COMPETITIVENESS, INVESTMENT AND EFFICIENCY ANALYSIS OF EDIBLE BIRD'S NEST RANCHING IN JOHOR BAHRU AND GUA MUSANG, MALAYSIA

FATIN FARAZH BINTI YA'ACOB

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By

FATIN FARAZH BINTI YA'ACOB

Thesis submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for the Degree of Doctor of Philosophy

July 2019

DEDICATION

TO MY BELOVED DAUGHTER

EL INSYIRAH

…thank you for being my strength with all obstacles that I faced through out this journey…

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Doctor of Philosophy

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July 2019

Chairman : Professor Mohd Shahwahid Haji Othman, PhD
Faculty : Economic and Management

The swiftlet industry is listed under 12 Entry Point Projects (EPP) under the Agriculture NKEA which is one of the cores of Economic Transformation Programme (ETP) as it can generate income for the nation. Malaysia aims to dominate at least 40 percent of global demand for EBN by year 2020. Yet Malaysia was only able to meet 20 percent of world export. Although these swiftlet ranching are located in both urban and rural areas but a majority are in the earlier.

Previous literatures have suggested that Malaysian swiftlet ranching is less competitive than that in Indonesia and Thailand. It lacks strategic plans to enhance its competitiveness with a dearth of research on its competitiveness. Yet the number of swiftlet houses is increasing annually. Even though this industry is lucrative, but it is high risk and unpredictable. To raise profit, ranchers need sufficient knowledge on efficient swiftlet house management particularly on how to fully utilize inputs to maximize the EBN production. The structure of swiftlet ranching between urban and rural area differs and a question arises whether this could affect the production of EBN. This study has been conducted in Johor Bahru and Gua Musang with the earlier and latter representing swiftlet ranching activities in urban and rural areas respectively. Therefore, this study has three aims: (i) to assess the factors that contribute to or lack of competitiveness of swiftlet ranching, (ii) to determine factors that influence investors' decision making in swiftlet ranching activities and (iii) to assess the level of efficiency of switflet houses and pinpoint the best operating practices of efficient ranchers in both Johor Bahru and Gua Musang.

For the first objective, a survey of 95 swiftlet ranchers from each of the two districts was undertaken to assess the factors that contribute to the competitiveness for both area. The Porter Diamond's model of competitiveness is applied using factor analysis. For the second objective, the same respondents were used to examine the factors

influencing investment decision making. The Investor Behaviour theory is adopted as the analytical model using PLS-SEM methods. For objective three, the theory of Frontier Efficiency and non-parametric Data Envelopment Analysis (DEA) method were used to measure the efficiency of swiftlet houses. For this third objective, a 150 swiftlet houses is surveyed each for Gua Musang and Johor Bahru.

For objective one, it was found that factor conditions is the most important component followed by demand conditions, firm strategy and structure and rivalry, related and supporting industry, role of government and finally chance for both areas. Knowledge and experience are most important factor to be competitive and to be successful in swiftlet ranching industry.

For objective two the result revealed that in Johor Bahru, heuristic construct has the highest impact to investment decision making followed by market and herding constructs for Johor Bahru. Meanwhile for Gua Musang, market construct has the highest impact to investment decision making followed by heuristic and herding. The prospect construct was revealed to be not significant for both districts. Potential investors have to consider various factors carefully before making investment decisions.

For objective three, the result highlights the existence of scale inefficiency among swiftlet houses in Johor Bahru and Gua Musang. The swiftlet houses are too small and did not benefit from economies of scale. This industry has to develop standard operating procedures regarding the right formula of swiftlet house practices to attract the swiftlet into entering and producing good quality nests. Reliable data sharing from efficient ranchers can be used to raise the efficiencies of Malaysian swiftlet houses.

The major limitation of this study is on the total number of respondents selected. Due to difficulties to obtain willing respondents, a total of 190 ranchers and 300 swiftlet houses were surveyed for both districts. The sample sizes could be expanded by incorporating other players such as value adding EBN processors and EBN exporters. In this manner, the study could also be further improved by expanding the investigations all along the value chain. By adopting this approach, more information could be gathered, analysed and the findings on efficient practices of value adding EBN processing and exporting disseminated.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia Sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

ANALISIS DAYA SAING, PELABURAN DAN KECEKAPAN PENGHASILAN SARANG BURUNG WALIT DI JOHOR BAHRU DAN GUA MUSANG, MALAYSIA

Oleh

FATIN FARAZH YA'ACOB

Julai 2019

Pengerusi : Profesor Mohd Shahwahid Haji Othman, PhD
Fakulti : Ekonomi dan Pengurusan

Industri burung walit disenaraikan di bawah 12 Projek Titik Permulaan (EPP) di bawah NKEA Pertanian yang merupakan salah satu teras Program Transformasi Ekonomi (ETP) kerana ia dapat menjana pendapatan bagi negara. Malaysia mensasarkan untuk menguasai sekurang-kurangnya 40 peratus daripada permintaan global menjelang tahun 2020. Malaysia kini hanya memenuhi 20 peratus eksport dunia. Peternakan burung walit di Malaysia terletak di kawasan bandar dan luar bandar, dengan majoriti berada di kawasan bandar.

Berdasarkan kajian sebelumnya, industri peternakan burung walit di Malaysia adalah kurang kompetitif berbanding Indonesia dan Thailand. Tambahan pula, peternakan burung walit di Malaysia tidak mempunyai rancangan strategik untuk meningkatkan daya saing nya dan terdapat kekurangan penyelidikan mengenai daya saing industri ini. Bilangan rumah burung meningkat dari tahun ke tahun di dalam negara. Industri ini menguntungkan, namun ia melibatkan risiko tinggi dan tidak mudah untuk diramal. Untuk meningkatkan keuntungan, peternak perlu meningkatkan kecekapan pengurusan rumah burung walit dengan pengoptimumkan penggunaan input-input untuk memaksimumkan pengeluaran EBN. Terdapat perbezaan struktur dalam pembangunan penternakan burung walit antara kawasan bandar dan luar bandar. Perbezaan ini menimbulkan persoalan sama ada pengeluaran EBN turut boleh terjejas. Kajian ini telah dijalankan di Johor Bahru dan Gua Musang yang melibatkan aktiviti penternakan burung walet di kawasan luar bandar dan bandar. Oleh itu, kajian ini mempunyai tiga matlamat: (i) untuk mengenal-pasti faktor-faktor yang menyumbang kepada daya saing penternakan burung walit, (ii) untuk menentukan faktor-faktor yang mempengaruhi pengambilan keputusan pelabur dalam aktiviti penternakan burung walit dan (iii) menilai tahap kecekapan rumah burung dan menentukan amalan operasi terbaik dan berkesan bagi penternakan burung walit di Johor Bahru dan Gua Musang.

Untuk tujuan pertama, satu tinjauan ke atas 95 penternak burung walet dari setiap daerah ini. Model daya saing Porter Diamond dipakai dan menggunakan analisis faktor untuk mengenal-pasti faktor daya saing yang signifikan. Untuk tujuan kedua, responden yang sama telah digunakan untuk menentukan faktor-faktor yang telah mempengaruhi pengambilan keputusan pelaburan penternak-penternak. Teori kelakuan pelabur menggunakan kaedah PLS-SEM dipakai untuk memenuhi objektif ini. Untuk objektif tiga, teori Kaedah Kecekapan Frontier dan Kaedah Analisis Envelopment Data (DEA) bukan parametrik digunakan untuk mengukur kecekapan rumah burung walet. Jumlah rumah burung walet adalah 300 (150 rumah burung walet di Gua Musang dan 150 rumah burung walet di Johor Bahru) untuk memenuhi matlamat ini.

Hasil kajian menunjukkan untuk objektif satu, konstruk faktor syarat adalah komponen paling penting di kedua-dua daerah. Ini diikuti oleh konstruk faktor permintaan, konstruk strategi, struktur dan persaingan firma, konstruk industri berkaitan dan sokongan, konstruk peranan kerajaan, dan konstruk peluang. Ilmu pengetahuan dan pengalaman adalah faktor paling penting untuk menjadi kompetitif dan berjaya dalam industry penternakan brung walit.

Untuk objektif kedua, hasil kajian menunjukkan yang di daerah Johor Bahru, konstruk heuristik mempunyai pengaruh tertinggi dalam membuat keputusan pelaburan diikuti dengan pasaran dan penggembalaan untuk Johor Bahru. Sementara itu untuk Gua Musang, konstruk pasaran mempunyai impak tertinggi dalam membuat keputusan pelaburan diikuti oleh konstruk heuristik dan 'herding'. Sebaliknya, konstruk prospek didedahkan tidak penting bagi kedua-dua daerah. Pelabur baru perlu mempertimbangkan dengan teliti pelbagai faktor sebelum membuat keputusan pelaburan.

Batasan utama kajian ini ialah jumlah responden yang dibanci. Sebanyak 190 peternak dan 300 rumah burung walit untuk kedua-dua daerah dipilih kerana kesukaran mendapatkan lebih banyak responden. Disyorkan hal ini boleh di atasi dengan meluaskan kajian untuk memasukkan pemain-pemain lain di dalam rantaian nilai industri EBN. Ini melibatkan pemproses sarang burung walit dan pengeksport EBN. Dengan cara ini, lebih banyak maklumat dapat dikumpulkan, dianalisis dan disebarkan amalan terbaik mengenai bagaimana meningkatkan kecekapan industri sarang burung walit di sepanjang nilaitambah dari pemprosesan hingga ke pengeksportan.

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First and foremost, I would like to thank and praise Allah Azzawajalla the Almighty and the Most Merciful for without His blessings and consent, this dissertation could not have been made possible. Thank you Allah for providing me with the opportunity to complete this journey even though tested withvarious obstacles.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

Mohd Shahwahid Haji Othman
Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Chairman)

Abdul Rahim Abdul Samad
Associate Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Member)

Zulkornain Yusop
Professor
Faculty of Economics and Management
Universiti Putra Malaysia
(Member)

_____
ROBIAH BINTI YUNUS, PhD
Professor and Dean
School of Graduate Studies
Universiti Putra Malaysia

Date:

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Name and Matric No.: Fatin Farazh Ya'acob (GS37277)

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Signature: _____
Name of Chairman of Supervisory Committee: Professor Mohd Shahwahid Haji Othman

Signature: _____
Name of Member of Supervisory Committee: Associate Professor Abdul Rahim Abdul Samad

Signature: _____
Name of Member of Supervisory Committee: Professor Zulkornain Yusop

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LIST OF ABBREVIATIONS

1GP	Garis Panduan Pembangunan Industri Burung Walit Bersepadu
AE	Allocative Efficiency
AVE	Average Variance Extracted
BCC	Banker, Charnes And Cooper
BTS	Barlett's Test Of Sphericity
CCR	Charnes, Cooper And Rhodes
CCTV	Closed Circuit Television
CE	Cost Efficiency
CEE	Central And Eastern European
CFA	Confirmatory Factor Analysis
CNCA	Certification And Accreditation Administration Of China
COLS	Corrected Ordinary Least Square
CR	Composite Reliability
CRS	Constant Returns To Scale
DEA	Data Envelopment Analysis
DFA	Distribution Free Approach
DMU	Decision Making Unit
DRS	Decreasing Returns To Scale
DVS	Department Of Veterinary Services
EBN	Edible-Birdnest
EFA	Exploratory Factor Analysis
EFA	Explanatory Factor Analysis
EPP	Entry Point Project
ETP	Economic Transformation Programme
FDH	Free Disposal Hull
IRS	Increasing Returns To Scale

KMO	Kaiser-Meyer-Olkin
LV	Latent Variables
MOA	Ministry Of Agriculture And Agro-Based Industry
MOH	Ministry Of Health
MP3	Media Player 3
MPI	Malmquist Productivity Index
MV	Manifest Variables
NKEA	National Key Economic Areas
NRIS	Non-Increasing Returns To Scale
OLS	Ordinary Least Squares
PLS-SEM	Partial Least Squares Structural Equation Modeling
PTE	Pure Technical Efficiency
RFID	Radio Frequency Identification
RM	Ringgit Malaysia
SE	Scale Efficiency
SFA	Stochastic Frontier Approach
SOP	Standard Operation Procedure
TE	Technical Efficiency
TFA	Thick Frontier Approach
TFP	Total Factor Productivity
USA	United States Of America
VHM	Veterinary Health Mark
VIF	Variance Inflation Factor
VRS	Variable Returns To Scale

CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter provides the background of the study, problem statement, research questions, research objectives and significance of this study, scope of the study, operational terms, organization of the study and conclusion of this chapter. At first, this study provides a general description of the edible-birdnest industry in Malaysia with regards to the market condition in EBN industry and swiftlet ranching. These will then lead to the problem statement, research questions and research objectives, significance of the study, scope of the study, operational terms, organisation of study and chapter summary.

1.2 Background of the Study

The business of swiftlet ranching is firmly anchored on its potential for lucrative returns. The growing demand is derived especially from the rising affluence of Mainland Chinese and the world-wide trend of pharmaceutical and herbal products companies in using edible birdnest (EBN) as base materials for producing natural and organic extracts and products (Merican, 2007). Realizing the prospects of swiftlet ranching, the Malaysian government in 2010 has designated it as a high-growth sub-sector in the agriculture National Key Economic Area (NKEA). This activity has been earmarked as an Entry Point Project (EPP) under the Economic Transformation Programme (ETP) announced in late 2010 with the aim to turn it into an agro-business to serve the export market and to create a viable form of livelihood. Although swiftlet ranching business or activities is a minor player compared to other establish business, it significant in their own way. They have contributed to exports and created a fair amount of employment. Around 50 percent of the global demand of EBN has not been meet (Abdullah *et al,* 2011). This become the opportunities for the swiftlet ranching activities to explore as according to Depertment of Veterinary Service (DVS), Malaysia only dominates 20 percent from world export and this industry aims to achieve at least 40 percent of world export by 2020.

With the above keep in mind, the swiftlet ranchers need to concentrate to be competitive in creating and sustaining superior performance. This is because Malaysia has a lot of opportunities to further grow in this industry as this country becomes the preferred sources of EBN (Koon, 2011). Besides the suitable surrounding environment that allows Malaysia to produce EBN, this country is the dominance country who get approval from Chinese government to export EBN to their country after China banned EBN import in their country. This is because Malaysian EBN can meet all EBN requirements from them. They must know the factors that can lead to competitiveness in this industry. To ensure this industry is sustainable in the long term, the level of competitiveness and the factors that lead to it are important to examine. This is because

the level of competition the factors that lead to it can be a paradigm shift for the ranchers and government to improve the country's effort to compete and earn a place among importers in order to become the leading country in the EBN global market.

The main attraction of people make decision to engaged in swiftlet ranching business are to maximize their income as the profit for this business is lucrative. Thus, in order for them to pursue their intention on this business, every investor has to make right decision making. Decisions should never be made only by relying on the personal resources and do not consider the situational factors. Situational factors are extended not only to the problem faced by the decision maker, but also to the environment. So, in order to make appropriate decision, one needs to analyze the variables of the problem by mediating them applying cognitive psychology.

Since main motives are to maximize profit, thus the swiftlet ranching need to be efficient to fully utilize the inputs to produce maximum output. One of the problems for the ranchers is no special standard operating procedure (SOP) on swiftlet ranching design. They build it based on experience of other ranchers (Ibrahim *et al*, 2009). Many ranchers use shoplots or terrace houses for swiftlet ranching while some build new buildings for swiftlet ranching to start their business. This will depend on the financial budget of the investor as long as the place chosen has similarities to the cave habitat such as being dark and humid in order to make the swiftlet feel like they are in their original habitat. When the efficient and inefficient swiftlet ranching can be segregate, then the efficient swiftlet ranching can be as a benchmark for the rest to follow.

Besides that, this industry has dearth of research that touch on economics and business area. Many studies have focused on the scientific research of EBN. Thus, this study would like to focus on the economics aspects so that ranchers can get some knowledge regarding the competitiveness, investment and efficiency of the swiftlet ranching.

1.3 Edible-Birdnest (EBN) Industry in Malaysia

The trade in edible-birdnest (EBN) has its beginning in China during the T'ang Dynasty (618-907BC) where it was served as a royal dish (Othman, 2012) and has been traded in Malaysia for the past 500 years between the Malay Archipelagos and Mainland China since 16th century (Sankaran, 2011). In year 2006, Malaysia is third largest producer of EBN with 9 percent of global supply after Indonesia (60 percent) and Thailand (20 percent) (Looi & Omar, 2016). Then in 2017, according to Dr Quaza Nizamuddin Hassan Nizam who is DVS director-general, Malaysia become the second largest producer which contribute 20 percent of global supply after Indonesia with total production of 25 tonnes of EBN per month (FMT News, June 2017).

Malaysia exports EBN worldwide with the main export market being Hong Kong which covers 50 percent of Malaysia export then followed by China (8%), Taiwan (4%) and Macau (3%). As there is continued demand from importers countries especially China, the production of EBN is expected to increase. The EBN is particularly prized

in Chinese culture due to their rarity and delicate taste. EBN is also among the most expensive animal product consumed by humans (Rabu *et al*, 2015). There are several reasons of high demand from global especially from China. This is because EBN is a very popular diet among the people. Besides that EBN consumption is also a measurement of an individual's status in society. On top of that, the raising awareness of healthy food, natural based cosmetics and increasing standard of living can be among other reasons for the rapid demand for EBN (Othman, 2012). People began to put emphasis on a balanced life and started giving priority to preserving health because of rampant new diseases and epidemics of unknown causes occurring worldwide. Therefore, people started to take precautionary steps by taking health supplements such as vitamins and this among other reasons. All these lead to the rising demand of the EBN. The Aerodramus Fuciphagus EBN in Malaysia is the best in terms of quality and this is one of the factors for its continuous high demand from the international market. The primary market of swiftlet EBN is for consumption of the Chinese people.

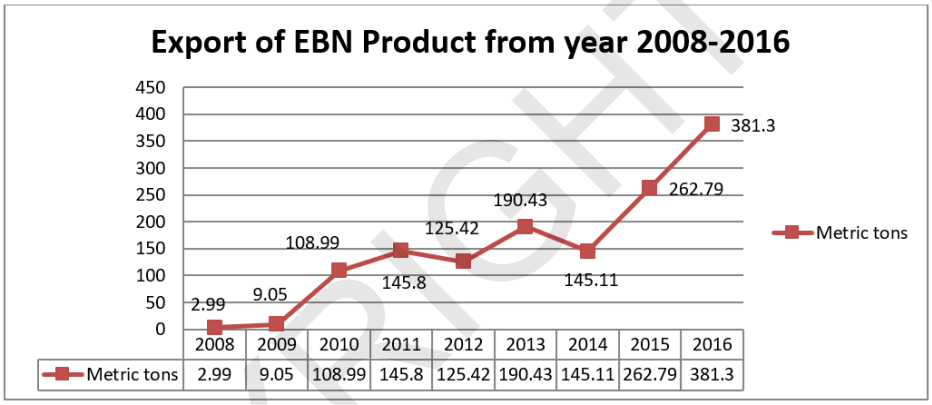

Figure 1.1: Export of EBN from Year 2008 – 2016

(Source: Department of Veterinary Services (DVS), 2015)

Figure 1.1 above shows the worldwide export of EBN including to China, Hong Kong, Taiwan, Singapore, Japan, Brunei, USA and other countries from year 2010 to 2016 where the figures increased year by year. In 2010, EBN exports recorded a total of 108.89 metric tons and increased by 33.77 percent to 145.8 metric tons in 2011. In the middle of 2011, an embargo from China caused a sharp decline in the Malaysian EBN export. This led to decrease in export by 13.98 percent from 145.8 metric tons (2011) to 125.42 metric tons (2012). In 2014, there wasa slight decline in export and only after the embargo was lifted that Malaysian export showed a positive trend which was 45.01 percent increase from year 2015 to 2016. In 2016, the total export was 381.3 metric tons with value of RM3.44 billion. From this trend, there is a real potential for Malaysia to achieve RM5.2 billion of export by year 2020.

Figure 1.2 below depicts the total export of EBN product to China from the year 2011 until 2016. There was a drastic decrease of export to that country starting from year 2011 to 2013 because of the embargo imposed by Chinese government. Then it's started to bounce back up slowly in 2014 until now after the embargo problem was solved.

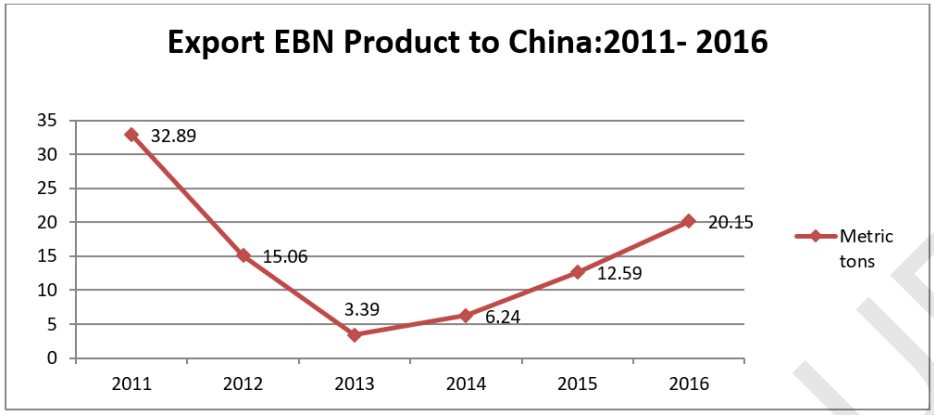

Figure 1.2: Export EBN Product to China from Year 2011 to 2016
(Source: Department of Veterinary Services (DVS), 2015)

The Malaysian EBN safety issues arose in 2011 when China authorities found excessive nitrite contained in Malaysian EBN which occurred when unscrupulous ranchers adulterated EBN to emulate highly prised Red EBN for ill-gained profit. Under the Malaysia Food Regulations 1985, the accepted level of nitrite in EBN in Malaysia is 30 parts per million (ppm), however based on the report, the contaminated EBN contained more than 100 ppm nitrite which at that level could adversely affect human health (Chien *et al,* 2015). This incident led to delayed exportation to China and caused a drastic drop in the price of EBN. The embargo created substantial loss to Malaysian EBN producers who rely heavily on trade with China which is an important world importer of EBN.

Due to this, the Malaysian government through its veterinary department (DVS) conducted an investigation to ensure that only safe and uncontaminated EBN was exported. Malaysia sent a delegation of officials and EBN exporters to China to discuss the issue with the Chinese government. After several rounds of negotiation, the Chinese government came up with several conditions that Malaysian ranchers need to comply with. Besides the 2011 case, in 2017, China imposed a temporary restriction on imports of EBN from Malaysia following the declaration of bird flu (H5N1) outbreak in Kelantan last March 2017. However, in June 2017, the ban was lifted as the viral infection had stopped.

After the banned was lifted, the number of swiftlet houses started increased year to year. The adapted ranching systems proved quite successful since the industry had grown faster in which 6,048 swiftlet houses were recorded in 2011 and these swiftlet houses have increased to 10,016 until year 2015 (DVS Report, 2015). Table 1.1 above reveals shows the number of swiftlet houses registered with Department of Veterinary Services (DVS) by state in Malaysia until year 2015. Johor has the highest number of swiftlet houses with 2381 swiftlet houses, followed by Perak (1622 swiftlet houses), Pahang (1012 swiftlet houses), Selangor (921 swiftlet houses) and other states.

Table 1.1: Swiftlet Ranches Registered Under the DVS in 2015.

State	Number	Percentage
Johor	2381	23.8%
Kedah	452	4.5%
Kelantan	384	3.8%
Melaka	113	1.1%
Negeri Sembilan	579	5.8%
Pahang	1012	10.1%
Perak	1622	16.2%
Perlis	86	0.9%
Pulau Pinang	349	3.5%
Sabah	584	5.8%
Sarawak	790	7.9%
Selangor	921	9.2%
Terengganu	693	6.9%
Labuan	50	0.5%
Total	10,016	100.0%

(Source: Department of Veterinary Services (DVS), 2015)

1.4 Swiftlet Ranching

Swiftlet ranching is fast becoming a sought after investment in the South East Asia region as investors can gain profits of up to millions of dollars within a few years as long as the swiftlet house is built and maintained in the right way. Swiftlet ranching can be defined as a business involving the conversion of people-centric buildings into buildings used to house and protect a certain species of swiftlet (Merican, 2007). Swiftlet ranching originated from Indonesia where the local ranchers take great effort in modifying buildings into cave-like conditions in order to attract swiftlets into the buildings to nest. To entice the swiftlet to enter the house and nest, swiftlet sound system was installed. The design and location of the swiftlet house also needs to be emphasized on because with proper care, the swiftlet house can produce good quality nests that will bringa good return of investment.

Indonesia was the first country that used this method because they know that studies on swiftlet habitat have shown that swiftlet is hard to be found in a public space. In order to attract the swiftlet to stay in one place, they began converting old buildings to be made into new habitats for the swiftlet. Doing so also helps ranchers to monitor the movement and development of the swiftlet. The swiftlet ranching activities started to boost in Malaysia after the Asian Economic Crisis in 1997 to 1998, when it caused many business had experience hard times and a great number of them closed down the business. Rather than leaving their properties idle, some of property owners decided to convert their shoplots into swiftlet houses. During that time, Malaysia adopted mainly technology and the idea of swiftlet ranching activities from Indonesia. From that, investors in Malaysia started to realize the financial viability, the availability of swiftlet population in Malaysia and the demand for EBN in the world market is very high with limited supply, then Malaysian swiftlet industry began to rise (Merican, 2007).

Even though Malaysia has availability of swiftlet population as Indonesia, unfortunately Malaysia quite tough to compete with Indonesian's swiftlet ranching development due to higher cost to build swiftlet houses. Malaysia is five times higher compared to Indonesia due to higher fixedand variable cost in Malaysia such as construction cost, labor cost and others (Umi Kalsum *et al,* 2013). Even, Malaysia also is less competitive compared to emerging market which is Thailand. However, Malaysia has better level of productivity compared to both competitors' countries.

As mentioned before, there is no standard of operation (SOP) on swiftlet ranching design, but generally, there are 5 important aspects that must be considered in constructing the every swiftlet houses namely location and path of swiftlet, size and structure, artificial voice, temperature and humidity, entrance door, threats and the enemies' location and swiftlet route (Wan Khairy *et al*, 2015). With increasing number of swiftlet house every year, it could be helpful for all rancher throughout the country if Malaysian government can come out with SOP of swiftlet houses design which can increase production of EBN.

However, there is specific guideline was produced by Ministry of Agriculture and Agro-Based Industry (MOA) for EBN industry, namely the "Garis Panduan Pembangunan Industri Burung Walit Bersepadu" (1GP). This guideline only provides and explains the criteria to be followed in respect of care for swiftlet house, processing premises and animal welfare. It encompasses the existing government legislative affairs for the licensing and registration of harvesting and processing premises. In addition, the standard describes 1GP record systems, packaging, labeling, transport, import and export, disease control, specifications, grading, and facilities. Ranchers must also abide by waste disposal procedures and regulations as prescribed by the Ministry of Natural Resources and Environment (MNRE). The guidelines also contain recommendations to help agencies or authorities and private parties, namely the owner of the swiftlet ranches to work together for a proper plan to develop the EBN industry. These guidelines will apply throughout the country for all types of swiftlet ranching.

As we can see in Table 1.1 in section 1.2, Johor is the highest swiftlet houses in Malaysia and Johor Bahru among the highest in the state of Johor. Most swiftlet houses in Johor Bahru are shoplots were ranchers renovate the existing shoplots to emulate the swiftlets natural habitat. This quite impressive because Johor can be category as an urban area and have rapid development in swiftlet houses compared to East Coast Malaysia. This situation is not surprisingly because according to Misliah & Rafaee (2001), 88.57 percent of swiftlet houses were recorded in the urban areas while 11.52 percent were recorded in the rural area. The same pattern was observed by Othman *et al*, (2008) where 71.63 percent of swiftlet houses were in urban areas and 28.37 percent were in rural areas.

However, in the east coast of Malaysia such as Kelantan, even though the development of swiftlet houses is not rapid as Johor, but they can produce agood quality of EBN especially in Gua Musang because of the preserved natural surroundings and the most appropriate climate (Utusan Malaysia, 2014). Most of swiftlet houses in Gua Musang are landed houses and the ranchers build it on their idle land. Furthermore, Gua

Musang is the location which has the majority of Malay compared to the Chinese who are the pioneers of this industry. In 2010, the population of Kelantan was 1.54 million where 82.8% or 1.275 million people are Malays (Department of Statistics Malaysia, 2010).

1.5 Problem Statement

Swiftlet ranching industry is growing at phenomenal rates in Malaysia. According to DVS, a total of 10016 of swiftlet house recorded in 2015 which increase up to 65.61 percent from year 2011 to 2015. Swiftlet ranching continues to grow strongly because it can gain high profit with low operating cost (Vaiappuri *et al*, 2012). With the support of the government by being used as one of National Key Economic Areas Program (NKEA) Agriculture under the Ministry of Agriculture (MOA), swiftlet ranching is predicted to grow further in the future and it is estimated to achieve at least 40 percent of world export by year 2020. However, in 2015 Malaysia has only met 20 percent of world export (Department of Veterinary Services). In addition, according to Umi Kalsum *et al*, (2013), the difference in production costs has made Malaysian swiftlet ranching industry less competitive compared to Indonesia and Thailand. These problems need critical analysis to find out factors that can contribute to competitiveness of swiftlet ranching industry and how it can be improved to achieve the goal set by the government for this industry.

In order to improve this condition, people need to bear in mind that swiftlet ranching in Malaysia were located in both urban and rural area. The unique of this swiftlet ranching is most of the swiftlet houses were located in urban area (Misliah & Rafaee, 2001) even though it is well known that swiftlet only nest in the environment that similar with their habitat. However, the recent data indicates that the number of swiftlet houses in the urban areas had started to decrease but are gradually increasing in the rural area (Othman *et al*, 2008). This may be due to three main reasons which are swiftlet population is also abundant in the rural areas, the lack of suitable places in the urban areas for swiftlet rearing and agriculture areas support more food sources for swiftlet especially insects (Lourie & Tompkins, 2000). Even though the numbers of swiftlet houses in rural area are increasing and have more room for expansion but, people should not take light on the situation of swiftlet ranching in urban areas and it should be improved.

With this situation mentioned above, analysing the competitiveness of the swiftlet ranching in these both areas becomes a need to understanding the underlying structure, conduct and performance of these both areas. Yet, there is a dearth of research on the competitiveness for swiftlet ranching as many studies focus more on scientific research of EBN. The same can be said for the lack of strategic plans to enhance competitiveness of the swiftlet ranching.

Another important issue that needs to be focused on is swiftlet ranching incurred high capital to enter it. However, there still high number of swiftlet houses increase from year to year. Even though this industry is a lucrative business, but it is still involved a

high risk. One of the main reasons is the high cost of building swiftlet houses which however does not guarantee profit for the investors if their swiftlet ranching are not successfull (Nurshuhada *et al*, 2015). Given this quandary this leads to the question of what behavioural factors are influencing investors to continue investing in the swiftlet ranching. This industry is sometimes unpredictable. The future prospects of this industry remain uncertain due to poor regulation, depleting wildlife population and limited research in improving productivity (ETP Annual Report, 2012). Unexpected things such as the death of swiftlet and changes in habitat conversion canals play an important role in determining the gain or loss in the swiftlet ranching. Although this industry is much controlled by the Chinese community but Malays community is not left behind to participate and grab business opportunities in this high impact industry. Thus, it is interested to know the reasons behind a great participation of ranchers into this swiftlet ranching. Therefore, a study providing a comprehensive understanding of the investors' behaviour in this industry and how these factors influence their investment decision greatly needed. It will be useful for investor to understand common behaviours from which justify their reactions for better returns.

There is a difference in development of swiftlet ranching between Johor Bahru and Gua Musang area in term of their structure of swiftlet houses. In Gua Musang area, most of the ranchers need to build a new swiftlet houses as they have their own idle agriculture land meanwhile in Johor Bahru area, the ranchers instantly convert the shoplots into swiftlet houses. This was due to many small to medium size of business closed down their business due to hard time happen in Asian Economic Crisis in 1997 (Merican, 2007; Ibrahim *et al,* 2009). This begs a question whether the differences in structure of swiftlet ranching can affect the production of EBN.

Hence, theoretical and empirical research evidence in Malaysia remains dearth in term of economics area. Most of the studies undertaken have stressed on scientific research that examined the content in EBN (Norhayati *et al*, 2010; Zainab *et al,* 2013; Azizon *et al,* 2012; Noriah & Ramli 2012), Meei *et al,* 2015), nitrate and color analysis of Malaysian EBN (Meei *et al,* 2015), habitat of swiftlet (Ibrahim *et al,* 2009; Ibrahim *et al,* 2011; Syed *et al,* 2012; Azahar *et al,* 2013; Nurshuhada *et al,* 2015), and the importance of management of swiftlets house or husbandry science in influencing business sustainability of EBN in Malaysia (Rafi *et al,* 2015). Thus, there is also a need to examine critical factors that influence competitiveness in swiftlet ranching, actors that influence investors' decision making in swiftlet ranching and salient features or characteristics of efficient swiftlet house that can serve as the benchmark since Malaysia does not have specific SOP regarding the management of swiftlet houses.

1.6 Research Questions

With the problem statement given above, the research questions for this study are:

1) What are the critical factors that influence competitiveness in the EBN industry in Johor Bahru and Gua Musang?
2) What are the factors that influence investors' decision making in swiftlet ranching business in Johor Bahru and Gua Musang?

3) What are the best practice of efficient swiftlet house that can serve as the benchmark to inefficient swiftlet house in Johor Bahru and Gua Musang?

1.7 Research Objectives

Swiftlet industry is a new industry in Malaysia thus there is a lack of knowledge and research regarding the swiftlet EBN economic performance. Analysing the competitiveness of the swiftlet ranching becomes an essential to understanding the underlying structure, conduct and performance of ranching activities. With better understanding of the swiftlet ranching, the profiles of firms with higher economic performance could be ascertained to serve as guidance for other less successful firms already in operation. It is also necessary to investigate the way EBN ranchers allocate their management input in order to raise their output of EBN production.

Given that involvement in the ranching activities requires high investments from the ranchers and much promotion and support have been given by the government, it is also necessary that further investigation on the determinants influencing investment interests in the swiftlet ranching be undertaken to help potential investors gain more knowledge before embarking into the industry. With these feedbacks the government could set up appropriate policies, regulations and guidelines to serve the industry better. The specific objectives of this research could be broken down to the following:

1) To analyse the critical factors that influence competitiveness of the EBN industry in Johor Bahru and Gua Musang.
2) To determine the behaviouralfactors that influence investors decision making in swiftlet ranching business Johor Bahru and Gua Musang.
3) To assess the level of efficiency of switflet houses and pinpoint the best operating practise by efficient from the rest that focus in Johor Bahru and Gua Musang.

1.8 Significant of the Study

The EBN industry is an industry that can generate revenue for the Malaysian economy. Thus there is a need to sustain this industry for the sake of players in this industry and the relevant government agencies as well. One important contribution of this study lies in the establishments of how individual players in the swiftlet ranching work at gaining competitiveness through sourcing direct information from the ranchers. This is against hearsay information from general inferences made by certain government agencies. This study is significant for several reasons explained below.

First, swiftlet industry or EBN industry is still in its infancy stage in Malaysia and research area especially economic is still under developed. By study the factors that contribute to the competitiveness level for swiftlet ranching that capture both rural and urban area, the existing swiftlet ranchers throughout the country can appreciating the role of various factors influencing the viability of the industry and to identify reforms

required to stay competitive in the market. Not many studies assess the competitive level for swiftlet ranching in Malaysia. This is relatively a new study that addresses the factors influencing the competitiveness in these ranching activities which can be applied in all areas in Malaysia. Thus, this study contributes to new knowledge for EBN industry especially swiftlet ranching. Furthermore, this study is useful in testing the applicability of the Diamond model on an industry of a developing economy such as the Malaysia since past studies have been conducted on advanced nations.

Second, EBN industry is a lucrative industry that involved high capital intensive. People who have money are interested to join this business as it will give them a lucrative profit without knowing the effect if they do the wrong decision making. By knowing all relevant factors that contribute existing investors to invest in swiftlet ranching can provide the analytical information needed in making decisions when investing in this business to the potential investors that interested in ranching activity. Furthermore, this objective was using investor behavioural theory that usually researchers used in stock market. Thus, it shows that this theory is applicable to well explain the investor behavioural in swiftlet ranching. This theory also considered in the perspective that investors not only affected by capital and knowledge in making decision, but information structure and the characteristic of market participants systematically influences investors decision making.

Third, the previous studies are interested in scientific study about the suitable habitat environment of swiftlet, level of knowledge of ranchers rather than how to manage input efficiently to maximize output. To fill these gaps, this study provides knowledge for the rancher to manage efficiently their input in order to maximize the production of EBN. The findings of this study can be useful to the existing ranchers who are facing difficulties in attracting swiftlet into their swiftlet houses to be more efficient by comparing their performances with the more successful swiftlet houses as benchmarks. As this study capture both rural and urban areas that have difference environment as well as difference structure of swiftlet house, thus it can be as a guideline to every state in Malaysia. Furthermore, the government can select these efficient ranchers identified by this study and investigate their standard operating procedures (SOP). These SOPs can be used as guidance in terms of efficient operating procedures to be adopted and for skills development courses and training to raise the level of efficiency of other ranchers in the country.

1.9 Scope of the Study

The scope of the study is to know the factors that contribute to competitiveness in swiftlet industry, to identify the factors that influence investors to invest in swiftlet industry and to identify the efficient swiftlet houses to be as benchmark for inefficient swiftlet houses. Basically this study has three separated objective as well as methods and theories. For objective 1, this study wants to understand the structure and performance in swiftlet industry. This study seeks to examine the factors that contribute to the competitiveness level of EBN industry. To examine the competitiveness, Porter Diamond model was applied. This model has 6 factors namely factor condition, demand condition, firm strategy, structure and rivalry, related and supporting industry,

role of government and chances. For objective 2, the study seeks to identify factors that influence investors to invest in this industry even though they alert that this industry is unpredictable and the number of inefficient swiftlet house increase simultaneously with the increasing number of swiftlet house year by year. For cater this objective, the investor behavioural theory was applied which have 4 factors namely heuristic, prospect, market and herding. For objective 3, the levels of management efficiency of swiftlet ranching are measured using the data envelopment analysis (DEA) method by applying the production approach in the analysis. The output for this objective is yield of swiftlet house which is raw EBN (in kilogramme). This study use DEA to optimize the performance measure of each DMU to understand about each DMU. In other words, the focus of DEA is on individual observation and it calculates a maximum performance measure for each DMU relative to all others units in the observed population. The purpose is to discriminate efficient swiftlet houses from inefficient ones and pinpoint best operating practices of swiftlet house. After run DEA, the data is then put through the parametric (t-test) and non-parametric Mann-Whitney and Kruskal-Wallis tests in order to compare which of the two areas is better in management of swiftlet ranches.

These separate studies are undertaken to tackle these three concerns be facing the swiftlet industry namely:

i. To meet the high production and exporting targets set by NKRA, there is an urgent need to identify factors to spur the growth and competitiveness of swiftlet ranching

ii. The rising investments in swiftlet ranching although welcome, have to be understood and monitored by potential investors and the Department of Veterinary Services (DVS), the agency licensing and managing the swiftlet industry. This is necessary to ensure a healthy and sustainable development of the industry. Potential investors have to be provided with a clear understanding of what factors are influencing existing investors. In this way decisions to be made by potential investors are guided with appropriate knowledge.

iii. Since swiftlet ranching has several premises facing inadequate swiftlet visits and dismal productions, there is a need to understand the operations of efficient swiftlet ranchers as guidance to be followed by other existing ranchers to imitate and make necessary production improvements. By disseminating the operating procedures of efficient ranchers, the overall efficiency of the swiftlet industry could rise.

All the survey in this research has been done in Johor Bahru, Johor and Gua Musang, Kelantan. All samples from these two state were surveyed at the May 2016 until September 2016 in order to obtain information and data needed for the research. The distributions of the samples surveyed are 50 percent each from Johor Bahru and Gua Musang.

These two states were chosen after the researcher ran the pilot test at several states which are Penang, Melaka, Selangor, Kelantan, Terengganu, Perlis, Negeri Sembilan and Johor for a research funded by the grant provided by the National Centre of Excellence (COE) for swiftlet industry under DVS. Johor state has been chosen since it has the highest number of swiftlet ranching in Malaysia, base on statistics given in Table 1.2. Based on the interview during the pilot study, many ranchers also suggest Johor Bahru as a good place to do research since it has demographic features contributing to a successful swiftlet ranching to produce EBN in an urban area setting. The swiftlet ranching environment is quiet different from the original habitat of swiftlets which only could survive at areas of forests or farms that have ample food sources. Other than that the pilot survey interview of ranchers also suggest Gua Musang as a good comparison for Johor Bahru since they can produce good quality EBN from swiftlet ranchers with a socio and enviroment demographics quite different with Johor Bahru since they operate in rural areas. With these different areas, this study can observe the management practices and the structure of swiftlet ranching for each district as people know that swiftlet ranching in Malaysia located in both rural and urban area.

The sample size for objectives 1 and 2 covers 190 ranchers (95 ranchers in Johor Bahru and 95 ranchers in Gua Musang). For objective 3, the sampling size is 300 swiftlet houses (150 swiftlet houses in Johor Bahru and 150 swiftlet houses in Gua Musang). All data was obtained from interviews done via questionnaires.

1.10 Operational Terms

For the purpose of establishing an equal understanding of this research and to reconcile any differences in definitions, the keyterms used for this study are defined as operational definition. Table 1.2 presents operational definitions used in this study.

Table 1.2: Operational Definition of this Study

Variables	Operational Definition
Competitiveness	The ability to provide products as or more effectively and efficiently than the relevant competitors.
Ranchers	The owner of swiftlet house
Production of raw EBN	Yield in kilogram (kg) for raw birdnest produce by each of swiftlet houses.
Raw EBN	Bird nest produce from swiftlet saliva without go through any cleaning process.
Technical efficiency	The ability of the decision making unit (DMU) to maximise outputs from a given set of inputs and is associated with managerial decisions. The technical efficiency scores can be decomposed into pure technical and scale efficiency to determine the main source of the technical efficiency.
Pure technical efficiency	Efficiency evaluated by Bankers, Charnes and Cooper (BCC) model and it represents success of a unit at converting inputs to outputs.
Scale efficiency	Success of a branch at operating in optimum scale. Scale efficient branch works at the most productive scale size.

1.11 Organisation of the Thesis

Chapter 1: Introduces the context of the research covering issues such as the background of the study, rationale for the research, research questions and objectives in order to give an overview of this research. To explain further insight of this research, the remaining sections are as follows:

Chapter 2: Presents an exhaustive review of the literature. It illustrates a range of variables that should be considered when evaluating the competitiveness, investment decision making, and production of EBN industry. From the review of the literature, an immediate hypotheses development is established.

Chapter 3: An immediate discipline that is theoretical framework in this chapter describes the proposed relationships among the study variables in this study. The research method describes the research process including the purpose of the study, unit of analysis, sampling design, quantitative data collection procedures and data analysis.
Chapter 4: Presents the results of the data analysis of the study. This chapter includes a presentation of sample representatives, common bias check, descriptive statistics and regression analysis of the study.

Chapter 5: Concludes the study by discussing the major findings based on the respective research questions, limitations and implications of the study. The chapter ends with some suggestions for future research in the area.

1.12 Summary

This chapter generally describe about the swiftlet industry as a whole in Malaysia for better understanding on how the three objectives of this study arise. However, the main highlight for chapter one are summarised in Table 1.3 below:

Table 1.3: Summary of Chapter One

Objective of this study	Contribution of this study
i. To analyse the critical factors that influence competitiveness of the EBN industry in Johor Bahru and Gua Musang.	The findings of this study hopefully could identify the factors that can influence the competitiveness level of EBN industry. This analysis is crucial to stay competitive in the market. By understanding of competitiveness may bring enormous opportunities and unnecessary risk.
ii. To determine the behavioural factors that influence investors decision making in swiftlet ranching business Johor Bahru and Gua Musang.	The information structure and the characteristic of market participants systematically may also influence the investor decision making. Due to this reason, the investigation on the behavioural factors is vital since none of the research have studied this point of view. Thus, this study could improve understanding of this issue.
iii. To assess the level of efficiency of switflet houses and undertake a gap analysis among the most efficient from the rest that focus in Johor Bahru and Gua Musang.	This study will contribute new findings on the management knowledge on building structure that can increase production of EBN. The identification of efficient ranchings can be the benchmark for the inefficient

	ranching that could contribute to higher production of EBN. Besides that, the government can select these efficient ranching and investigate their standard of operation (SOP) as a guidance to raise level of efficiency of other ranching in this country.

These three objectives capture different perspective as well as using different methods and theories. The study of areas which is Johor Bahru and Gua Musang is choosen based on the preliminary study done at the beginning of this research. Chapter 2 will explained all theories and variables considered in this study.

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