the loss of Malaysian original mangrove area once recorded at 32% in 1996. The recent statistics show that there is about 225 thousand hectares of mangrove area left in 2009 (Peninsular Malaysia, 2010; Sabah, 2010; STIDC PERKASA, 2009) as compared to about 446 thousand hectares of mangrove area recorded in 1997 (Spalding *et al*, 1997). Thus, the loss of Malaysian original mangrove area has increased to about 50% in 2009. Destruction of the mangrove forest is mainly due to the development of various economic activities, such as logging and aquaculture.

Continuous destruction of mangrove forests will bring adverse externalities to the ecosystems. This is so as there is approximately 70 species of plants recognized as mangrove species and the greatest diversity of mangrove species to be found in Southeast Asia (Spalding *et al*., 1997), where the high biodiversity of mangrove forests serve as nursery grounds

for many aquatic organisms (Massaut, 1999). As such the preservation of such mangrove forests is inevitable. Besides, mangrove forests also tend to stabilize coastlines against erosion, acting to reduce the energy of wind, waves, and storm surges, filtering runoff entering coastal waters from rivers, and to protect coastlines from floods and tsunami (Claude, 2002; Massaut, 1999) .

Removal or restriction of access to mangrove forests also will lead to occurrence of social issues. Some local communities are depending on mangrove for food, charcoal, construction materials and employment. For instance, certain brackish wild species of fish, shrimp, mud crab and shellfish captured from mangrove forests are important aquatic species for human consumption. Besides, *Rhizophora* is one of the important trees found in mangrove forest and particularly sought for charcoal. In fact, certain types of charcoal produced in Malaysia have pharmaceuticals value and highly demanded in Japan. Thus, if mangrove areas were lost without reforestation, the socioeconomic conditions for the communities along the coast are expected to be worse off.

THE IMPORTANCE OF SHRIMP FARMING IN MALAYSIA

Shrimp is one of the most prominent fishery commodities in Malaysia as it is a high value fishery commodity which registered a trade surplus over the years. This is evidenced by the Balance of Trade figures that showed positive values across the years and Revealed Comparative Advantage coefficients that show improving levels of trade surpluses and competitiveness for shrimp commodities in Malaysia, particularly for fresh shrimp product (Ng *et. al.*, 2010a).

Increase of farmed shrimp output might be one of the factors that improve the trade competitiveness of the shrimp commodity in the global market due to consistent stocking, monitoring, harvesting, and supplying. Unlike the shrimp supply from marine capture where the production is frequently constrained by external factors, such as limited stock in a wild population, over-fishing, and seasonal capture. Thus, the ability to supply shrimp in a more consistent trend is one of the factors affecting competitive advantages for Malaysia in the global shrimp trade.

Realizing the great potential for the current and future shrimp industry, the Malaysian government, in 2007, had allocated 5,300 ha of land through the Aquaculture Industrial Zone programme that specifically alienated land for shrimp farming activities. Furthermore, Fatimah *et al.* (2008) and Malaysia (2009) outlined that the contribution of farmed shrimp towards total aquaculture production in Malaysia has exceeded farmed fish production since 1995.

As shown in Table 1, marine capture shrimp output increased in decreasing trend while farmed shrimp production increased in increasing trend. Moreover, the Malaysian farmed shrimp production increased from 28% of the total shrimp production in 2004 to 43% in 2009. Thus, it can be concluded that the 44% of the growth rate in shrimp production from 2004 to 2009

Table 1
Malaysian Shrimp Production by Source, 2004 – 2009 (MT)

Year	Inland	Marine	Aquaculture	Total	Growth Rate (%)
2004	285 (*0.3%*)	80287 (*72%*)	31155 (*28%*)	111,727	-
2005	306 (*0.3%*)	54651 (*62%*)	33878 (*38%*)	88,835	-20.49
2006	NA	63089 (*64%*)	35806 (*36%*)	98,895	11.32
2007	303 (*0.3%*)	72639 (*63%*)	43198 (*37%*)	116,140	17.44
2008	NA	82120 (*62%*)	51403 (*38%*)	133,523	14.97
2009	389 (*0.2%*)	91064 (*56%*)	69798 (*43%*)	161,251	20.77

Source: Annual Fisheries Statistics (various issues)

is derived mainly from improvements in the aquaculture production. From the increasing trend found in the shrimp culture output, it is evidenced that farmed shrimp production has great potential to outperform marine captured shrimp production in the future.

ESTABLISHMENT OF BRACKISH WATER SHRIMP FARMS IN MALAYSIA

Farmed shrimp in Malaysia is produced by pond systems in both freshwater and brackish water environments. Nevertheless, the majority of shrimp is produced in the brackish water environment as production technology used in this environment is more efficient compared to technology adopted in freshwater shrimp production. In 2008 and 2009, 99% of the total farmed shrimp produced was from brackish water environment (Malaysia, various issues). The major brackish water shrimp species for commercial purpose are banana shrimp (*Penaeus vanamei*) and tiger shrimp (*Penaeus monodon*). However, of late the former is preferred because of more resistant to diseases.

The shrimp farms in Malaysia are generally established along the coastal mangrove areas. Since mangroves grow on a very wide range of soil types, including clays soil with acceptable higher salinity level it is very suitable for aquaculture farming system especially shrimp culture (Clough, 1992). According to FAO (1987), clayey soil stabilises the bed of the pond and absorbs large quantities of nutrients while releasing them slowly over a long time period to the overlying water. Furthermore, FAO (1987) stated that clayey soil normally holds higher amounts of organic matter than light textured soils and thereby increases the productivity of the pond. Thus, clayey soil is an important factor in contributing to the productivity of shrimp farming which is easily found in the coastal mangrove forests.

However, studies have shown that a high concentration of shrimp farming in one area will result in high levels of pollution in the surrounding area (Vandergeest, 2007). A large scale shrimp farming activity requires a large scale of inputs to support its operations. Hence, resources in the surrounding area will be exploited more

significantly. For instance, the destruction of mangrove swamps in Southeast Asia occurred at an alarming rate, and this was mainly due to the development of shrimp farming activity (Gujja & Finger-Stich, 1996; Iwama, 1991). As a result, the destruction of mangrove forests will bring a certain level of economic loss directly and indirectly to the coastal community, and also the total cost of recovering the forest would be very high.

Furthermore, the Consumer Association of Penang (CAP) (2010) also stated that the establishment of farmed marine shrimp ponds has led to the destruction of thousands of hectares of mangroves in Malaysia. This association have objected to the development and expansion of shrimp farming in Malaysia as it has adverse impacts to the environment and socio-economy of the coastal habitat especially the fishing community.

However, issues raised in the discussion are mainly from other producing countries, which Malaysia could learn from their experience in handling the adverse conditions. In fact, Othman (2008) has outlined that the establishment of shrimp farms in Malaysia has slowly shifting to less critical areas, such as coastal land and abandoned coconut estates or paddy fields which are close to infrastructure and facilities. Othman (2008) also reported that the total shrimp farming acreage has increased from 2,600 ha in 1995 to 7,500 ha in 2004.

In 2009, the total acreage for shrimp farming is estimated to utilize about 7,300 hectares of the total production area in the brackish water environment (Malaysia, 2009). The acreage of shrimp farm was slightly decreased in 2009 as compared to the previous year because code of practice for marine shrimp farming is implemented in Malaysia in order to conserve environment and reduce adverse socio-economic impact. Proper selection of shrimp farming area is emphasised in this code where the establishment of shrimp farm on mangrove forest is discouraged.

In fact, the establishment of Aquaculture Industrial Zone also has gone through the environmental impact studies prior to its implementation. For instance, a Detailed Environmental Impact Assessment (DEIA) study had been conducted before the establishment of the Integrated Shrimp Aquaculture Park (i-SHARP) in Terengganu. In fact, shrimp ponds constitute only 38% of the total land allocation under this project; this pond acreage is relatively low as compared to traditional shrimp culture method, where the pond area would be 80% to 85% of total shrimp farming area (Cheang, 2010). The other 62% of the land is used to ensure that the farm is run in ecologically sound practices.

METHODOLOGY

A field survey was conducted on the shrimp culturists that consisted of farm owners, managers, and supervisors in selected States of Peninsular Malaysia. This survey was conducted under consultation and assistance from the Department of Fisheries (DOF) at federal, state, and district levels.

The study areas covered Manjung districts in Perak, and several areas surrounding the Kota Tinggi district in Johor. The shrimp farms in these two states were chosen due to the higher concentration of shrimp farms operating in these regions. This is evidenced from Ng *et al.* (2010b) who found that Selangor, Sabah, Perak and Johor are the major States producing farmed shrimp. However, the reason for not choosing Selangor and Sabah in this study was due to budget and time constraints.

Prior to the survey the questionnaire was presented to the DOF officers at district levels and was thoroughly discussed. The purpose was to ensure that the questionnaire was well-designed to suit the objectives of the study and also to make adjustments to questions and statements in order to ease respondents' understanding and eventually providing rational responses.

In order to obtain the perspectives of the shrimp culturist on conserving mangroves, a set of questionnaire was designed that contained demographic and perspective sections. In fact, all statements listed in the perspective section were positive statements. Thus, any disagree or strongly disagree of any of the statement illustrates certain level of perception towards the environmental issue(s).

In the demographic section, respondents had to fill in the details regarding to their age, educational background, working experience in aquaculture sector, and experience in aquaculture trainings. In the perspective section, a series of statements regarding to the hypothetical environment and mangroves expected conditions with 5-likert scale responses were designed in order to examine the understanding and perspective of the respondents towards environment issues. The data were first analyzed by descriptive analysis and then, followed by exploratory factor analysis.

Awareness on the Importance of Mangrove Forests among Shrimp Culturists in Peninsular Malaysia

This study involved 45 respondents and the survey was assisted by the Department of Fisheries (DOF) officers . The results of responses on the ecosystem statements are presented in Table 2. As far as the demographic information is concerned, the age of respondents is ranged from 23 to 65 years old, with the mean age 41 and a standard deviation of 11. The education level in terms of number of years of schooling is ranged from three to 16 years; the average education level is ten years with a standard deviation of two years. Aquaculture experience is ranged from two to 26 years with the mean of nine years and a standard deviation of five years. There are 20 out of 45 respondents have gone through formal trainings, of which nine out of the 20 trainings were organized by DOF and the rest were organized by private sectors. The result is consistence where we can conclude that younger operators need more training.

As shown in Table 2, there are more than 50% of total respondents agreed with half of the given statements. The results indicate that more than half of the respondents understood with the basic

TABLE 2
The Shrimp Culturist's Response on Statements regarding the Mangroves and Environmental Issues, Peninsular Malaysia (%)

No.	Statement	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Total
1	Aquaculture run-off affects wild population.	4	49	2	31	13	100
2	Introduction of new species to wild population damages the natural food chain.	2	16	29	53	0	100
3	Introduction of exotic species into coastal water damages the natural food chain.	2	13	42	42	0	100
4	Natural food chain in wild populations is important for environmental sustainability.	24	67	7	0	2	100
5	Natural resource is an important input for production of goods and services.	22	51	18	7	2	100
6	Shrimp farming will result in mangrove conversion.	4	13	18	49	16	100
7	Shrimp farming will result in large-scale degradation of mangrove.	0	31	22	33	13	100
8	Shrimp farming affects mangrove flora and fauna.	0	20	20	47	13	100
9	Mangrove flora and fauna is important for environmental sustainability.	20	67	11	2	0	100
10	Abandonment of shrimp ponds will affect environmental sustainability.	16	78	4	2	0	100
11	Most of the mangrove flora and fauna hardly survive in shrimp pond area.	0	13	9	64	13	100
12	The establishment of shrimp farm causes depletion of tidal wetlands.	0	7	13	64	16	100
13	Water discharge from shrimp farms will pollute the surrounding area.	18	56	7	20	0	100
14	High concentration of shrimp farms in a one area will result in high level of water pollution in the surrounding area.	16	44	9	31	0	100

environmental issues and the importance of mangrove to the ecosystems. About 53% of the respondents agreed with the statement that aquaculture run-off affects wild population. Similar responses were obtained from statements 13 and 14. It shows that more than half of them were aware of the potential pollution caused by aquaculture activities. In contrast, 53% of the respondents disagreed with the negative impacts from the introduction of new species to wild population on the natural food chain. Again, the shrimp culturists had high regard toward the natural resources as indicated by responses to statements 4, 5 and 9.

The respondents did not believe that shrimp farming would destroy mangrove and its flora and fauna as well as causing

depletion of tidal wetlands. The high percentage on disagreement to statements 6, 7, 8, 11 and 12 illustrates their attitudes toward these constructs. The attitude is developed due the fact that most of the shrimp farms are built in the approved coastal mangrove area with tides. In fact, the establishment of shrimp farms in mangrove is also monitored by the Department of Environment. Therefore, most of the respondents believed that the mangrove destruction issues due to shrimp farming activities were actually exaggerated.

The DOF officers informed researchers that most of the shrimp culturists were applying organic inputs in their daily operations as chemicals were prohibited by the Malaysian government and also rejected by major shrimp importers, such as EU (European Union), USA, and Japan. Furthermore, the farms are mainly built on the areas with tides so that, the wastage discharged from shrimp farms is harmless to the environment since it will be washed away during the high tide. With the necessary precautions taken, most of the respondents had denied that their shrimp farms were harmful to mangrove flora and fauna.

Findings from Factor Analysis

The factor analysis was performed to uncover the underlying environmental issues that were related to aquaculture activities perceived by shrimp culturists. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Kaiser, 1970, 1974) is an indicator of factorability.

Table 3 shows the result of KMO and Bartlett's Test of Sphericity. The KMO test was 0.727 indicating that the degree of common variance among the 18 variables on the respondents' perceptions towards environmental issues was middling. The probability associated with the Bartlett test is <0.001, which satisfies the requirement for appropriateness factor analysis.

As shown in Table 4, there are four eigenvalues greater than 1.0 and considered significant. The factor analysis yielded four factors explaining 65.32% of the total variance (Table 4). Table 5 shows the rotated component matrix for 15 items of the four factors. Issue one is labeled as "conservation of natural resources" by the following items: natural resource is an important input for production of goods and services; diseases prevention improves productivity; natural food chain in wild populations is important for environmental sustainability; mangrove flora and fauna is important for environmental sustainability; and food safety is important for human health. The variance explained by this factor is 21.34% with the highest factor loading of 0.854 (Table 5).

Second issue is labeled as "intrusion of aquaculture". Three variables are identified in factor two which explained 16.60% of the variance. The highest factor loading is 0.855. The items identified are shrimp farming affects mangrove flora and fauna; shrimp farming will result in large-scale degradation of mangrove; and the establishment of aquaculture farm causes depletion of tidal wetlands.

TABLE 3
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.727
Bartlett's Test of Sphericity	Approx. Chi-Square	905.266
	df	120
	Sig.	.000

TABLE 4
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.906	24.412	24.412	3.906	24.412	24.412	3.415	21.343	21.343
2	3.380	21.126	45.537	3.380	21.126	45.537	2.656	16.598	37.940
3	1.755	10.970	56.508	1.755	10.970	56.508	2.532	15.822	53.763
4	1.409	8.808	65.316	1.409	8.808	65.316	1.848	11.553	65.316
5	.985	6.159	71.474						
6	.860	5.376	76.850						
7	.770	4.815	81.666						
8	.512	3.197	84.863						
9	.488	3.051	87.914						
10	.416	2.598	90.512						
11	.364	2.276	92.788						
12	.335	2.091	94.879						
13	.255	1.595	96.474						
14	.218	1.363	97.838						
15	.208	1.297	99.135						
16	.138	.865	100.000						

Extraction Method: Principal Component Analysis.

TABLE 5
Rotated Component Matrix

Item	Component			
	Conservation of natural resources	Intrusion of aquaculture	Intrusion of foreign species and chemical	Farm waste
Natural resource is an important input for production of goods and services	.854			
Diseases prevention improves productivity	.813			
Natural food chain in wild populations is important for environmental sustainability	.730			
Mangrove flora and fauna is important for environmental sustainability	.680			
Food safety is important for human health	.668			
Shrimp farming affects mangrove flora and fauna		.855		
Shrimp farming will result in large-scale degradation of mangrove		.814		
The establishment of aquaculture farm causes depletion of tidal wetlands		.809		
Introduction of exotic species into coastal water damages the natural food chain			.814	
Introduction of new species to wild population damages the natural food chain			.774	
The use of antibiotics affects food safety			.655	
Most of the mangrove flora and fauna hardly survive in shrimp pond area			.574	
Aquaculture run-off affects wild population			.516	
High concentration of shrimp farms in a one area will result in high level of water pollution in the surrounding area				.806
Water discharge from farms will pollute the surrounding area				.762

"Intrusion of foreign species and chemical" is the third issue obtained from the analysis. This issue has five items with the highest factor loading of 0.814. The variance explained was 15.82%. The items in the third issue are: introduction of exotic species into coastal water damages the natural food chain; introduction of new species to wild population damages the natural food chain; the use of antibiotics affects food safety; most of the mangrove flora and fauna hardly survive in shrimp pond area and aquaculture run-off affects wild population.

The last issue is "farm waste". This factor explained 11.55% of the variance. The items in the last factor are high concentration of shrimp farms in a one area will result in high level of water pollution in the surrounding area has the highest factor loading of 0.806 and water discharge from farms will pollute the surrounding area.

Before any conclusive discussion on the latent factors that have been generated by the factor analysis, reliability test need to be conducted. Reliability analysis was conducted for the remaining items in each factor. From the analysis, the internal reliability for the factor analysis has been tested and the alpha scores for each factor are presented in Table 6. The final alpha score range for the factor analysis is 0.726 to 0.834. It meets Peter (1979) and Churchill *et.al.* (1984) where those reliability levels that are less than 0.5 might be acceptable in social sciences which means that those items should be retain in the scale.

The exploratory factor analysis uncovered four underlying environmental issues that are related to aquaculture production perceived by shrimp culturists. The shrimp culturists have shown consistent attitude pertaining to the needs of conserving natural resources. Data of responses to this issue illustrate higher percentage is for the importance of safeguarding the natural environment. The shrimp culturists, however have different perceptions pertaining to the second issue which is the intrusion of aquaculture will destruct mangrove area. Evidence from data indicates that aquaculture farming will not destruct mangrove area. As far as the third issue is concerned, it is worth noted that the majority shrimp culturists perceived that the introduction of new species into wild population will not harm natural food chain. A consistent finding with researchers' expectation, farm waste is perceived to

TABLE 6
Internal Reliability Analysis on Factors Affecting Aquaculture Entrepreneurs' Perceptions towards Environmental Issues in Aquaculture Production

Factor	Alpha Scores	Number of Item
Conservation of natural resources	0.834	5
Intrusion of aquaculture	0.821	3
Intrusion of foreign species and chemical	0.726	5
Farm waste	0.794	2

pollute areas surround the aquaculture farms. From this analysis, it can be inferred that the issues immerged are the resultant of shrimp culturists current level of knowledge of sustainable aquaculture production.

Policy Implications

This study discovered various levels of attitudes and perceptions of shrimp culturists toward environmental impacts or potential impacts from aquaculture farming and development. The majority shrimp culturists were fully aware and agreed with pollution caused by aquaculture farming. However, they lagged in knowledge in a more complex situation such as the possible damage to natural food chain if a new or exotic species were introduced. By the same token, the encroachment of aquaculture farming in mangrove area, to them, was not very critical, although statistics show otherwise.

Undoubtedly, shrimp industry is gaining ground for it market potential and value. Albeit good export demand, international market such as the EU has imposed stringent conditions, among others on environment concerns, on shrimp products which are to be imported. As such, to be competitive via cost efficiency is inadequate as conformance to market requirements is inevitable in current and future settings. Hence, shrimp culturists need to acquire and equip themselves with sustainable production knowledge and skills to be competitive and sustainable.

The shrimp culturists have to be educated to enhance their understanding and awareness on the adverse environmental impacts that might occur from their farms to the nature habitat and mangroves ecosystems. This program can be conducted by distributing posters or magazines that contain the current information on environment and mangrove destruction to shrimp culturists. Besides, the organizers can increase the frequency of running aquaculture trainings in order to provide advanced techniques and technologies to develop sustainable shrimp farmers.

Alternative lands for shrimp farming are necessary to reduce mangrove forest destruction in establishment of shrimp farms in Malaysia. The change has to be encouraged and promoted by the government, such as introducing subsidies on basic water supply equipment to those farms established in the alternative areas. As water source is supplied by mean of pumps or connected by canals, commercial farms integrate reservoir and sediment ponds to cater for their operation in ensuring good quality water supply.

In order to expedite the growth of the industry at a sustainable rate, a specific area should be identified by the government as a one stop centre for shrimp aquaculture. Ng *et al.* (2010b) highlighted that farmed shrimp in Malaysia are mainly concentrated in Perak, Selangor, Johor, and Sabah; thus, one of these states is proposed to become as a Target Area of Concentration (TAC) for shrimp farming. Within the TAC, policy makers could promote shrimp culturists to adopt sustainable practices as listed in the responsible code of practice for marine shrimp aquaculture and also to monitor their behaviour more efficiently. Hence,

the shrimp aquaculture activities can be operated in sustainable way and minimized the alleged negative impact on mangrove areas.

According to Malaysia (1999), responsible code of practice for marine shrimp aquaculture contains a series of comprehensive methods to ensure that shrimp farms are productive and also environmentally sustainable. Thus, it is worthwhile to make the code mandatory instead of voluntarily. Moreover, it covers the precaution criteria as below:

i. Farm base selection. One of the objectives is to conserve mangrove forest and natural conservation area from shrimp farming activities. Hence, shrimp farms are encourage to build on the zone proposed by the state governments, which is the Aquaculture Development Area.

ii. Farm building. The objectives are to establish the lower cost farm in order to minimize the adverse externalities to the environment. Minimize chopping trees in the farm area is one of the main approach in order to achieve the objectives.

iii. Farm management. Recycling and treating waste water before water is discharged to natural environment is encouraged under the code.

iv. Harvesting. The objective is to ensure that farmed shrimps produced in Malaysia are safe for human consumption.

v. Exotic species. Fish/Shrimp Health Certification is necessary for imported foreign shrimp species to Malaysia. Approval from DOF is also needed in order to transport exotic shrimp species even across states.

vi. Recording aquaculture data. Shrimp culturists are encouraged to keep farm records systematically.

CONCLUSION

The shrimp farming is a potential economic activity in Malaysia, yet if not controlled could possibly produce negative impact to the environment; in particular the mangrove forests. In fact, mangrove forests in Malaysia have reduced significantly in the past decades but not solely due to shrimp farming. The introduction of Shrimp Farming Code is expected to lessen the cutting down of mangrove trees, and hence, promoting sustainable and environmental friendly shrimp aquaculture farming systems. The study found that the awareness of the environmental issues among shrimp culturists is still low. There are several policy implications that brought to the discussion to possibly increase the environmental awareness among the culturist and also to conserve the mangrove forest. Education is one of the best ways to increase environmental awareness and understanding of the importance of mangroves to coastal ecosystems. On a positive note, the recent study has found that the establishment of shrimp farms have slowly shifting to less critical areas. Besides,

shrimp aquaculture practices can be monitor more effectively once the TAC for shrimp farming is introduced.

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The Impact of Agriculture Land Development Programme (ALDP) of Orang Asli Resettlement Plan Scheme (RPS) in Pahang, Malaysia

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ABSTRACT

In the 1960s, Malaysia like other newly independent nations used modernisation of agriculture systems as a priority for its rural development plan. Orang Asli, as one of the target groups were e xposed to commercial and cash crops to replace their traditional ways of farming. The government believed the best way to improve the economic conditions of rural people was to introduce the oil palm, rubber, temperate crops and other commercial plants. The Agriculture Land Development Programme(ALDP) is one of the programmes under the Economic Development Programme implemented by Department of Orang Asli Development (JAKOA) to address the high incidence of poverty among Orang Asli population. The objectives of this study are (1) to identify the level of impact of ALDP and (2) to determine the relationship between selected demographic factor and the impact of ALDP. This study only focuses on Orang Asli who were involved in ALDP oil palm plantation scheme in all RPS in Pahang. This is a descriptive study using the quantitative method of a questionnaire as a tool to collect data from the respondents. This study involved 170 respondents who received monthly dividends between RM400 until RM800. The results of the study revealed that the level of impact is moderate in all aspects discussed. Meanwhile, the Pearson Product-Moment Correlation result showed that income category and land size have significant positive relationship with level of ALDP impact. Some recommendation was made due to results of study for future improvements of ALDP.

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INTRODUCTION

Orang Asli are the indigenous inhabitants of Peninsular Malaysia. There are three main Orang Asli tribes left in Peninsular Malaysia; Negrito, Senoi and Proto-Malay who are further sub-divided into eighteen sub-ethnic groups. Under Senoi, there are six sub-ethnic groups namely the Temiar, Semai, Jahut, Che Wong, Semoq Beri and Mahmeri. As for the Negrito, there are six-ethnic sub groups - Kensiu, Kintaq, Jahai, Mendriq, Bateq and Lanoh. The Proto-Malay group consists of six-ethnic sub groups - Temuan, Jakun, Semelai, Orang Kuala, Orang Seletar and Orang Kanaq.

They constitute a minority community making up approximately 0.58% of the total population of Malaysia or only 149,723 members who can be further divided into 3.2 % Negrito, 54.2 % of Senoi and 42.6 % of Proto-Malay (JAKOA, 2004; Johannes Ridu, 2009). Almost all of Orang Asli have no religion or are *animists whose* lives are influenced by nature-based superstitions, such as the hills, rivers, stones and caves and thus natural forests still have a big influence in their daily life. Only small portion of them have converted to Islam, Christianity or other religions due to inter-marriage.

Malaysia is working hard to become a fully developed country by the year 2020. In order to achieve this goal, many community development strategies and programmes are introduced to promote the well-being of the people and to make sure all Malaysians receive equal attention in this respect. As such, the said community development programmes must be a "state tool" in order to to achieve national progress, (Asnarulkhadi *et al*., 2009). Such programmes must be equipped with 'easy to handle' properties but 'sharp' enough qualities to get the desirable output. Hence, ALDP acting as such a 'tool' for the Orang Asli community development should provide an easy and acceptable scheme for implementation, with the ability to make a considerable positive impact on this society.

The implementation of a large scale development programme such as ALDP will undoubtedly make a desirable impact on many aspects of Orang Asli lives. The Department of Orang Asli Development (JAKOA) as the main agency responsible for Orang Asli development should stay alert about their clients' welfare. At the onset of the implementation of Resettlement Plan Scheme (RPS) for basic amenities, the JAKOA with help of agriculture agencies will work hard to improve Orang Asli socio-economic situation through the ALDP.

In order to reach goals more efficiently in this programme the Rubber Industry Smallholder Development Authority (RISDA), Federal Land Consolidation and Rehabilitation Authority (FELCRA) and Farmers' Organisation Authority of Malaysia (LPP) which act as the main agriculture agencies (Hassan, 1998) will help in implementing the ALDP. Unlike the FELDA scheme, the provision for RPS is in the form of 'grant' or 'gift' to the Orang Asli. This implies that such programmes

do not require the expenses to be paid back by them. The FELCRA and RISDA will function as the operation arms of JAKOA in the sense that all work in the field is undertaken by an agriculture agency, right from clearing to planting and harvesting.

In addition to benefits from various facilities, each family in RPS gets ten acres of land for rubber, oil palm, and fruit orchards, and two acres for housing and subsistence crops under ALDP (Jimin *et al*., 1983). While JAKOA focused on the development program through commercial crops (oil palm and rubber), participants not only received dividends through plantation produce but were also given job opportunities by getting the chance to become directly involved as plantation workers (JAKOA, 2010). By referring to FELCRA (2011), we realize that there are 125 projects under RISDA and FELCRA which bring benefits to 6,001 participants through a total dividend distribution of RM 47.8 million. Pahang has the highest number of projects, participants and dividend distribution of Orang Asli farms.

However despite many years of ALDP implementation, many Orang Asli still remain in poverty. As stated in the 10th MP document, poverty among Orang Asli communities was aimed to fall below 25 percent. But statistics show that about half of Orang Asli community is still suffering from poverty.

Most of the ALDP participants receive RM400.00 to RM800.00 as monthly dividends. If RM 800.00 is taken as the current poverty line, majority of the Orang Asli households even in urban areas are below the poverty line (Edo *et al.*, 2009). However, some of the Orang Asli population who manage and sell their oil palm or rubber on their own smallholdings have been earning between RM1,500 and RM3,000 per month (Nicholas, 2010).

The Peninsular Malaysia *Orang Asli* Association (POASM) says that the Orang Asli are treated as mere shareholders or they just earn their income through a 'share' system without being directly involved in plantation work as such (Zawawi, 2000). Majorities are still involved in the traditional economic sector and have no skills. Some of them refuse to get involved on their land with the commercial crops and prefer the traditional ways of life.

Nowadays, many of the Orang Asli are self-employed as they harvest forest produce for a living. They usually earn a monthly income between RM150 and RM400 from selling rattan and crabs (Kamal *et al*., 2006). Another type of forest produce is river fish, clams, bird and other exotic animals, ornamental and medicinal plants, cigarette rolls made from *nipah* leaves and others. Usually their wives run the stalls along the main roadside to sell the collection of their forest produce. This shows that the Orang Asli still heavily depend on the forests even when they are involved in ALDP.

Regroupment has helped to "modernise" the Orang Asli economies by eliminating swiddening and most other subsistence activities, while totally integrating them into the market economy (Nicholas, 1990). This regroupment did not overcome their

lack of skills and absence of knowledge in managing commercial crops (Rosemary & Bayr, 2009; Ministry of Rural and Regional Development Malaysia, 2005; Endicott & Dentan, 2004). The situation became worse when the government preferred to hire foreign workers rather than local Orang Asli people for cheap salary and no resistance to working on plantations.

Other studies have mentioned that the ALDP was actually an important tool to uplift Orang Asli's living standards due to the apparent difference between the villages that were involved in the scheme with others which were not (Lim, 1997, 2003; Omar, 2004; Nicholas, Tijah & Tiah, 2003). As examples of this difference we can look at the higher monthly household income, education and health level of the community that was involved in this programme in comparison to those which did not participate. For those who did participate in the scheme, there was clearly an improvement in the income, where they could have gained between RM400.00 and RM800.00 for their monthly dividends and a bonus of RM1000.00 at the year's end without working on the estates.

Many past studies were done to identify the impact of the development programs such as resettlement and land development program, but the specific research on the impact of commercial agriculture crops programme introduced to Orang Asli was never observed clearly. Generally, the objective of the study is to evaluate the impact of Orang Asli participation in ALDP in Pahang. The specific objectives are (1) To identify the level of ALDP impact on respondents socio-economic and (2) To determine the relationship between selected demographic profiles and the impact of ALDP.

In social science, Latanẽ (1981) defines social impact as any influence on individual feelings, thoughts, or behaviour that is exerted by the real, implied, or imagined presence or actions of others. In this study, the impact of ALDP is measured in term of skills and farm practices, life style, ownership and economic related aspects. Impact is based on change brought by ALDP on Orang Asli.

The ALDP is one of innovations introduced to this community to replace the traditional way of farming. It involved new technologies and skills in farm management and plantation. The Orang Asli community, like other communities is expected to refuse the immediate t adoption of an innovation. Early adopters are the people who adopt the practices or idea of ALDP right away, while late adopters are those who wait to see how successful it is before making the final decision to adopt. However, all people will pass through five stages on their way to adoption. These stages include knowledge, persuasion, decision, implementation, and finally adoption (Rogers, 1983).

The rate of adoption is based on and affected by the personal characteristics such as age and socio-economic status, in addition to characteristics of the targeted community (Rogers, 1995). Rogers (1995) has also stated that the higher the level of education, the higher the diffusion rate will be.

METHODOLOGY

The criteria for selecting RPS instead of villages in the study area are based on the following considerations:

1. The facilities and provisions in RPS are the same. All the RPS participants receive equal facilities provided by the government.
2. Early implementation of ALDP which was carried out in RPS will make the availability of information much easier.

This study focuses only on ALDP oil palm plantation because of following reasons:

1. The skills and practices needed are different in different crops like in rubber, oil palm and temperate crops. It is easier for the researchers to focus on only one crop.
2. To ensure homogeneity among the respondents (i.e those involved in commercial crop oil palm).

The biggest number of population in four RPS involved in oil palm include RPS Kedaik, RPS Buluh Nipis, RPS Runchang and RPS Bukit Serok, Pahang which consist of almost 955 of the total dividend receivers (JAKOA, 2010).

Table 1 shows the distribution of respondents involved in this study. Most of respondents were from RPS Bukit Serok that is 46 (27.1 percent). Second highest number of respondent is 44 (25.9 percent) from RPS Kedaik, continued by RPS Runchang with the 43 (25.3 percent) and Buluh Nipis with 37 (21.8 percent) number of respondents.

TABLE 1
The Distribution Number of Respondents by RPS

Name of RPS	Frequency (n=170)	Percentage (%)
Kedaik	44	25.9
Bukit Serok	46	27.1
Runchang	43	25.3
Buluh Nipis	37	21.8

This study involves descriptive statistical analysis of operating results from research performed by looking at frequency data. Frequency and percentages of data are enough to interpret the in part of demographic respondents. Mean, maximum and minimum value was applied on suitable items. In addition, for Likert scale part, mean and standard deviation was also applied to interpret the results. Likert Scale is applied to identify the level of impact of ALDP on Orang Asli socio-economic.

Pearson *r* analysis was applied in this study to determine the relationship between two metric variables that are dependent variable (impact of ALDP) and selected independent variable (demographic factor). Pearson *r* is applied when analysing data conforming to normal distribution. To test the statistical significance of the relationship between two variables, the appropriate statistic to use is the *t* statistic and the population parameter is symbolized as ρ (rho). The two variables are correlated if the Sig-r < α. In this study, α value is 0.05. This study also discusses the correlation strength based on Guilford's Rule of Thumb where $r < 0.20$ is very weak correlation; $0.20 < r < 0.40$ is weak correlation; $0.40 < r < 0.70$ is moderate correlation; $0.70 < r < 0.90$ is

strong correlation and 0.90 < r: very strong correlation (Guilford, 1956).

RESULTS AND DISCUSSION

The empirical results and discussions are presented in two sub-sections. The first sub-section is the descriptive analysis used to describe the 1) respondents' demographic profile and 2) Level of ALDP impact on Orang Asli socio-economic. Meanwhile in the second sub-section is Pearson Product-Moment Correlation analysis was applied to identify the relationship between demographic factors and impact of ALDP.

The Results of the Descriptive Analysis

Demographic Profile

Table 2 presents the distribution of frequencies and percentages of respondents based on their backgrounds. As mention ed earlier, this study only involved the respondents who participated in the oil palm ALDP. From the age level distribution, the average age of respondents is around 41 years old and above, where 56 (32.9 percent) of the respondents are between 41 – 50 years old and 45 (26.5 percent) fall within the range of 31 – 40 years old.

Most of the respondents are male with 138 (81.2 percent) out of 170 respondents. However, 32 (18.8 percent) are female respondents which shows that opportunity was also given to the women to participate in the program. All of them are from two Proto-Malay sub-ethnic groups which comprise of 168 (98.8 percent) Jakun and 2 (1.2 percent) Semelai. The highest percentage is of Jakun

TABLE 2
Demographic Profile of Respondents (n=170)

Characteristic	Frequency (n)	Percentage (%)
Age (years)		
< 30	10	5.9
31 – 40	45	26.5
41 – 50	56	32.9
51 – 60	41	24.1
61 – 70	11	6.5
>71	7	4.1
Mean =47.18		
S.D =11.74		
Max =25.0		
Min =88.0		
Sex		
Male	138	81.2
Female	32	18.8
Sub-Ethnic		
Jakun	168	98.8
Semelai	2	1.2
Religion		
Islam	6	3.5
Animisme	164	96.5
Education Level		
No education	88	51.8
Primary	67	39.4
Secondary	13	7.6
Tertiary	2	1.2
Income Level		
<RM500	15	8.8
RM501 – RM1000	99	58.2
RM1001 – RM1500	41	24.1
RM1501 – RM2000	10	5.9
RM2001 – RM2500	3	1.8
>RM2501	2	1.2
Mean =990.47		
S.D =458.06		
Max =400.0		
Min =4000.0		
Number of Household (persons)		
< 5	106	62.4
6 – 10	60	35.3
11 – 15	3	1.8
>15	1	0.6
Mean =4.88		
S.D =2.91		
Max =0.0		
Min =20.0		

because the locations of the study that are Pekan and Rompin Districts are originally and primary occupied by the Jakun. This study revealed that 88 respondents or almost 52 percent of respondents did not attend formal education . Almost 40 percent or 67 of respondents attended primary school. Only a small number that is 2 (1.2 percent) achieved tertiary level of education. More than half of them that is 99 (58.2 percent) of the respondents gain RM 501 – RM 1,000 per month. The highest monthly income gained was more than RM2,500 by 2 (1.2 percent) respondents. The lowest monthly income is below RM500 by 15 respondents or 8.8 percents.

Table 3 shows the distribution of full and part-time jobs of the respondents. From the results, 53 (31.2 percent) are working as rubber tappers. The job of forest product supplier is second highest with 27 (15.9 percent) which proved that Orang Asli was still attached to the forest as their traditional source of income. The next type of job is self-employment with 24 people (14.1 percent). Self-employment refers to the village jobs and as mentioned by respondents they are a combination of fishermen, farmers, and forest product suppliers. Forty-three (25.3 percent) of respondents have no jobs and depend on the monthly dividend from the ALDP as their main source of income.

Regarding part time jobs, most respondents 130 (76.5 percent) do not have a part-time job. Forest product supplier is the highest part-time job among respondents with 13 (7.6 percent).

The ALDP farm size is not much different between 4 RPS, whereby on average it is 6 acres per individual. Only with Bukit Nipis, the acreages are less, i.e. 3 acres.

Table 4 shows the distribution of respondents by type of cultivated land. From the results, 52 (30.6 percent) of respondents cultivate the traditional land by planting rubber. Only 3 (1.8 percent) of them are using traditional land for orchards.

Meanwhile Table 5 shows the distribution of total farm land sizes of respondents. More than half of the respondents that is 91 (53.5

TABLE 3
Main and Part-time Job of Respondents (n=170)

	Main jobs		Part-time jobs	
	n	%	n	%
Rubber tapper	53	31.2	7	4.1
Forest product supplier	27	15.9	13	7.6
Self-employment	24	14.1	7	4.1
Salary worker	10	5.9	2	1.2
Oil palm worker	6	3.5	3	1.8
Cash crop farmer	5	2.9	7	4.1
Businessman	2	1.2	1	0.6
No job/ housewife	43	25.3	130	76.5

TABLE 4
Distribution of Respondents by Type of Cultivated Land (n=170)

Type of Cultivated Land	Frequency (n)	Percentage (%)
ALDP oil palm plantation (by FELCRA and RISDA)	170	100.0
Rubber plantation (by RISDA)	34	20.0
Tradition land planting with rubber	52	30.6
Tradition land planting with oil palm	11	6.5
Tradition land planting with orchard	3	1.8

TABLE 5
Distribution of Respondents by Farm Land Size (n=170)

Farm Land Size (Acre)	Frequency (n)	Percentage (%)
< 3.0	24	14.1
3.1 – 6.0	91	53.5
6.1 – 9.0	29	17.1
9.1 – 12.0	16	9.4
12.1 – 15.0	4	2.4
>15.01	6	3.5

percent) have 3.1 – 6.0 acres of land. This is the land size reserved through ALDP. For those who have farm land size of more than 6 acres, they use it for another income by planting rubber, oil palm and orchards and are involved in the commercial market.

Impact of ALDP

This part discusses the impact of ALDP on respondents in changing their skills related to oil palm plantations and farm practices, changes in the aspects of their life style, property holdings, assets, and income and economic**.**

Some of the study revealed that the majority of Orang Asli are still involved in traditional economic sector and have no skills in commercial plantation. Table 6 below shows the change in skills related to oil palm plantations and farm practices among respondents. Thia study discovered that the change in this aspect is low. This is confirmedby the answers of strongly disagree and disagree given by the respondents in relation to the skills listed below. The highest change in skills come from respondents who can handle fertilizer equipments with 2.935 mean score. Next skill is handling pesticide tools and handling grass cutting machines with 2.882 and 2.741 mean score respectively. However, the specific skills relate to oil palm plantation such as taking care of palm trees, planting palm trees and cutting oil palm stalks is low with a mean of score of 2.412, 2.388 and 2.365 respectively.

The respondents who did not have enough skills to identify diseases linked to oil palm and identify the treatment for the disease of oil palm had a mean score of 1.582 and 1.547 respectively. Overall, the

TABLE 6
Changes in Skills Relate to Oil Palm Plantations and Farm Practices (n=170)

Changes in Skills	Score Frequency (Percentage)						
	1	2	3	4	5	Mean	S.D
Handle fertilizer equipment	49 (28.8)	23 (13.5)	16 (9.4)	54 (31.8)	28 (16.5)	2.935	1.508
Handle pesticide tools	52 (30.6)	21 (12.4)	17 (10.0)	55 (32.4)	25 (14.7)	2.882	1.503
Handle grass cutting machine	54 (31.8)	27 (15.9)	19 (11.2)	49 (28.8)	21 (12.4)	2.741	1.469
Take care of palm trees	62 (36.5)	33 (19.4)	27 (15.9)	39 (22.9)	9 (5.3)	2.412	1.326
Plant palm trees	62 (36.5)	40 (23.5)	19 (11.2)	38 (22.4)	11 (6.5)	2.388	1.346
Cut the oil palm fruit stalk	66 (38.8)	38 (22.4)	10 (5.9)	33 (19.4)	23 (13.5)	2.365	1.496
Type of fertilizer for oil palm	69 (40.6)	49 (28.8)	23 (13.5)	21 (12.4)	8 (4.7)	2.118	1.206
Kind of pesticide for oil palm	71 (41.8)	49 (28.8)	21 (12.4)	20 (11.8)	9 (5.3)	2.100	1.219
Drive farm machinery (tractors)	81 (47.6)	42 (24.7)	15 (8.8)	20 (11.8)	12 (7.1)	2.059	1.295
Measure of fertilizer for the oil palm	74 (43.5)	56 (32.9)	21 (12.4)	13 (7.6)	6 (3.5)	1.947	1.089
Measure of pesticide for oil palm	77 (45.3)	56 (32.9)	14 (8.2)	18 (10.6)	5 (2.9)	1.929	1.107
Know the market price of palm oil	84 (49.4)	45 (26.5)	20 (11.8)	15 (8.8)	6 (3.5)	1.906	1.132
Determine soil fertility	93 (54.7)	49 (28.8)	13 (7.6)	14 (8.2)	1 (0.6)	1.712	0.963
Calculate the profit of oil palm	90 (52.9)	56 (32.9)	13 (7.6)	9 (5.3)	2 (1.2)	1.688	.912
Farm financial budget planning	93 (54.7)	53 (31.2)	12 (7.1)	10 (5.9)	2 (1.2)	1.677	0.927
Identify disease of oil palm	102 (60.0)	50 (29.4)	8 (4.7)	7 (4.1)	3 (1.8)	1.582	0.895
Identify treatment for the disease of oil palm	102 (60.0)	52 (30.6)	9 (5.3)	5 (2.9)	2 (1.2)	1.547	0.821

Note: 1: Strongly disagree; 2: Disagree; 3: Less agree/ disagree; 4: Agree; 5: Strongly agree

impact of ALDP in increasing respondents' skills with farm practices is low and it shows the low adoption by respondents for innovations in ALDP.

From a social aspect, ALDP also has an impact or brings change to the respondents' life style. Table 7 demonstratesthe aspects of changes in the life style brought by ALDP.

TABLE 7
Change in Life Style (n=170)

Change in Life Style	Score Frequency (Percentage)						
	1	2	3	4	5	Mean	S.D
I love getting involved in community activities such as gotong-royong and welfare.	5 (2.9)	2 (1.2)	12 (7.1)	68 (40.0)	83 (48.8)	4.306	0.884
I am increasingly aware of the importance of good health.	7 (4.1)	1 (0.6)	3 (1.8)	88 (51.8)	71 (41.8)	4.265	0.874
I am concerned about eating a healthy and balanced.	8 (4.7)	1 (0.6)	7 (4.1)	94 (55.3)	60 (35.3)	4.159	0.906
I am concerned about education and knowledge.	8 (4.7)	4 (2.4)	11 (6.5)	77 (45.3)	70 (41.2)	4.159	0.987
The way I dress changing due to fashion trend.	25 (14.7)	7 (4.1)	10 (5.9)	73 (42.9)	55 (32.4)	3.741	1.347
I still practice the Orang Asli traditional knowledge.	6 (3.5)	16 (9.4)	36 (21.2)	74 (43.5)	38 (22.4)	3.718	1.028
My friends from others nations and race are increased.	20 (11.8)	25 (14.7)	16 (9.4)	73 942.9)	36 (21.2)	3.471	1.297
I am not concerned with inter-marriages with other nations or races.	25 (14.7)	22 (12.9)	26 (15.3)	66 (38.8)	31 (18.2)	3.329	1.318
I practice the technology of life such as mobile phones (and computers).	30 (17.6)	36 (21.2)	21 (12.4)	71 (41.8)	12 (7.1)	2.994	1.276

Note: 1: Strongly disagree; 2: Disagree; 3: Less agree/ disagree; 4: Agree; 5: Strongly agree

83 (48.8 percent) of respondents agreed that ALDP encouraged them to get involved in social and community activities such as *gotong-royong* and community welfare. This statement had the highest mean score (4.306). Furthermore, the respondents took care of their health because they were becoming increasingly aware of the importance of maintaining good health and got concerned about having a healthy and balanced diet with a mean score of 4.265 and 4.159 respectively.

The respondents were also concerned about the importance of knowledge, education and fashion styles with a mean score of 4.159 and 3.741 respectively. This is a good finding since it shows that they are trying to give a meaningful balance to their lifestyles through social, health, education and appearance as other communities have already done. The study also discovered that technology use such as mobile phones and computers among the respondents was relatively low with a mean score of 2.994. It was thought beneficial for the Orang Asli to get exposed to the technologies because it is now considered to be a basic need.

Changes in respondents' ownership are shown in Table 8. According to the data 88 (51.8 percent) of respondents agree

TABLE 8
Change in Ownership (n=170)

Change in Ownership	Score Frequency (Percentage)						
	1	2	3	4	5	Mean	S.D
Have own vehicle	24 (14.1)	17 (10.0)	25 (14.7)	88 (51.8)	16 (9.4)	3.324	1.209
Increased the ownership of household appliances	31 (18.2)	20 (11.8)	45 (26.5)	59 (34.7)	15 (8.8)	3.041	1.247
The addition of other crops other than oil palm	51 (30.0)	23 (13.5)	47 (27.6)	43 (25.3)	6 (3.5)	2.588	1.253
Increase in house size	55 (32.4)	34 (20.0)	38 (22.4)	39 (22.9)	4 (2.4)	2.429	1.225
Involved in livestock (chickens, goats, ducks, etc.)	59 (34.7)	40 (23.5)	33 (19.4)	28 (16.5)	10 (5.9)	2.343	1.271
Construction of new homes	53 (31.2)	39 (22.9)	54 (31.8)	24 (14.1)	0	2.288	1.057
Size of land owned increased	55 (32.4)	33 (19.4)	70 (41.2)	11 (6.5)	1 (0.6)	2.235	0.999
Opening own oil palm plantations	69 (40.6)	38 (22.4)	42 (24.7)	18 (10.6)	3 (1.8)	2.106	1.110
Increase the number of livestock	71 (41.8)	48 (28.2)	41 (24.1)	9 (5.3)	1 (0.6)	1.947	0.962
Building own business	79 (46.5)	39 (22.9)	43 (25.3)	7 (4.1)	2 (1.2)	1.906	0.993

Note: 1: Strongly disagree; 2: Disagree; 3: Less agree/ disagree; 4: Agree; 5: Strongly agree

that ALDP can help them to get their own vehicles. This statement has the highest mean score (3.324). Next are the statements that the ALDP increased the ownership of household appliances, can plant other crops such as rubber trees and get involved in livestock (chickens, goats, duck, with the mean score of 3.041, 2.588 and 2.343 respectively.

However, 79 (46.5 percent) of respondents claimed that ALDP did not in any way facilitate the task of building their own business, thus creating the lowest mean score (1.906). In short, the ALDP did not bring many changes in property and asset holdings of the respondents except for vehicle and household utensils. No extension was found in another asset such as house or farm size and other agriculture activities.

Table 9 shows the changes in economic related issues of the respondents. The study discovered that the respondents can afford the monthly house loans through ALDP dividend as the highest mean score (3.777). The ALDP also let the respondents to purchase more grocery and increase their cash income with a mean score of 3.424 and 3.065 respectively. However, ALDP has a low impact on increasing their total savings with the lowest mean score, 2.859. In short, the ALDP brings a positive impact in

TABLE 9
Change in Economic Related Aspects (n=170)

Change in Economic Related Aspects	Score Frequency (Percentage)						
	1	2	3	4	5	Mean	S.D
Afford the monthly house bills	5 (2.9)	14 (8.2)	40 (23.5)	66 (38.8)	45 (26.5)	3.777	1.025
Purchase more grocery	9 (5.3)	20 (11.8)	51 (30.0)	70 (41.2)	20 (11.8)	3.424	1.019
Cash income increases	21 (12.4)	32 (18.8)	42 (24.7)	65 (38.2)	10 (5.9)	3.065	1.142
Able to provide educational opportunities for children to higher level	17 (10.0)	35 (20.6)	64 (37.6)	48 (28.2)	6 (3.5)	2.947	1.016
Total savings increased	26 (15.3)	38 (22.4)	48 (28.2)	50 (29.4)	8 (4.7)	2.859	1.143

Note: 1: Strongly disagree; 2: Disagree; 3: Less agree/ disagree; 4: Agree; 5: Strongly agree

increasing the income and economic status in order to full-fil their daily needs. This is true for the short term benefit but not for the long term benefit where the respondents cannot make enough saving for the future .

Level of ALDP impact

Table 10 shows the level of ALDP impact on respondents. From the result, the level of impact of ALDP is moderate with a mean of 93.930. Based on the data collection, 120 (70.6 percent) of the respondents are in the moderate level of impact of ALDP, 38 (22.4 percent) in the low level and only 12 (7.1 percent) of the respondents in the high level impact of ALDP. In short, the ALDP has brought moderate impact in their life whether in terms of skills in farm practices, lifestyle, properties and asset holding, income and economy. Rightly, the ALDP as a main tool to develop the economic status must have a big impact on the respondents' livelihood.

The Result of the Pearson Product-Moment Correlation Analysis

This part is to determine the relationship between the demographic factors of the respondents and the level of ALDP impact. The selected demographic factors are age, income, and land size, education level and number of dependents.

The result of correlation analysis for a sample of 170 respondents is summarized in Table 11. From the analysis, there is a significant relationship between income of the respondents and the level of ALDP impact at 0.01 level of significance with $r = 0.316$ and $\rho = 0.000$. The same result is also true for correlation analysis between land size and level of

ALDP impact where the study shows that there is a significant relationship between these two variables at 0.01 level of significance with $r = 0.281$ and $\rho = 0.000$. This implies that an increase in the income category and land size will bring a positive impact as a result of ALDP.

TABLE 10
Distribution of Respondent by Level of ALDP Impact (n=170)

Level	Frequency	Percentage	Mean	S.D
			93.930	23.283
Low (40.0 – 93.0)	38	22.4		
Moderate (94.0 – 147.0)	120	70.6		
High (148.0 – 200.0)	12	7.1		

TABLE 11
Independent Variables and the Impact of ALDP (n=170)

Demographic Factor	r	ρ (2-tailed)
Age Category	0.067	0.385
Income Category	0.316**	0.000
Number of Year Involvement	0.048	0.536
Land Size	0.218**	0.000
Number of Dependent	-0.050	0.521

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

However, the results also show that for two of these analyses, the relationships between variables are weakly correlated because the r values are between $0.20 < r < 0$ (Guilford, 1956). For correlation analysis of demographic factors, this study revealed that there is no significance between age, number of years of involvement and the number of dependents. The study by Ribka (2008) also showed that age category and number of dependents have no significant relationship with the acceptance of agricultural technology information among respondents as show in this study.

CONCLUSION AND RECOMMENDATIONS

From the demographic profile, this study involved Jakun and Semelai ethnic sub-groups with a total of 170 of respondents from Pekan and Rompin district in Pahang. The majority of respondents have an income below RM1000 per month including the dividend given and they work as rubber tappers and forest product suppliers. Their types of jobs showed that Orang Asli population still depends on agriculture and forest to survive. Due to changes in their life style which raised the amount of money they required, the activities of Orang Asli also changed. Thus commercial crops such as rubber and oil palm became their choice for planting while forest produce still had a demand in the market.

The study on level of impact of ALDP shows that the moderate impact of ALDP with respect to skills related to oil palm plantations and farm practices create changes in the aspects of life style, property holding, assets, income and economic status**.** This insight was gained from 120 (70.6 percent) respondents. The correlation between

independent variables and impact of ALDP was also studied. From the results, income category and land size have a significant positive relationship with the impact of ALDP. Increasing this variable will increase the impact of ALDP.

The JAKOA with help from other agencies must empower the Orang Asli in a variety of economic endeavors to improve their source of income. This is to make sure the Orang Asli who are involved in ALDP do not become over dependent on gift or dividends given for their survival. They should teach them to earn profits through other means than commercial crops. This is because depending on forest products only maintains the high level of poverty for those involved in agriculture and forestry. Another source of income is related to tourism, culture and small medium enterprises as already in practice in other communities. Related information should be more frequently introduced and diffused for Orang Asli. Orang Asli needs knowledge about management and value of money in order to avoid being taken advantage of by the middle man as reported by Baharon (1967).

When hope is restored by giving people the 'power', they will find a way to lift themselves out of poverty to reach success and spend their benefit from ALDP in a wise way. This also pertains to the Orang Asli who should learn to handle the farm management on their self without any help from agencies. The main constraint is the capital and knowledge. Empowerment can begin with their local leadership, by building individual and institutional local capacities through training programs. Once they are given this, it will help Orang Asli to develop and manage the development programme independently.

The researcher believes that income level and land size will affect the degree of success of ALDP and other development economic programmes for Orang Asli. By increasing these three factors, they will increase the acceptance toward ALDP. All three items will contribute to the increase of the socio-economic level of these people. So the JAKOA and other agencies that are interested to help this community must be aware that they will have to increase the income level and land size so that the Orang Asli population can feel the impact of this programme in their lives.

It is also suggested that giving land titles to individuals can start with RPS as it was done with FELDA for settlers to create the sense of belonging and security and this will directly encourage them to develop the land as well as to protect their rights as stated in the National Land Code. In addition, Aboriginal Peoples Act 1954 (Act 134) that was enacted to provide protection and security to the Orang Asli during the war against the communism or terrorism should be revised now to make sure it is relevant to the present day situation and fix the needs of Orang Asli especially about having land rights. The change will encourage Orang Asli's participation in mainstream development.

In short, after more than 20 years of ALDP implementation, Orang Asli can diffuse the commercial crop value in their

lives as one innovation to improve their socio-economic status since the moderate impact of ALDP on this study location. In addition, they have their own commercial crops after involvement in ALDP. Hence, the JAKOA, agriculture agencies with the help of the government will try to keep the improvement of this programme an ongoing matter in order to achieve the objectives of the programme. It is hoped that the impact of ALDP will be of greater importance to the participants than at the present. It is the government's aspiration that the Orang Asli community will come into the mainstream of the national economic development while simultaneously acquiring the ability to compete with other races and participate as *1Malaysia* in the efforts to achieve the goal of Vision 2020. The researcher believes that ALDP can be one of the ways for the government to reach this target.

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Assessing the Comparative Advantage of Malaysian Ruminant Production: A Policy Analysis Matrix Approach

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ABSTRACT

The comparative advantage of ruminant sector is measured in selected state Peninsular Malaysia using a modified Policy Analysis Matrix (PAM) to determine whether ruminant production has comparative advantage if produced under commercial, medium, or small farm size. This study showed that Peninsular Malaysia has a strong comparative advantage in commercial production of ruminant products. The result indicates that producing the one unit value added of ruminant products in commercial farm size can be achieved by using less than one unit of the domestic resource factors. It means that ruminant products in Peninsular Malaysia are more profitable to produce in commercial sized farms than to import them

Keywords: PAM, comparative advantage, ruminant, production, Peninsular Malaysia

INTRODUCTION

Ninth Malaysian Plan (9MP) spelled out policies to increase food production. In the 9MP, the government has been promoting the revitalization of the agricultural sector as the third engine of economic growth. The new agricultural programs involve greater orientation of a development program toward more modern and commercial scale production of agro-products to spur the domestic food production including livestock products.

The policy to increase food production is closely related to free trade agreements that will provide opportunities for agricultural products from foreign countries to conduct trade in Malaysia. Free trade also provides opportunities for Malaysian agricultural products in international markets. The existence of a policy to increase food

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production is expected to increase the number and quality of food products, making Malaysian agricultural products competitive with similar products from abroad.

The argument behind the idea of free trade basically refers to the concept of comparative advantage and the benefits that can be achieved through specialization in accordance with comparative advantage. Livestock product is the one commodity that participates in free trade, both as an import substitute product or as an export promotion product.

THE LIVESTOCK INDUSTRY IN MALAYSIA

The livestock subsector in Malaysia grew 7.9% between January and December 2008 . The livestock was contributing around 10.1% to the overall performance of the agriculture sector in 2008. The value-added of the livestock subsector continued to grow 5.2 % in the period from January to December 2009 driven by higher production of poultry and beef cattle. The production of poultry expanded 5.5% in that period in 2009**.** The introduction and implementation of transferring effective microorganism technology, modern poultry farming as well as incentives for farm enhancement contributed to the increase in poultry production. Value added of cattle and goat farming increased from 12.5% and 38.8% respectively in the period 2009, as a consequence of integrated and commercial feedlot farming as well as the implementation of Livestock Sector Entrepreneurship Transformation Scheme (Ministry of Finance, 2009).

According to Federation of Livestock Farmers Association of Malaysia (2009), the ruminant sector lags far behind with the majority of beef and goat still owned by individual farmers who rear these animals as part of their overall rural agricultural activities. The total ex-farm output value of beef is estimated to be about RM759.60 million and goat about RM50.01 million in 2008. Increasingly, though there is some effort at raising beef as an integrated activity with palm oil cultivation in view of its potential as an effective replacement for herbicide use in keeping down vegetative growth among the trees, and as a tool for organic recycling of the vegetative soil cover.

Livestock in Malaysia is dominated by poultry meat that has the largest share of production with 59.21%, followed by eggs, pork, beef, and goat that have a production share of 26.86%, 12.02%, 1.82%, and 0.09% respectively. Among these products number of poultry meat productions is the largest. In the last five years, average production of chicken meat is 1,039,198 metric tons. This amount is large compared with the average production of eggs of 471,360 metric tons or pork with average production of 211,068 metric tons. In fact, the average production of poultry meat is very large when compared with the average production of beef and goat meat of which only 31,945 and 1,610 metric tons are produced respectively (Department of Statistic Malaysia, 2008).

In addition, the level of self-sufficiency

for beef, goat, pork, poultry meat, and poultry eggs are 25.88%, 9.15%, 121.41%, 121.58%, and 114.19% respectively (Department of Veterinary Services, 2009).

The data above shows the numbers of poultry production have exceeded the demand in this country. This condition provides opportunities for poultry products to enter the export trade with the intention of raising foreign exchange for the country. Moreover, the production of ruminant products (beef and mutton) still cannot suffice demand. This is in accordance with the theory of trade, where the excess production can be used for export while the lack of production will be met through import (Tsakok, 1990).

The above data shows the ruminant products needed to increase production numbers in order to accomplish a demand for domestic beef and goat meat as well as reduce dependence on imports. In relationto the Third National Agricultural Policy (NAP3), the production of fresh beef, mutton and milk will increase for the domestic market. Private sector led commercial production will be actively encouraged to adopt modern approaches and farming on a large-scale basis. Smallholder livestock activities with a potential will continue to be transformed into larger commercial operations to improve efficiency. Therefore, the main question is whether Malaysia has the comparative advantage in the production of beef and mutton?

THE POLICY ANALYSIS MATRIX

This study aims to determine the comparative advantages of ruminant subsector in Malaysia. The Policy Analysis Matrix (PAM) is used as an analytical tool for investigating which commodity system within an economy's agriculture sector hold a comparative advantage (Morrison, 2002). According to Yao (1997) the structure of a PAM can be described as a product of two accounting identities: one defining profit as the difference between revenues and costs, and the other measuring the effects of divergence (distorting policies and market failures) as the difference between observed parameters and parameters that would exist if the divergences were removed. The primary objective of constructing a PAM is to derive a few important policy parameters for policy analysis. In this paper, four most commonly used parameters are:

i. Nominal Protection Coefficient of Output (NPCO)
ii. Nominal Protection Coefficient of Input (NPCI)
iii. Effective Protection Coefficient (EPC)
iv. Domestic Resource Cost (DRC) ratio

PAM as presented in Table 1, has three rows. The first row of the PAM is calculated with the private prices or financial prices. The private prices are the prices actually received or paid by the economic actors. The second row is a calculation based on social prices (economic prices), which describe the price or social value of the economic value for the elements of cost and performance. The third row involves the calculation of the price difference in private cost and the social

cost as a result of the impact of government policies or existing market distortions.

The first row of the PAM is the calculation of private profitability (D), defined revenue (A) minus total costs (B+C). Where, B and C are tradable and domestic inputs, respectively (Table 1). In other words, the first row of the PAM contains the value for the accounting identity measured at private prices, which are the price actually used by local producers to purchase their inputs and sell their outputs. Private profitability in the first row, demonstrates the competitiveness of the livestock production system, given current prices for inputs, outputs and policy. The second row of the PAM calculates the social profit that reflects social opportunity costs. Social profits measure efficiency and comparative advantage. Social profitability (H) measures revenue valued at social prices less value of tradable and domestic input both valued at social prices. A positive social profit indicates that the system uses scarce resources efficiently and contributes to national income (Nelson, 1991). The negative social profits indicate social inefficiencies suggest that production at social cost exceed the cost of import. In other words, the sector cannot survive without government support when social profits are negative. The final row of PAM represents the extent to which policies distort revenues and cost from international levels.

The PAM framework can also be used to calculate important indicators for policy analysis. These include NPCO, NPCI, EPC, and DRC . The Nominal Protection Coefficient measures the impact of commodity specific price interventions such as import tariffs. NPCO is given by the ratio of private revenue to social revenue (A/E). An NPCO greater than one implies that the domestic output is protected and vice versa, if the ratio is less than one. NPCI is expressed as B/F (the ratio of value of tradable inputs at local market prices or private prices to value tradable inputs at world market prices or social prices). EPC will measure the total effect of government

TABEL 1
Structure of the Policy Analysis Matrix (PAM)

		COST		PROFIT
	REVENUE	INPUTS TRADABLE	INPUTS NON-TRADABLE	
Private Prices	A	B	C	D = A - B - C
Social Prices	E	F	G	H = E – F - G
Divergence	I = A – E	J = B – F	K = C – G	L = I - J - K= D - H

Source : Pearson, 2003

Note : A = Revenue in Private Price; B = Inputs Tradable in Private Price; C = Inputs Non-Tradable in Private Price
D = Private Profitability; E = Revenue in Social Price; F = Inputs Tradable in Social Price
G = Inputs Non-Tradable in Social Price; H = Social Profitability; I = Output Transfer; J = Input Transfer
K = Factor Transfer; L = Net Transfer

interventions; it can be computed from the PAM as a ratio of value added in local market prices (A-B) to the value added in the world prices (E-F). If EPC is greater than one, it means that government intervention has favored local production, although it is more economical to import the commodity (Legese, 2007).

DRC is the ratio of the domestic production in social values (G) to value added again in social terms (E-F). It indicates the cost of domestic factors that has to be incurred to obtain one unit of value added in social terms. A DRC value between zero and less than one implies that commodity has a comparative advantage while the value above one and those negative indicate that an activity is wasting scarce resources that could be used efficiently elsewhere (Mahlanza *et al.*, 2003).

DATA AND GENERAL ASSUMPTION

The secondary data are published data, which was obtained from various resources. Basically, the data from Department of Statistic, Department of Veterinary Services (DVS), Ministry of Agriculture (MOA), Ministry of Finance (MOF), and other related sources were utilized. The primary data were collected from a survey conducted in 2009 for livestock farms. The said survey took into account data on the information on the production for the year of 2008 which included reports on quantities of farm production inputs and outputs, scale of farm, prices paid and received by livestock producer. The ruminant subsector consisted of beef and goat farming. Each farm is classified into a commercial, medium and small scale farm as shown in table 2. Classification of farms facilitated comparison of the different farm class where there are variations in cost of production and revenue due to the differences in utilization of resources and prices of output and input.

This survey was implemented in Negeri Sembilan, Perak and Selangor. The location was based on the potential resources of livestock in the center ar ea of livestock products in Peninsular Malaysia. The number of samples used in this survey are 39 beef producers and 40 goat producers from the research area. The techniques of data collection on each element of the respondents were carried out with a structured questionnaire.

TABEL 2
Classification of Farms

COMODITY	FARM SIZE	POPULATION
Goat	Commercial	>500 heads/year
	Medium	100 - 500 heads/year
	Small	<100 heads/year
Beef	Commercial	>250 heads/year
	Medium	50 - 250 heads/year
	Small	<50 heads/year

Source: Department of Veterinary Services (DVS), 2005

The major information collected from the survey were from: (1) Livestock reconciliation table and estimation of farm production and (2) Cost profile for each livestock enterprise. The presentation of the livestock reconciliation table was based on the format being used by Tan *et al.* (1989). The total physical output (production) for both categories was estimated as follows:

Production
= Live weight gain over the production (per kg of Live weight)
= Sales (kg Live weight)
+ home consumption (kg Live weight)
+ closing stock (kg Live weight)
− opening stock (kg Live weight)

The compilation of revenue and production cost, trading and processing cost profiles collected from the farms were in the private value. These private values need to be converted into social value prior to DRC calculations. Conversion Factors (CF) were used to convert the private to social values. The CF of a selected item that had a direct involvement in the production of livestock was estimated using the formula obtained from Veitch M.D (1986). The selected items that have no CF, the CF need to be estimated and was categorized into immediate inputs and primary inputs. The immediate inputs included the following: feed, MVS (medicine, vaccine, and supplement), livestock purchased, fuel,

TABEL 3
Conversion Factors from Financial to Economic Analysis

INTERMEDIATE INPUT			CONFERSION FACTOR
	Feed		0.95
	MVS		0.88
	Livestock Purchase		0.95
	Fuel		0.88
	Repairs & Maintenance		0.78
	Water		0.75
	Electricity		0.84
	Office Supplies		0.90
TAX			0.00
LAND RENT			1.00
LICENCE			0.00
PRIMARY INPUT			
	Labor		0.82
	Depreciation		
		Building	0.86
		Equipment	0.90
		Transportation	0.70
	Interest		1.30
LOSSES			1.00

Source: Veitch, 1986

repair and maintenance, utility, and office supplies. The primary inputs included labour, depreciation, interest and land rent. Other items included were TAX, license and losses.

In addition, for allocating the cost of inputs into the domestic and foreign components it is important to calculate the DRC. All Input or output that is not being traded across national boundaries of a particular country either because the cost of production or limited trade practices is named as domestic component. Cost of domestic component is also known as non-tradable cost. On the other hand, all input or output is traded if its production and consumption will affect the country's level of import or export on the margin named as the foreign component. Cost of foreign component is also known as tradable cost. The breakdown of domestic and foreign components is presented in Table 4.

TABEL 4
Allocation of Costs Between Domestic and Foreign Component

			Domestic (%)	Foreign (%)
Intermediate Input				
	Feed			
		Broiler	20	80
		Layer	20	80
		Beef	10	90
		Goat	20	80
	MVS		20	80
	Repairs & Maintenance		100	0
	Water		90	10
	Electricity		90	10
	Fuel		50	50
	Livestock Purchase			
		Broiler	50	50
		Layer	50	50
		Beef	50	50
		Goat	50	50
	Office Supplies		100	0
Tax			100	0
Land Rent			100	0
Licence			100	0
Primary Input				
	Labor		100	0
	Depreciation			
		Building	100	0
		Equipment	100	0
		Transportation	67	33
	Interest	Building	95	5
Losses			100	0

Source: Veitch, 1986

RESULT

In this study, the Policy Analysis Matrix (PAM) is used to evaluate the comparative advantage of alternative activities, namely beef, and goat in Malaysian livestock industry. The most prominent indicators used by the PAM are the Domestic Resource Cost (DRC) ratio and Social Profitability. A simple definition of the DRC is that it measures the ratio of the cost of domestic factors used by the commodity (production and marketing) system to the value added of the system, both measured at economic prices. In other words, the DRC measures the ratio of the cost of domestic resources used by the commodity system to the value created by the commodity system, both measured at social prices.

Similarly, social profits measure efficiency or comparative advantage, although outweighed by the DRC for comparison of different activities. The results can be taken directly from the second row of the PAM matrix, where social profits equal social revenues less total social costs (tradable and non-tradable costs).

In addition, the PAM framework can also be used to calculate important indicators for policy analysis. The nominal protection coefficient (NPC), a simple indicator of the incentives or disincentives in place, is defined as the ratio of private price to a comparable world (social) price. NPC can be calculated for both output (NPCO) and input (NPCI). The other indicator is an effective protection coefficient (EPC), which measures the total effect of government interventions. The summary result on protection coefficients on ruminant production in Peninsular Malaysia are reported in Table 5.

Analysis of Protection

The ratio formed to measure output transfers is called the Nominal Protection Coefficient of Output (NPCO), a term taken from the literature on international trade. NPCO shows how much domestic prices differ from social prices. If NPCO exceeds one, the domestic prices are higher than the import or export price and thus the system is receiving protection. If NPCO is less than one, the domestic price is lower than the comparable world price and the system is unprotected by policy. The NPCO for ruminant industry 1.05 which indicates that policies have caused domestic output price of livestock sectors in Peninsular Malaysia to be higher than the world price by approximately 5%[1]. Therefore, there has been a transfer of 5% gain from the customer to the producers of ruminant product. In other words, the condition of the current price of ruminant products has indirectly provided an incentive for the development of ruminant production in Peninsular Malaysia.

Impact of divergence and government policies contained in the tradable inputs is indicated by the value of a nominal protection coefficient on input (NPCI). Shaped policy on tradable inputs and domestic factors can form trade policy and subsidies and taxes, while other forms of divergence can be results of market distortions. NPCI shows how much domestic prices of tradable

[1]Mahlanza *et al*., 2003

TABEL 5
Analysis of Protection

KIND OF FARM	FARM CLASS	NOMINAL PROTECTION COEFFICIENT OF OUTPUT (NPCO)	NOMINAL PROTECTION COEFFICIENT OF INPUT (NPCI)	EFFECTIVE PROTECTION COEFFICIENT (EPC)
BEEF	Small	1.05	1.06	1.05
	Medium	1.05	1.06	1.05
	Commercial	1.05	1.05	1.05
	All Size	1.05	1.05	1.05
GOAT	Small	1.05	1.06	1.05
	Medium	1.05	1.06	1.05
	Commercial	1.05	1.05	1.05
	All Size	1.05	1.06	1.05

Source: Farm survey conducted on Peninsular Malaysia, 2009.

inputs differ from their social prices. If NPCI exceeds one, the domestic input cost is higher than the input cost at world prices and the system is taxed by policy. If NPCI is less than one, the domestic prices are lower than the comparable world price and system is subsidized by policy[2].

According to evaluation of government protection in Table 5, NPCI Malaysian ruminant industry ranged in between 1.05-1.06. These coefficients suggest that producers are paying 5%-6% more for their tradable inputs than they would have been able to obtain them at their respective social price[3]. This means the policy provide 5%-6% tax per unit of tradable input paid by domestic producer[4].

The existence of government policy in the form of value added tax on input production in the ruminant subsector relate with the higher portion of foreign component of the inputs used in the ruminant production such as feed and MVS. The feed for beef and goat has 90% and 80% of foreign component respectively even as the input MVS for ruminant production using 80% of foreign component. The higher foreign component used on input caused the price to rise due to import tariff, which created a negative transfer from the entire set of policies affecting tradable inputs.

Effective Protection Coefficient (EPC) is the indicator that shows the full impact of a set of policies and includes both output price-enhancing effects (import tariffs) and cost-reducing effects (inputs subsidies). As can be seen in Table 5, all kinds of farms in ruminant sub sectors generated EPC of about 1.05. It is indicating that the net impact of government policy influencing product markets on output price policy and tradable-input price policy is to allowing the depicted beef and goat production to have a value added in private prices 5% greater than the value added without policy transfers (as measured in social prices).

[2]Pearson, 2003
[3]Morrison, 2002
[4]Joubert, 2000

EPC on ruminant sub sectors is greater than one which indicates positive incentive effects of commodity policy. This policy shows the government has given heavy support of 5% for value added on both beef and mutton production, which has been beneficial to the producers. In other words, EPC greater than one shows the government policy and market performance has been supporting the activities of ruminant production in Peninsular Malaysia.

Analysis of Social Profitability

In general, the cost of livestock purchased has a large portion to the total production costs for beef farm. In addition, the high cost of feed and labor apparently affects the profit earned in the production of beef. In case of small size farm, on average they suffer losses amounting to RM2.98 per kg LW where 32% of total production cost are livestock purchased, then the cost for feed and labor used 20% and 21% of the total cost respectively. The medium size farm also suffered losses amounting to RM1.78 Per kg LW with the portion about 51% of total production cost for livestock purchased, 17% for feed cost and 15% for labor cost.

At the same time, as it can be seen from Table 6 that it appears that among the three types of scale in beef farm, only in the farm of commercial scale could provide benefits. That farm has a social profitability (SP) ratio of 0.87 which means every one kilogram of beef produced will give profit about RM0.87/ kg LW. Beef farm size on commercial beef usually purchased in large numbers (> 300 head / year), which are preserved in three to six months then continue to sell to their customers. This business recorded cost of livestock purchased with the portion about 86% of total production cost, while the cost for labor and feed was only the remaining amount of 5% and 3% respectively.

In case of small ruminant subsector, goat farm is able to gain profits in both on commercial and medium farm size. Medium size farm gained a profit of 5.95 RM/kg LW while the goat on commercial size farm gain 9.75 RM/kg LW profit. In terms of proportion of labor and feed cost, the medium size farm incurred 16% and 13% labor and feed cost respectively, while the livestock purchased made up 48% of the total production cost. Whilst, goat farm on commercial size pay for labor and feed cost with a portion of 10% and 23% respectively, and livestock purchased made up of about 28% from the total production cost.

In case of small farm size, the labor and feed cost made up 21% and 24% respectively of the total cost, and livestock purchased is about 19% of the total production cost which is very low and the number of animals is too small to make profitable business. Large portions of food and labor costs lead to negative profits obtained in goat production for small size farm about 3.14 RM/kg LW.

Analysis of Comparative Advantage

The comparative advantage analysis is to measure the efficiency level of domestic resources used in order to gain or save foreign exchange. To estimate the comparative advantage in Malaysian livestock industry, the study implements

TABLE 6
Analysis of Comparative Advantage and Economic Profitability

KIND OF FARM	FARM CLASS	SOCIAL PROFITABILITY (SP)	DOMESTIC RESOURCES COST RATIO (DRCR)
BEEF	Small	(2.98)	1.71
	Medium	(1.78)	1.50
	Commercial	0.87	0.81
	All Size	0.59	0.87
GOAT	Small	(3.14)	1.23
	Medium	5.95	0.72
	Commercial	9.75	0.65
	All Size	2.81	0.86

Source: Farm survey conducted on Peninsular Malaysia, 2009.

the method of domestic resource cost (DRC) estimation described by Monke and Pearson (1989). In a simple definition, the DRC measures the ratio of the cost of domestic resources used by the commodity production system to value added created by the commodity production system, both measured at social prices.

The DRC result concludes by raising the issue as to whether the production of livestock products in Malaysia has a comparative advantage that reveals the efficiency of the use of domestic resources to save or earn one unit of foreign exchange. If DRC is less than one and greater than zero it indicates that ruminant production has a comparative advantage because the value of domestic resources used in production is less than the value of foreign exchange saved. If DRC is greater than one it indicates that ruminant production has the comparative disadvantage because the value of domestic resources used in production is greater than the value of foreign exchange saved.

Based on the findings provided in Table 6, the commercial beef farm has the comparative advantage in production of beef with DRC ratio of 0.81. However both the small and medium size farms do not have the comparative advantage in beef production. On the other hand, the small goat farm has the comparative disadvantage indicated by DRC ratio of 1.23. The commercial and medium size goat farms have the comparative advantage in mutton production with DRC ratio of 0.65 and 0.72 respectively. These ratios indicate both commercial and medium farms used domestic resources lower than the value of output produced.

The sensitivity analysis needs to be done to test the effect of changes in input prices on the analysis of comparative advantage in ruminant production subsector. It is known that beef productions have a comparative advantage only when produced in commercial size, but do not have a comparative advantage when produced in the medium and small size. Sensitivity analysis is conducted by increasing the input cost of production to understand the level of comparative advantage on

the production system. Decreasing the input cost of production is conducted to analyze whether the production system has a comparative advantage or not.

The total cost of inputs on beef production in Malaysia is dominated by labor costs and the cost of livestock purchased. Beef production in commercial size still has a comparative advantage when the labor cost is increased by 60%, but if the cost of livestock purchased is increased by 20% the commercial beef production has a comparative disadvantage. As both costs are simultaneously increased by 20%, then this production does not have a comparative advantage.

Beef production in the medium and small size sectors do not have a comparative advantage, so the sensitivity analysis is done by lowering input costs. Production of beef in the small size still does not have a comparative advantage even though the cost of labor decreased by 60%. The same condition also occurs in the medium beef productions. However, beef production in the medium size farm has a comparative advantage as the cost of purchased livestock decreased by 40%, while beef productions in the small size farm still do not have a comparative advantage as the cost of purchased livestock is reduced to 60%.

At the same time, when both costs are reduced by 30% it is understood that beef productions in the medium size farm has a comparative advantage. However, beef production in the small size has a comparative advantage when both the cost is lowered by 50%.

As a result, the sensitivity analysis shows that changes in the cost of purchased livestock are highly influencing factors on the level of comparative advantage of beef production in Malaysia.

Goat meat production in Malaysia have a comparative advantage when produced in commercial and medium size, but do not have a comparative advantage when produced in small size.

The commercial goat production still has a comparative advantage when the labor cost or cost of livestock purchased increased up to 60%. This production still has a comparative advantage when both costs are simultaneously increased by 60%.

Production of goat in the medium size farm still has a comparative advantage as the cost of labor increased by 60%, but if the cost of livestock purchased increased by 60% this production has no comparative advantage. Goat productions in the medium size farm also have no comparative advantage when both costs are simultaneously reduced by 40%.

The cost of goat production in the commercial and medium size farms are dominated by labor costs and the cost of livestock purchased, in contrast to that, the cost of goat production in small size is dominated by the cost of feed and labor costs. The small goat production farms have a comparative advantage when feed costs or labor costs are reduced by up to 60%. Similarly, if both costs are simultaneously reduced by 30%, then this production could have a comparative advantage.

TABLE 7
Sensitivity Analysis

FARM SIZE	BEEF		GOAT	
	SENSITIVITY ANALYSIS	DRC	SENSITIVITY ANALYSIS	DRC
All size	normal	0.87	normal	0.86
	increased labor 60%	0.94	increased labor 60%	0.98
	increased livestock purchased 10%	1.00	increased livestock purchased 30%	1.05
	increased labor 10%+livestock purchased 10%	1.02	increased labor 20%+livestock purchased 20%	1.02
Commercial	normal	0.81	normal	0.65
	increased labor 60%	0.86	increased labor 60%	0.71
	increased livestock purchased 20%	1.09	increased livestock purchased 60%	0.80
	increased labor 20%+livestock purchased 20%	1.11	increased labor 60%+livestock purchased 60%	0.87
Medium	normal	1.50	normal	0.72
	decreased labor 60%	1.26	increased labor 60%	0.83
	decreased livestock purchased 40%	0.96	increased livestock purchased 60%	1.06
	decreased labor 30%+livestock purchased 30%	0.98	increased labor 40%+livestock purchased 40%	1.02
Small	normal	1.71	normal	1.23
	decreased labor 60%	1.37	decreased feed 60%	0.97
	decreased livestock purchased 60%	1.14	decreased labor 60%	0.99
	decreased labor 50%+livestock purchased 50%	0.99	decreased feed 30%+labor 30%	0.98

Source: Farm survey conducted on Peninsular Malaysia, 2009.

Based on the sensitivity analysis one can concluded that the comparative advantage indices in goat production are very much influenced by changes in the cost of livestock purchased especially by the commercial and medium size farm. However, the cost of feed has greatest influenced in small farm operation in order to maintain comparative advantage in goat production.

CONCLUSION AND RECOMMENDATION

The results of this study show that economically producing beef and goat in Peninsular Malaysia is efficient and profitable. However, practical ways to increase the competitiveness and efficiency are not explicitly found in this study. From this study, we can conclude that the analysis of comparative advantage only depicts the resource usage in terms of domestic savings. The analysis reveals that ruminant group has a comparative advantage in production of livestock product, especially when both beef and goat is produced on commercial scale. Beef farm has a comparative advantage in commercial scale, as shown by the DRC ratio of 0.81. This ratio indicates the beef farm on commercial scale used 0.81 (US$) of domestic resources to produce output with value about US$1. This means that the farm can save 0.19 (US$) of foreign exchange in every output produced. At the same time, goat farm on commercial scale only used 0.65 (US$) of domestic resources to produce output with value about US$1 and saved 0.35 (US$) of foreign exchange.

According to Tsakok (1990), the level of comparative advantage of each subsector is greatest if DRC ratio is closer to zero. As a result, the goat farm on commercial scale has a more comparative advantage compared with beef farms in Malaysian livestock industry.

In this study, it is indicated that commercial goat production can bring greater profits than the profits obtained from commercial beef production. Nevertheless, in reality, the selling price of domestic goat production is prohibitively expensive. High input costs make goat prices (per kg LW) very expensive compared with beef prices (per kg LW).

As describe d earlier, the higher cost in ruminant production relates to the higher portion of foreign component of the inputs used in the ruminant production such as feed cost. Goat feed used 80% of foreign component while beef feed used 90% of foreign component. This makes it difficult for the Malaysian government to regulate the level of the livestock price, because due to increased imports of livestock, prices would reduce the level of comparative advantage in production of ruminant product.

This study recommends that Malaysian government needs to advise the livestock producers to find or produce alternative feed. The alternative feed must use 50% higher domestic component in order to reduce dependence on import feed. Furthermore, government needs to consider building the animal feed industry in the country. In order to facilitate this, the government must begin examining ways to produce animal feed effectively and efficiently,

and required preliminary research on Malaysia's comparative advantage in producing ruminant feed.

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The Potential Use of E-Procurement in the Malaysian Palm Oil Industry Supply Chain

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ABSTRACT

E-procurement is electronic methods of conducting business transactions particularly purchasing activities. Many companies around the world have started to apply the technologies though there are still some which refuse to utilize them. The objective of this paper was to investigate the application of e-procurement technologies in managing purchasing activities among the Malaysian Palm Oil Industry (MPOI) supply chain players. Responses from the representative player of each stage of the MPOI supply chain were gathered via in-depth interviews using an open ended questionnaire. A detailed analysis based on content analysis from the responses revealed that e-procurement technologies could be a potential tool to increase the efficiency of purchasing activities, enhance purchasing and searching processes, as well as providing relevant information on materials, and aid in the reduction of human error. Certain products for example fresh fruit bunch (FFB), crude palm oil (CPO), crude palm kernel oil (CPKO) and palm kernel however were found to be impractical to use e-procurement tools due to several reasons. These products were commonly supplied by very established suppliers who are quite conventional in their business. Thus e-procurement tools are not often used in their purchasing activities. This paper concluded that e-procurement technologies were not 'really' available in the MPOI supply chain.

Keywords: E-Procurement, internet, Malaysian Palm Oil Industry, supply chain management

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INTRODUCTION

Companies realize that the application of advanced Internet technologies such as e-procurement would be necessary to operate in a highly competitive market.

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E-procurement is one example of a set of advanced Internet technologies. It uses a web-based technology to support the key procurement processes, including requisition, sourcing, tendering, contracting, ordering, informing, auctioning and payment.

Van Weele (2005) described e-procurement as a collection of web technology-based purchasing solutions aimed at simplifying commercial transactions within and between companies. There are claims from Croom (2000); Croom and Brandon-Jones (2007); de Boer *et al.* (2002); Eadie *et al.* (2010); Gunasekaran and Ngai (2008); Kheng and Al-Hawamdeh (2002); Rai and Tang (2006); Roche (2001); Sander *et al.* (2002) and Puschmann and Alt (2005) that e-procurement technologies offer some benefits. The claimed benefits are that they simplify traditional procurement processes, enhance choices in supplier selections, improve buyer-supplier relationships, increase market transparency, lower purchasing prices and transaction costs, reduce administrative costs, shorten order fulfilment cycle time, lower inventory levels, provide a two-way communication of real-time purchasing information, and establish a close collaboration between companies and their business partners. These claimed benefits have in some ways attracted attention from most companies around the world to start adopting e-procurement technologies.

Recognizing the importance of e-procurement for global transactions, the government of Malaysia has developed marketplace portals to ease the purchasing processes for the companies. The utilization of e-marketplace portals by companies is basically to simplify and increase their external interactions with various parties to obtain the latest information on products or services and to conduct online purchasing transactions. Several government agencies such as the Malaysian Institute of Microelectronics Systems (MIMOS), the Ministry of Plantation Industries and Commodities , the Multimedia Development Corporation (MDC), the Malaysian Palm Oil Association (MPOA) and the Ministry of Science, Technology and Innovation are involved in the establishment of e-marketplace portals. Oilpalmworld is an example of palm oil e-marketplace portal established to enable palm oil-based companies to have a wider business reach and to increase the efficiency of these companies in searching potential customers and suppliers globally. This enhances the transparency of relevant business activities within the palm oil industry players. The palm oil portal enables palm oil industry to encourage business-to-business (B2B) e-commerce functions and bring buyers, sellers, plantation owners, refiners, traders and brokers from around the world into a single platform.

By recognising the potentials of e-marketplace in the palm oil market, many palm oil supply chain players have become involved in online purchasing with the use of e-procurement tools. Although e-procurement offers significant potential for improving efficiency and

effectiveness in purchasing activities, there are some limitations and risks that the use of e-procurement technologies have revealed. The objective of this paper was to investigate the application of e-procurement technologies in managing purchasing activities among the Malaysian Palm Oil Industry (MPOI) supply chain players.

LITERATURE REVIEW

According to Davila *et al.* (2003), companies' concerns about e-procurement technology can be attributed by two main reasons. Firstly, the implicit association that companies have made between e-procurement technologies and the Internet-enabled business models responsible for an Internet 'bubble' particularly regarding the reliability and compatibility of Internet systems. Secondly, technology related issues such as implementation which are complex, time consuming and expensive.

Segev and Gebauer (2001) also described other key factors such as the marketplace structure, functionality and capabilities of e-procurement systems that need to be considered by companies before changing to an e-procurement strategy. There are also key questions concerning whether e-procurement technology is acceptable by suppliers and is the technology able to maintain established relationships with the suppliers (van Weele, 2005).

Details on e-procurement technology are essential to increase companies' understanding about the technology and to help them avoid the possibility of making a wrong solution. Most companies failed to effectively implement e-procurement technology because of poor planning on the technology (Bradley, 2005).

Besides, companies are not thinking about their e-procurement strategies and failed to involve key suppliers at the earliest stage of e-procurement implementation. Presutti Jr. (2003) suggested that before implementing e-procurement solutions, companies must evaluate their purchasing process to determine if it needs to be initially changed in order to deliver its benefits. The company must have at least some history of cross-functional collaboration and early supplier involvement in order to establish a collaborative e-procurement strategy and to integrate e-procurement systems.

Besides , the integration of e-procurement systems between companies and their suppliers is one of key challenges that need to be implicitly understood. As Segev and Gebauer (2001) explained, the connectivity and integration of e-procurement systems are key challenges, and in most cases they have to be compatible in the context of existing enterprise legacy systems. Nevertheless, according to Gilbert (2000) there are problems relating to connectivity of e-procurement technology as some companies have failed to fully understand the inter-organizational collaboration and network effects of e-procurement technology in order to move the right information from suppliers to employees, and the complexities of integrating e-procurement technologies, particularly those which relate to existing systems.

Concerns about e-procurement emphasize more on issues regarding the level of supplier involvement and selections in e-procurement systems. Such concerns as described by van Weele (2005) are about which suppliers are appropriate to make a deal, whether they are ready to be engaged in electronic connection or whether they are willing to follow established form of electronic functions about buying and purchasing, whether the suppliers are willing to change their traditional procurement method to e-procurement and whether close relationships can be maintained once e-procurement is applied.

These questions are crucial in helping companies to increase effectiveness of supplier communication in a more complex, multi-tiered supply chain and to develop a strong partnership with existing supply chain partners while making them more competitive for purchasing contracts. The right type of e-procurement systems can be chosen if companies have a full understanding about their purchasing processes and suppliers' requirements.

METHODOLOGY

Nine managers representing the MPOI supply chain players located in Selangor (Company 1, Company 2, Company 3, Company 4 and Company 5) and Johor (Company 6, Company 7, Company 8 and Company 9) were selected in this study. All companies were manufacturers of finished palm oil products. The managers were selected based on their willingness to participate and were contacted using contact details provided in the MPOB Directory. In-depth interview surveys were conducted to get feedback and responses from the managers. The managers' responses towards the use of appropriate e-procurement tools for different types of material was incorporated into the questionnaire consisting of several open ended questions.

Based on the responses, content analysis was used to analyze the eight types of e-procurement tools that were listed in the questionnaire, namely e-tendering, e-catalogue, e-auction, e-sourcing, e-informing, web-based ERP, web-based EDI and e-MRO. These e-tools were included in the questionnaire to investigate the applicability of the tools among players in the palm oil supply chain industry.

RESULTS AND DISCUSSIONS

Utilization of E-Procurement

Results of the study revealed that none of the respondents used any of the e-procurement tools to purchase materials or other goods (for example FFB, CPO, CPKO, PPO, processing chemicals and other ingredients, planting chemicals and materials, packaging materials, office supplies and equipment for operations). Five managers from Company 3, 4, 6, 7 and 9 indicated that they did not use e-procurement tools in their companies because they prefer traditional purchasing transactions for the reason that the transactions were easy to manage.

Generally , conventional tools such as telephone and facsimile were used for these types of transactions. It could be argued that the benefit of using conventional

tools to purchase companies' materials is not necessary in terms of being easy to manage but the benefit may be in terms of reducing costs or increasing the reliability of suppliers to customers. In this case, the managers did not perceive a problem with traditional methods and it was not clear to them that Internet technologies will provide benefit in terms of ease of managing the purchasing processes. However, if Internet technologies can deliver substantial benefits to the companies, the managers should make use of the technologies to assist their purchasing activities.

Another reason which was described by managers of Company 1, 2, 5 and 8 was that their companies' current system was incompatible with other systems particularly suppliers' systems. Due to this situation, some companies were reluctant to use advanced Internet systems or tools for purchasing materials from the suppliers particularly established suppliers.

In the palm oil market, many established suppliers do not use advanced Internet technologies in their business transactions and based on that, Company 1, 2, 6 and 8 were reluctant to introduce e-procurement tools to their suppliers. The palm oil players, particularly the suppliers, would need to enhance their understanding of Internet technologies before e-procurement tools or systems could be established successfully within the MPOI. However, in order to establish such tools or systems, the palm oil companies would need to invest in the relevant technologies and the technologies should be reliable and compatible to be used by other parties, particularly the suppliers.

Managers from Company 1, 3, 6 and 9 also claimed that e-procurement tools were not suitable for use because their goods are seasonal and perishable. The issue of seasonality and freshness has always been the key factor for producing good quality palm oil products. The quality of palm oil-based products, particularly crude palm oil (CPO), has to be monitored and maintained before they get to the end customers.

Managers' perceptions that e-procurement tools were not suitable for use with perishable and seasonal goods could be questioned. Some producers of perishable products such as flowers and fish use a Dutch auction (known as descending auction because the price decreases during the auction) for selling their products to buyers. An e-procurement tool could implement a Dutch auction method.

In the flower industry in the Netherlands for example, a Dutch auction is commonly used method by flower growers to sell cut flowers to buyers. These buyers normally purchase the flowers for various wholesalers and retailers where the flowers are then repackaged and resold to end-consumers or retail stores. With the application of Internet, buyers can gain access to the products through an online Dutch auction (one type of e-auctions). E-auctions enable retailers, wholesalers and other commercial buyers to purchase extensive varieties of cut flowers from growers worldwide.

Through online auctions, buyers could specify instantly to growers how to package the products and when to ship them. All

requirements and the process of exchanging relevant information can be efficiently managed by the growers. This would reduce product handling costs, reduce packaging costs and increase the quality of end products. This demonstrates that managers' perception that e-procurement tools could not be applied to the palm oil products particularly FFB is possibly not true. The evidence has proved that e-auction tools can be useful for managing purchasing activities of perishable and seasonal products and the tools have been practiced in other industries including the flower industry.

The Potential Use of E-Procurement Tools in Purchasing Activities

All managers were asked questions on the potential use of e-procurement in their companies. Table 1 summarises some conclusions for each of e-procurement tools based on managers' responses. This is followed by detailed descriptions of each of e-procurement tool.

E-Tendering

The managers responded that e-tendering could potentially be used to help their companies receive specific details on materials and fast responses on orders from suppliers. In this case, e-tendering was seen as a tool to speed up the process of purchasing activities between the companies and their suppliers. As manufacturers, the companies required a reliable tool to assist them in receiving prompt information about materials prior to the distribution activities. This also helps the companies to provide reliable export activities. However according to the managers, although e-tendering could help to speed up the process of providing information and responses on tendering, it was incomplete because further negotiations between all parties were required to complete a tender.

According to the managers, the drawback of e-tendering was that all tenders are opened before they are brought to the Tender Board and sent to the discussion table. The managers also responded that unlike the conventional method of sealed envelopes, in e-tendering, one source (a competitive tender) can be asked to re-enter a fresh tender at lower or higher prices in order to secure a deal or for personal gain. This could lead to malpractice at the tender receiving end.

However , it is argued that one of the claimed advantages of using e-tendering is that it provides openness and fairness to all parties involved in the tendering processes. For example, e-tendering enables the automatic rejection of suppliers who fail to meet the tender specification and at the same time allows potential suppliers to place a new tender in the system. This shows that a fair tender process is offered to the suppliers where each of the suppliers has the opportunity to place a tender on the system. The suppliers are also enabled to carry out online access and use e-mail communication to receive updated documentation and tender queries. Fast and accurate evaluation of tendering activities can be performed to help the companies to reduce tender cycle-time.

TABLE 1
Summary of Potential Use of E-Procurement Tools

E-Procurement Tool	Potential Use	Drawback
E-Tendering	▪ To receive specific details on materials and fast responses from suppliers ▪ To speed up the process of tendering activities	▪ Close-up (face-to-face) negotiation with buyers and suppliers could not be carried out
E-Auction	▪ Works in the same way as e-tendering but goods are traded in the reverse action	▪ Close-up (face-to-face) negotiation with buyers and suppliers could not be carried out ▪ Inapplicable for products which are supplied by established suppliers such as CPO, CPKO, palm kernel products
E-Sourcing	▪ One of the fastest ways in identifying supplies from new suppliers	▪ Close-up (face-to-face) negotiation with buyers and suppliers could not be carried out
E-Informing	▪ To increase the efficiency of purchasing activities ▪ Timely information from suppliers could be obtained	▪ Only available for very established supplies ▪ Little information about CPO, CPKO, palm kernel products could be sought from local palm oil millings ▪ Most of conventional suppliers and buyers do not depend on the Internet for purchasing transactions
E-Catalogue	▪ Global access to information on materials ▪ To speed up the process of searching and providing relevant information on materials	▪ Could not be used for products such as FFB, CPKO, CPO, palm kernel products ▪ No personal contact could be made ▪ Only available for very established supplies with very limited information
E-MRO	▪ Purchasing activities could be more efficient ▪ Could reduce human error	▪ Still impractical in the MPOI because the suppliers are still very conventional ▪ The system is not *'really'* available within the MPOI
Web-based ERP	▪ Could be used for limited items only ▪ Could only be applied at certain point in the palm oil supply chain	▪ Could increase the costs of production activities ▪ Inapplicable for purchasing perishable goods
Web-based EDI	▪ Exchanging and sharing online information ▪ Could be used on selected items only ▪ Reports related to production activities could be made available on the Internet	▪ Impractical tool for those players who are still very conventional

Another drawback of e-tendering as stated by the managers is that close-up (face-to-face) negotiation with buyers and suppliers could not be done. Some managers like to discuss business dealings in a closed environment where face-to-face negotiation during a personal visit is common. It is argued that in some cases, this type of negotiation method may not be necessary but for some people it may be a pleasant part of the job which gives them interest and satisfaction.

E-Auction

The managers responded that e-auction works in the same way as e-tendering however materials or goods were traded in the reverse action. Perhaps what the managers meant by their responses is that in the e-auctions, the price of goods continues to decrease until it reaches the lowest price to complete the auctioning processes whereas in the e-tendering, the price does not necessarily reach the lowest price for wining a tender. This explains that the suppliers who offer the lowest price or a combination of the lowest price and other aspects would be chosen by the companies for supplying the materials which are required for their operations.

On the other hand, conducting purchasing activities via e-auction could lead to some drawbacks. The managers claimed that using e-auction, a similar problem to e-tendering could occur which is close-up negotiation with buyers and suppliers could not be carried out. Furthermore, according to the managers, the demand of materials varies based on orders so auctioning activities may be difficult to perform. This is because orders on materials were difficult to predict. Comments made by the managers showed that e-auction was inapplicable for use in their companies because most of the supplies such as CPO, CPKO and palm kernel products are generally supplied by established local palm oil millers and some of the palm oil mills are owned by the companies themselves. Most of the upstream suppliers in the palm oil supply chain often use conventional tools when performing purchasing activities thus e-auction could not be a potential tool at this point of the palm oil supply chain.

E-Sourcing

According to the managers, the application of e-sourcing was considered as one of the fastest ways to identify supplies from new suppliers on the websites. However, according to them, most of the supplies such as machinery parts and inventories, particularly specialized machineries were unavailable on local websites. Most of these items were offered on overseas websites. The disadvantage of purchasing products from overseas suppliers as claimed by the managers was often related to delivery activities. These suppliers usually took a long time to deliver the supplies due to the long-distance involved. This would, in turn, lead to increase production lead time and finished palm oil products may take a longer time before they get to the end customers. In contrast, local suppliers would not take a long time for delivering their supplies;

it sometimes could only take a couple of hours instead.

Another drawback for using e-sourcing according to the managers was that close-up negotiation with buyers and suppliers could not be carried out. This is similar to the responses that they made for the application of e-tendering and e-auction. The managers further argued that when purchasing established goods or materials (such as chemicals) for certain production processes, the transactions could just be carried out through known sales representatives. This helps the companies to easily administer and reduce any impediment to the transactions such as delay in gaining relevant information on goods or information on status of orders.

E-Informing

As responded by the managers , by using e-informing, purchasing activities could be done more efficiently and timely information could be obtained from the suppliers. However, according to the managers, e-informing was only available in the palm oil market for very established supplies and was often used on limited information only. The managers further argued that to get privileged data or information, the companies do not need to rely on e-informing tool, but it needs to contact the sales representative who is responsible for the sales activities. This will increase the chance of getting more transparent business information which could be essential for the company.

The drawbacks of using e-informing in the palm oil companies are described based on the managers' comments where they claimed that most of the suppliers and buyers in the palm oil market were classified as conventional business companies. Most of these palm oil players do not depend on Internet transactions for purchasing activities. The managers further argued that there was little information from local palm oil millings that could be sought via e-informing tool especially information regarding the supplies of CPO, CPKO and palm kernel products.

These palm oil millings often used conventional tools for purchasing and other transactions whereas Internet tools were used for certain activities such as accessing to third party websites for the latest information about palm oil products. Besides, most of local vendors preferred to have direct contact with their customers for the reason that it could assist the vendors for further business dealings for example debt collection. According to the managers, the vendors also found it 'troublesome' to conduct e-informing with their customers because most of them were not yet ready to use the tool.

E-Catalogue

The advantage of using an e-catalogue as claimed by the managers was that the company could have better coverage. This suggests that information on suppliers' products could be accessed by the company globally. The disadvantage of using e-catalogue according to the managers was that no personal contact is involved. The managers commented that e-catalogue was

important because it helps to speed up the process of searching for materials from new suppliers on the websites. However, e-catalogue was only available for very established supplies with very limited information only.

Another disadvantage of an e-catalogue according to the managers was that the tool could not be used for palm oil products such as FFB, CPO CPKO and palm kernel products. Besides, there was no product catalogue needed for these products as their quality were governed by specifications set out by several parties such as Malayan Edible Oil Manufacturers Association (MEOMA), Malaysian Palm Oil Board (MPOB) and Palm Oil Refiners Association of Malaysia (PORAM). The key role of these parties is to monitor activities such as milling, refining and manufacturing in the palm oil industry.

E-MRO

The managers stated that e-MRO could be applied in the companies because purchasing activities could be conducted more efficiently and human error could be reduced. This suggests that certain purchasing activities for materials such as office supplies which are usually managed by the staff could be performed by e-MRO system. The staff would rely on an e-MRO system to do part of their job such as placing an order through the Internet. This helps the companies to reduce the number of staff involved in purchasing activities and also reduce costs associated with production and overhead.

Interestingly, the managers claimed that e-MRO in their companies was still at the development stage, which means that an in-house technician was only available when the systems were not working (downtime). The managers were commented that e-MRO was still impractical in the palm oil market as most of the suppliers were still very conventional. Besides, e-MRO systems were not 'really' available in the MPOI because some palm oil-based companies were reluctant to use advanced Internet technologies because they discovered that the technologies do not receive high attention especially from local suppliers.

Web-based ERP

Web-based ERP according to the managers could be used for limited items only. This suggests that the application of web-based ERP could only be applied at a certain point in the palm oil supply chain activities, for example in manufacturing activities for finished palm oil-based products. The drawback of web-based ERP according to the managers was that it could increase the costs of production activities and also there was 'no liquidity' in the current market. Perhaps 'no liquidity' means that there was not a lot of capital in the companies to invest in new Internet tools.

The managers believed that web-based ERP was relatively expensive. They added that web-based ERP was inapplicable for purchasing the FFB. This is because smallholders supply the majority of FFB produced. These smallholders usually sell the FFB to a middleman and prompt cash

or short term credit could be received by the smallholders. As the FFB are considered as perishable goods, they are to be delivered to the mills within 48 hours after they have been detached from the palm tree. Besides, the selling process of the FFB is done on 'a goodwill basis' between agents (middlemen/ intermediaries) and the millers. This may explain that the agents and the millers have reached an agreement for new business dealings where from the agreement both parties could benefit in terms of increasing business profit.

In the palm oil industry, agents are hired by some of palm oil companies including plantations/smallholders and millers. These agents are responsible for searching new business dealings for the companies and they must have detailed knowledge of the companies' products to help them increase the ease of selling processes to the target customers.

Web-based EDI

The managers responded that using web-based EDI, online information could be exchanged and shared by many parties at different locations on time. However, according to the managers, web-based EDI was used on selected items only. This means that the companies could only purchase items that are available on the suppliers' websites unless the information about the items had already been obtained and they had been used by the company prior to the purchase. The managers further stated that web-based EDI was currently enforced and carried out by the companies.

This allows all information including monthly trade records and daily production figures being reported electronically over the Internet. The managers commented that a web-based EDI tool was impractical in the palm oil market. This is because most of the palm oil buyers are still very conventional where Internet tools are not often used in their operations.

A short remark made by the managers that paperless trading (such as e-tendering, e-auction, e-catalogue) was becoming accepted for the 'coming generation of businesses' and in the palm oil market, which is a bit of a cartel system, hence not many palm oil players understand the concept of dealing and closing deals because a lot of factors are involved.

The managers added that the application of e-procurement tools was very promising however some of the customers and suppliers (local or international) were still not equipped and educated about this form of online transaction. They believed that some levels of procurement for materials such as stationery, chemicals and standard items where the demand is non-fluctuating were applicable for using e-procurement tools.

SUMMARY OF FINDINGS

Managers' lack of knowledge of advanced Internet technologies has contributed to low level application of e-procurement tools in the MPOI. Most of the managers were not clear that the tools could offer substantial cost-benefit to their companies and based on that they failed to effectively

implement the tools in their purchasing activities. T here are key reasons to explain why palm oil companies in this survey did not use e-procurement tools for purchasing activities. Based on the managers' responses, one of the reasons was that most of the palm oil companies prefer to carry out traditional purchasing transactions because the transactions were easy to manage. The managers perhaps do not perceive a problem with traditional methods and it is not clear to them that Internet technologies will provide benefit in terms of simplifying and managing the purchasing processes.

Another reason for not using e-procurement tools was because companies' current systems were incompatible with other palm oil players' systems. Many managers in the survey were concerned about the issue of reliability and compatibility of e-procurement systems particularly suppliers' systems. Managers' concern over this issue confirmed Davila *et al.* (2003) which explained the authors' concern over the issue of reliability and compatibility of e-procurement systems has been a key concern in many companies.

This suggests that the palm oil companies should increase the compatibility of their systems to be able to fully integrate and connect with all players in the palm oil supply chain. As claimed by Segev and Gebauer (2001), e-procurement systems have to be compatible for ease of purchasing transactions among key players in the supply chain.

Another key issue revealed in this study was related to the implementation of e-procurement tools among the established palm oil players. According to the managers, the tools were impractical to be used for purchasing materials with very conventional players. Due to this situation, many palm oil managers in this survey were reluctant to introduce e-procurement tools to the established suppliers (most of the established suppliers are conventional suppliers).

The key question to consider by the companies if they were to introduce the tools is whether the technologies could be potentially used by the established suppliers. According to Van Weele (2005), the decision to introduce e-procurement technologies must be based on whether the technologies are accepted by suppliers and whether the technologies are able to maintain the established relationships.

There was also a distinct perception from the managers that e-procurement tools were unsuitable for use with goods that are seasonal and perishable. However it could be argued that for some producers of perishable products such as flowers and fish, e-auctions have been successfully practiced for selling their products to potential buyers. The managers in this survey also argued that although e-tendering could help to speed up the process of providing information and responses on tendering, it is incomplete due to further negotiations between all parties (who are involved in the tendering process) are required to complete a tender. A face-to-face negotiation during a personal visit was commonly preferred by some managers to discuss follow-up business tenders. There was convincing evidence that

the managers have recognised the potential for using e-tendering in their companies. Nevertheless, in the palm oil market where advanced Internet transactions (such as e-tendering) are not often applied, common methods for example conventional tools and face-to-face negotiations are useful for further business negotiations.

Therefore in this case, the managers have reckoned that to complete and win a business tender, further negotiations would still be needed. It is argued that in some tendering cases particularly when dealing with regular suppliers, face-to-face negotiation may not be necessary. The responses from the managers also revealed that most of the palm oil players were not yet ready to use e-procurement tools. In view of this situation, most of purchasing activities in the MPOI might not be carried out online. This may explain that most of the players in the MPOI have little knowledge of e-procurement tools and they were less equipped with the tools. The palm oil players should therefore increase their knowledge of e-procurement tools to be able to use the tools in their companies more efficiently.

CONCLUSION

The discussions about the potential use of e-procurement technologies in the MPOI have given some important insights into the practical application of these technologies. Although the utilization of e-procurement technologies in the MPOI could be beneficial, the industry needs to become aware that at this stage there are still problems with existing systems integration among the Malaysian palm oil supply chain players. Most of the systems in the MPOI show a lack of common standards. There was also a lack of accessibility to systems by all suppliers and little investment in the systems. The success of utilizing the systems or tools depends greatly on the capability and reliability of the systems. The systems need to be compatible with the suppliers' systems as well as other palm oil players' systems to ensure their usability and effectiveness. More importantly, the palm oil supply chain players need to increase their knowledge of the usefulness of advanced Internet technologies in managing purchasing activities. There is an opportunity for the MPOI to use the new technologies available on the Internet and to diversify the procurement activities and remain competitive in the global palm oil market.

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Factors Influencing Malaysian Consumers Online Purchase of Herbal Products

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ABSTRACT

The industry for natural products has experienced a significant growth in demand for its products and there is no surprise that the government has given it full support. The economical production methods have made it possible for the Malaysian Small and Medium Businesses Enterprises (SMEs) to increase their output. However due to the limited number of available resources, local SMEs are finding themselves in competition for shelf space in retail grocery stores. One way to resolve this issue is for producers and entrepreneurs to turn to the internet to attract customers. A website that could offer the herbal products online could be an ideal venue to market such products. Moreover, the launch of such a website needs relatively minimal skills and infrastructure. In this study 1063 internet users were interviewed online in order to identify the factors which could influence their intention to purchase herbal products online. Descriptive Analysis and Factor Analysis were employed in this study. The factors which have been found to be significant in predicting the intentions of an average Malaysian to shop online for herbal product are: the internet speed and experience, herbal product characteristics, perceived benefits, subjective norm, payment methods and English proficiency.

Keywords: Herbal products, online shopping, intention, factor analysis, Malaysian consumers

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INTRODUCTION

The public awareness toward technology in Malaysia can no longer be doubted (Ooi *et al*., 2011).The use of the personal computers through government efforts, low cost in obtaining them or other factors have led to a greater use of the Internet in the country.

Along with this online shopping has seen a growing rate in Malaysia over the years . Everything from flight tickets to shawls to football jerseys to electronics are purchased online by Malaysian internet users. The increased spending year after year has made way for a wide variety of online products which suggests that the online shopping medium or e-commerce is a ripe tool for expanding businesses especially those with limited capital and resources like small medium enterprises (SMEs).

Similarly on the rise is the local manufacture of herbal products by local SMEs. According to NPCB , in 2011 about 69% of all natural products such as herbal products and traditional medicine are locally produced. In contrast, products from China which is the main exporter of natural products to Malaysia account for only 15% of the total registered products . This indicates an abundance of locally produced herbal products sold alongside imported products thus making them compete against each other for limited shelf space, marketing avenues and distribution channels. Most of these products are manufactured by SMEs with relatively small capitals and to compete in a fiercely competitive environment such as this does not seem to have a pleasant prospect for the business owners (Department of statistic, 2012).

Hence there is a need for cost effective and low barriers to entry medium in order to help the local herbal products manufacturers survive. This study proposes the use of the online shopping medium as a more cost effective medium for selling the locally produced SME herbal products. Thus it would be an ideal marketing alternative to initiate an online herbal product shopping website with the relatively minimal skills and infrastructure it requires. To truly thrive on their online shopping venture, SMEs would need reliable data on their prospective online consumers. This vital data should include demographics, perceptions about herbal products, perceptions about online shopping itself, their attitude towards shopping online for herbal products, whether their friends and families would play a major role in their shopping decision, or whether they have the necessary skills and equipment to purchase online. Data such as these would be vital for an SME to evaluate their likelihood of success in the online shopping, helping them make a more informed decision about this relatively new marketing channel, and perhaps to later thrive on.

REVIEW PAST STUDIES

Factors Affecting Online Shopping

Internet shopping is a novelty to most consumers in Malaysia but there have been some academic efforts to examine what constitutes the intentions and desirability of Malaysian consumers to shop online. Haque and Khatibi (2005) identified several factors such as online product price, trust in the online shop and education. Harn *et al*. (2006) found that a Chinese Malaysian is more likely to shop online compared to other ethnicities. The study also states similar online spending trend among degree holders and those with credit cards and/ or cheque books. According to their study

there are also some of the concerns of consumers associated with online shopping include the presence or lack of consumer protection laws, the level of trust in merchants, personal information safety, secured payments and to a lesser extent customs checks. However, directly related to future purchasing intentions was trust in the online retailer.

Hassan and Abdullah (2010) also tested four factors associated with online shopping on Malaysian internet users which are trust, website design, internet knowledge, and internet advertisement. Alam *et al.* (2008) examined the tendency to shop online among young Malaysians. They found that there were four factors associated with online shopping among young Malaysians via factor analysis such as trust, reliability, website design, and customer service. In a similar study, Delafrooz *et al*. (2010) studied factors which may affect students' attitude towards online shopping. As attitude is an important antecedent affecting behavioural intentions, any factors associated with it in this case would naturally be an influential factor towards the intention of shopping online. Among the factors are product price, the convenience of online shopping, a wider selection of products and a utilitarian approach to shopping as opposed to hedonistic shopping. The demographic factors affecting attitude were found to be age and income, based on the same analysis.

Ghazali *et al.* (2006) found that users are not very keen to purchase fish online, citing that they identify more with factors which impede the purchase of fish online as compared to its advantages. Shafie *et al.* (2011) went in a different direction and surveyed the blogs of female shop owners and found that attributes such as trust, privacy of personal information and reliable vendors are very important to such group pf shoppers. Aside from these they also place importance on the range of products, search ability within the website as well as customer service and social networking integration. Shaffril *et al.* (2009) may have shed some light onto why agricultural products and services are still an online rarity in Malaysia based on their survey of 450 agopreneurs; agricultural entrepreneurs do not surf the internet much for agriculture related websites. Their most visited agricultural website is the Department of Agriculture Malaysia website (www.agrolink.moa.my/doa), followed by the Malaysian Agriculture Research and Development Institute (MARDI) (www.mardi.my) and Federal Agriculture Marketing Authority (FAMA) websites (www.agrolink.moa.my/fama). Efforts by the government bodies such as the Department of Agriculture's "Agribazaar" are more towards creating business leads or B2B transactions and information hubs than traditional B2C online shopping. Ghani and Ahmad (2011) asserted that the Agribazaar was successful in generating business leads though much improvement is still required. In their study portal usefulness, system administrator support, portal's usability, content accuracy, relevant features, and privacy and legitimacy among some of the topics that needed improvement.

Product characteristics and features

are play important role in purchasing decision and (Degeratu, 1999). The study by Vijayasarathy (2002) shows that the importance of same characteristics in the online shopping medium. Products which are standardized in quality or believed to be of uniform quality such as books, DVDs, groceries and flowers are more likely to be considered when shopping online. This also holds true for products which consumers prefer to buy in anonymity or in privacy (Grewal *et al*., 2002). In comparison to this there are certain categories of products which result in a lower intention for consumer online shopping. These are more personal products for which consumers may have different preferences such as hygiene products, perfume and cosmetics as well as those products which require experience and knowledge of the product such as cars and electronics (Elliot & Fowell, 2000). As herbal products have a wide range of product characteristics, only those that can be related to the online shopping medium were included in the study. These include the quality of ingredients used in their production as opposed to taste, or the packaging as opposed to the tactile feel of the products and the health benefit claims of the products compared to ability to sample the products.

METHODOLOGY

Conceptual Framework

After deliberation and referring to the literature the researchers have based their conceptual framework on the Theory of Planned Behavior model developed by Ajzen in 1991. The conceptual framework can be observed in Fig.1. Factors included in the model were gathered from the literature, paying special attention to similar studies in other developing countries such as Thailand, Iran, China, Saudi Arabia among others. The factors examined in developing countries include Internet Speed, English Proficiency, and Internet Experience. Well known factors such as Trust, Perceived Consequences and others examined in the literature review

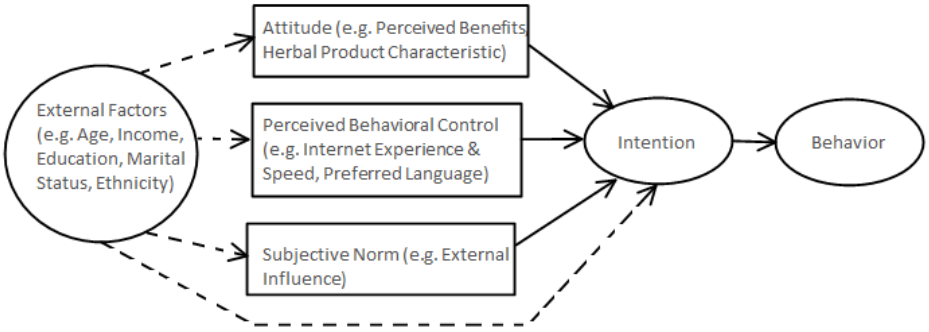

Fig.1: TPB based conceptual research model

were included to examine their influence on the behavior of Malaysian consumers for online shopping. Herbal knowledge, experience with herbal products and their perception towards them is also examined, as the knowledge of the function of a specifics herb may affect the consumer's decision to purchase a product containing that particular herb. Demographic factors are also included in the model as well as the effects all three of the constituents in the original TPB model and the Intention to perform the behavior itself.

Data Gathering

Online questionnaires were designed and distributed to users of the online social networking site have listed their current city of residence in Peninsular Malaysia on their social networking profile. Out of the three thousand email invitations to participate in the e-survey, 1063 respondents completed the questionnaire satisfactorily, indicating a success rate of 35%. The questionnaire is divided into 3 sections: personal information of respondents, herbal products consumption pattern preferences and online shopping intention of herbal based products.

Model Specification

Data analysis is then completed using descriptive analysis in order to quantify the demographics of the study. An explanatory factor analysis (EFA) was carried out to identify the component matrix. By performing EFA, we can determine the number of construct and any underlying structure among the variables included in the study.

Factor analysis was used to uncover the latent factors underlying consumers' perception and intention to purchase herbal products online. Respondents answered 55 statements which were seven point Likert scale and five point Likert scale about their attitudes, perception, subjective norm, perceived behavioral control and intention towards the online purchase of herbal products.

RESULTS AND DISCUSSION

Respondent Demographic Profile

Descriptive analysis was used to describe the sample and the results of the socio demographic profile of the respondents of this study. The demographic profile includes gender, ethnicity, marital status, age, education and income. Table 1 shows the socio-demographic profile of the respondents.

Table 1 indicates majority of the respondents were female (60.9 percent) compared to males (39.1 percent). Most of the respondents were Malays (57.9 percent), followed by Chinese (30.3 percent), Indians (10.1 percent), and other races with 9 respondents (1.7%). Since each ethnic group has its own herbal knowledge and legacy, this could mean that some ethnic groups are more inclined than others to use herbal products and possibly what herbs they prefer or know about. Most of the respondents range from 18 to 54 years old (85.7 percent), which is considered the active working or earning age. From the one thousand sixty three (1063) respondents, 63.9 percent were

married while 35.3 percent were single and 0.8 percent were single parents.

While marital status may not have a proven effect on herbal and supplement consumption, the added financial pressure of marriage may persuade some respondents to use herbal supplements and treatment instead of costly conventional healthcare. Furthermore, some herbs are specifically used as aphrodisiacs. The respondents with at least SPM (high school equivalent) represent 14.4 percent of total respondents. Certificate and diploma holders account for 28.2 percent of respondents, and can be considered as college goers. Finally, about 57 percent of the total respondents hold university degree.

Factor analysis

In this study, Keiser-Meyer-Olkin (KMO) sampling adequacy test and Bartlett's test of Sphericity were used to measure the sampling adequacy and the presence of the correlation between all the variables. The KMO test is used to test whether there is a significant number of a factor in the data set and measure the proportion of total variation in dependant variables that can be explained by independent variables. In this study, the result of KMO test reached the value of at least 0.800 (meritorious) which indicates that the sampling adequacy and factor analysis can be carried out.

After the varimax rotation of the consumers' responses to the 55 statements

TABLE 1
Summary of Respondents Background

Characteristic	Percentage	Characteristic	Percentage
Gender		Marital Status	
Male	39.1	Single	35.3
Female	60.9	Married	63.9
		Single Parent	0.8
Ethnicity			
Malay	57.9	Education level	
Chinese	30.3	Primary/Secondary	14.4
Indian	10.1	Diploma	28.2
Other	1.7	Degree	46.1
		Postgrad Degree	11.3
Age		Income	
under18	6.3		
18-24	25.4	Below 1500	15.1
25-34	34.2	1501-3000	33.5
35-54	26.1	3001-4500	35.3
55+	8	4501-6000	8.5
		Above 6001	7.6

Source: Survey, 2011

relating to their perception towards the purchase of herbal products online, the factor loading from the exploratory factor analysis was obtained and presented in Table 3. The factor analysis of 24 attitudinal statements was conducted and factors are then ranked according to the proportion of variance explained and a name was then given to each factor to reflect the latent stimuli underlying consumers' behavior towards herbal products and its online purchase. In this study, six latent factors which influence the consumers' behavior towards the online shopping herbal products were identified. The six latent factors which account for about 65.454 percent of the total variance are summarized as follow.

The first factor can be categorized as the risk of online shopping, with a total of 7 sub-variables and a combined variance explanation of 65.454%. As indicated in Table 3, the factor consists of the statements: The risk of being cheated is higher in online shopping of herbal products compared to shops or supermarkets (0.806), My credit card information may be exposed to risk when I shop online (0.688), Sometimes the picture you see in the website is not what you exactly get (0.686), It's not easy to trust the online sellers since I don't meet them in person (0.650), I am not sure about the quality of the product that I ordered online (0.647), Online shopping is riskier compared to traditional shopping (0.604), and receiving a purchased product in good condition is very important to me (0.558). From this factor, we can clearly assume that the consumer is still apprehensive about the risks associated with online shopping .

The second factor, with a total accountable variance of 14.651%, is labelled "Social Encouragement to Buy Online. It consists of 5 statements, which are: My friends encourage me to purchase some products online (0.702), My boss recommends me to try online shopping (0.671), My colleagues think buying products online is convenient (0.635), My online friends think purchasing online is convenient (0.615) and My family would approve of online purchasing (0.603). From this factor, we can surmise that con sumers feel the need to conform to the social norm around them, and can be affected by it to shop online for herbal products. It can also be said to reflect the collectivistic nature of Malaysian society.

Internet speed is the third factor uncovered in the factor analysis. This factor accounts for around 6.2% of the total variance. The statements in this factor include: A stable internet connection would

TABLE 2
KMO and Bartlett Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		0.831
Bartlett's Test of Sphericity	Approxi Chi-square	11575.232.897
	d.f	276
	Significance	0.000

TABLE 3
Summary of Factor Analysis Results

Items	Factor Loading					
	F1	F2	F3	F4	F5	F6
Internet Speed and Experience (ISE)						
A stable internet connection would make purchasing herbal products online more comfortable to me.	0.769					
I am confident that I can purchase products online if I wanted to.	0.755					
My understanding of the internet after years of using it helps me to shop online better, such as herbal products.	0.745					
If I were to shop online for herbal products, I would be comfortable and have complete control of my shopping process (e.g. I would know what to do and can do it with confidence).	0.680					
The speed of my internet connection is important when trying to purchase herbal products online.	0.668					
I would be more confident to purchase herbal products online if my internet connection is stable and fast.	0.641					
Variance (% of variance explained)	**15.322**					
Herbal Products Characteristics (HPC)						
There may be many fake/counterfeit herbal products on the internet trying to scam me.		0.827				
I am not sure about the authenticity/genuineness of the product that I ordered online.		0.768				
Sometimes the quality of the ingredient is not what I expected.		0.752				
It can be a bad experience if I did not receive the claimed benefits of the herbal product I purchased online.		0.689				
Receiving a purchased herbal product in good and safe packaging is very important to me.		0.652				
It is disappointing if the purchased herbal product is from an old stock/not fresh/new.		0.566				
Variance (% of variance explained)		**13.887**				
Perceived Benefits (PB)						
Online shopping for herbal products would be a good alternative to traditional shopping (e.g. shops and supermarkets etc.).			0.858			
There are more benefits in online shopping for herbal products compared to traditional shopping.			0.822			

TABLE 3 (*continue*)

Purchasing herbal products online would be very convenient (e.g. saves fuel, shop from home etc.).	0.682			
Online purchasing of herbal products would be enjoyable.	0.644			
Variance (% of variance explained)	**12.381**			
External Influence (EI)				
People who are important to me influence me to buy herbal products online.		0.815		
People important to me think I should try purchasing herbal products online.		0.760		
If someone I know has purchased herbal products online, then I would like to try it too.		0.725		
Variance (% of variance explained)		**8.402**		
Payment Method (PM)				
Online paying services like PayPal requires me to have a credit card.			0.866	
A lot of online vendors prefer credit cards.			0.864	
Variance (% of variance explained)			**7.733**	
Preferred Language (PL)				
I prefer vendors who use English instead of Bahasa Malaysia.				0.745
My command of the English language makes me confident in buying herbal products online.				0.716
I am more confident in buying from an online vendor who can use English.				0.658
Variance (% of variance explained)				**7.729**
Total percentage of variance				**65.454**

make purchasing online more comfortable to me (0.736), The speed of my internet connection is important when trying to purchase online (0.713) and I would be more confident to purchase online if my internet connection is stable and fast (0.657). From this collection of sub-variables, we can assume that for online shopping of herbal products, the internet connection speed can play an important role for consumers.

This next factor consists of statements which can be categorized as Reliable Vendor and Trust. With an explained variable percentage of 2.9%, the statements in this factor include: A vendor using a trusted delivery service (e.g DHL, UPS, FedEx etc.) would be my choice (0.706), I would purchase from an online vendor which has an honest and good reputation (0.623), A well-known vendor would be my choice when buying a herbal product online (0.583), Purchasing online would be very convenient (0.549) and I would purchase a herbal product from an online vendor who

is reliable (0.508). From these sub-variables, it can be assumed that a reliable vendor and trust is important when purchasing online, especially for herbal products.

The fifth factor is called Credit Card, and represents 1.582% of the total observed variance in the study. The statements in this factor are: A lot of online vendors prefer credit cards (0.911) and online paying services like PayPal requires me to have a credit card (0.611). This factor, needless to say, highlights the significant role played by credit cards in the online shopping environment.

And finally, accounting for 1.262% of the total variance observed in the study, internet experience consists of 3 statements: With my experience using the internet, buying herbal products online would be easy (0.815), I use the internet frequently so learning to shop online for herbal products would not be too difficult to me (0.543) and My understanding of the internet after years of using it helps me to shop online better (0.254). Obviously, the internet users in Malaysia think of themselves as experienced users, and can possibly handle new experiences well, thereby making internet experience a significant factor when shopping online for herbal products .

CONCLUSION

The main purpose of this research was to uncover the factors influencing the internet users to purchase herbal product online in Malaysia. The factors which are significant in predicting the intentions of an average Malaysian to shop online for a herbal product are: Internet Speed and Experience (ISE), Herbal Products Characteristics (HPC), Perceived Benefits (PB), External Influence (EI), Payment Method (PM) and Preferred Language (PL). These six factors explained about 65.45 percent of the variance found in the data.

The attitude of respondents towards the purchasing of herbal products online is generally positive in terms of advantages of online shopping, such as fun factor, efficiency, and more variety. The risks associated with online shopping as well as trust related issues also strongly influence the respondents' attitude. This finding concurs with other online shopping studies as such issues define the concerns with online shopping medium itself. The specific herbal product characteristics such as quality of ingredients, safety and freshness of packaging and others also affect the attitude of respondents. Addressing some of the respondent concerns while highlighting the advantages of online shopping can help to improve the attitude of potential customers towards online shopping of herbal products.

The society's views played an important role in this study as well as respondents reporting that family, friends, even the government influenced them with regards to online shopping for herbal products. This seems to be supported by the high influence of family and friends as sources of information on herbal products as well as their persuasiveness in convincing respondents to purchase herbal products. Malaysia seems to still be a collectivistic based society where the values of family and society are

more important than the individual. As such, marketing and promotions such as referrals, group discounts, and other tactics which require the participation of potential customers would likely be effective as well in the context of herbal products and the online shopping of herbal products. It would also be worthwhile to note that as family and friends are considered the most likely to influence respondents to purchase herbal products online, and considering the trend today, marketing on social networking sites where respondents interact with friends and family would also be potentially effective.

While most respondents express the confidence and familiarity with the internet, they are also concerned about the speed and stability of their internet connection, so much so that items pertaining to internet speed and stability were included in one of the highest rated factors uncovered in the exploratory factor analysis: Internet Speed and Experience. Along with the computer hardware and familiarity with the internet, the ISE factor suggests that those with broad band connections, currently considered the fastest and most stable available internet option in Malaysia, would be more likely to shop online for herbal products. Therefore marketing to those who have broad band would likely yield more results compared to those who go without it.

The findings of this study may prove useful as a rough guide to some of the factors needed to be addressed when considering the online marketing of herbal products. As the government is pushing for the advancement of the agro-entrepreneurs of the industry, the internet marketing of products is essential in opening up new avenues of marketing for the entrepreneurs. Hopefully the government will not only focus on the production and expert support side of the advancement plan, but also consider providing marketing support and advice in order to fully realize the potential of local agro-entrepreneurs. Practical information such as which demographics to target, which avenue of marketing to pursue are examined to one degree or another within this study and should prove useful for such plans. The chi-squared result obtained in this study should prove useful in this regard.

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- Indexed in **SCOPUS** (Elsevier), **EBSCO**, **DOAJ**, **CABI**, **Google Scholar**, **MyAIS** & **ISC**.

Scope of Journal

- *Pertanika* JSSH aims to develop as a flagship journal for the Social Sciences with a focus on emerging issues pertaining to high-quality research related to the **social** and **behavioural sciences** as well as the **humanities**, particularly in the Asia Pacific region.
- Refer to our website for detailed scope areas. http://www.pertanika.upm.edu.my/scope.php

Format for Paper Submission

- Articles should include the following:
  - problem formulation
  - conceptual framework
  - methodology/ approach
  - research design (if applicable)
  - statistical analysis (if applicable)
  - main findings
  - overall contribution
  - conclusions & suggestion for further research
  - acknowledgements (if applicable)

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In 1992, a decision was made to streamline *Pertanika* into **3 journals**. i.e.,

1. Journal of Tropical Agricultural Science (JTAS)
2. Journal of Science and Technology (JST)
3. **Journal of Social Sciences and Humanities** (JSSH)

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PROFILE: *Pertanika* publishes original academic articles rapidly. It is fully committed to the Open Access Initiative and provides free access to all articles as soon as they are published.

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For guidance on the submission process, or for any questions regarding submissions, you may contact the **Chief Executive Editor** at: nayan@upm.my

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