

# The Importance of Technical Knowledge in Sustainability of Malay Bird's Nest Industry in Malaysia

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## ABSTRACT

This paper discusses the importance of the knowledge in managing swiftlets' houses as well as the science husbandry behind the sustainability of birds' nests in Malaysia. The discussion of this paper was written based on the findings of fieldworks that were conducted in 2004 at Kelantan. Interviews with five successful entrepreneurs of the bird's nest industry have revealed proper techniques in managing the swiftlets' houses. These skills were explored either directly or indirectly through the entrepreneurs' involvement in the industry. This study also sought to examine the effectiveness of these skills in determining the productivity of birds' nests. All informants stated that their knowledge in these skills played an important role in determining the sustainability of their business.

**KEYWORDS:** Technical Knowledge, Sustainability, Swiftlets, Edible Bird's Nest (EBN).

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## INTRODUCTION

The edible birds' nests (EBN) industry in Malaysia has been growing rapidly since 2008. According to [1], there were 41 registered Swiftlets Association in 2010 across the country. Gross output value contributed by the members is worth of RM 3,007 million a month, and the value of fixed assets owned at the end of the year was deemed to be worth of RM 14,216 million.

Malaysia is the second highest exporter after Indonesia with a contribution of 20% in the total market for EBN. Average worldwide demand for EBN was estimated to be 12,000 metric ton a year, but total production from countries in Southeast Asia comes up to about 500 metric ton only [2]. Although the industry is much controlled by the Chinese community, the Malays are equally as active in participation as the commercial opportunities in this high impact industry are well-rewarded. There are sizeable number of Malay EBN entrepreneurs in almost all states of Malaysia such as Selangor, Kelantan, Terengganu, Johor, Perak, Perlis, Kedah and Pahang [3].

As new entrepreneurs in the industry, Malays confronted a plethora of challenges in obtaining accurate information in various aspects of the industry as much of the information is confidential. There are not many books and articles have been written about this industry. If available, they only provided shallow information about the industry. Probably, confidentiality has been a critical point behind the success of this industry where it causes the EBN market to be so lucrative. Among the most important aspects of the sustainability in the EBN industry which includes on how to make swiftlet population remain their occupation at the SBH (Swiftlets Bird House). One way to do this is to build a permanent habitat at the SBH that mimics the natural habitat of the swiftlets' caves. Previous studies by [4, 5, 6] on the procedures of luring swiftlets into SBHs and managing SBHs showed that swiftlets are sensitive enough to the smell of smoke, sulphur, plastic, cigarettes, paint and insecticide [7, 8]. Their legs are also very weak and cannot be used for jumping or running [9]. This means that swiftlets are unable to perch on power lines, tree branches and they are also never able to stand on the ground [10].

As novices to this industry, Malays need to gain some knowledge and then master and know all major aspects of the EBN market, including its technical knowledge. Therefore, the interest of this study was to observe the mastery of the management and knowledge of SBH among the Malays. Results from interviews with five successful entrepreneurs have discovered important information that should help the advancement of the Malays in this field. One the significant aspect was the ability to master the special knowledge related to the swiftlets' habitat.

## FIELDWORK

Observations and interviews which were conducted on five Malay entrepreneurs have led to a conclusion that managing the knowledge of SBH is the key to their success. The interviews were conduct from mid-2014 to the end of the year and the interviews were recorded using an MP3 recorder and analysed as the main

reference for this study. Informants were labelled anonymously as IF1, IF2, IF3, IF4 and IF5. Entrepreneurs who were selected are successful and experienced, and who have been in the industry for more than 4 years. The results of the interviews were analysed using ATLAS.ti 7 software to develop main themes of the study.

**MANAGEMENT KNOWLEDGE OF SBH**

This knowledge includes awareness regarding the threats and enemies of swiftlets as well as information relating to their habitats and technical aspects of the industry. All informants agreed that SBH knowledge management is very important, and it has to be learnt either through formal or informal methods. Technical knowledge here refers to the macro (knowledge regarding the structure of SBH) and micro (building residences that are in accordance with the swiftlets’ habitats) aspects of SBH. Based on the interviews, SBH management have five important aspects namely;

- 1) The location and path of birds
- 2) Size and structure
- 3) Artificial voice
- 4) Temperature and humidity
- 5) Entrance door
- 6) Threats and the enemies location and birds route

From the informants’ feedbacks, the researchers have discovered interesting findings related to the science of choosing the locations and routes of swiftlets. Table 1 is a summary of the passage of information obtained from the fieldwork.

Table 1: Response location and birds route

Informants	Feedback
IF1	We must know the birds’ flying paths, bird routes are a main thing because they determine whether the bird was about to enter or not to our swiftlet house.
IF2	If we want to construct a SBH we need to see the birds return, and place the focus of birds as well as the location of a food source for birds.
IF3	First: location, and after location is the weather factor... where we have to look... That area was a main place that swiftlets go to look for food. It depends on the suitability of the place. If we have a pretty location, indeed it will be risky.
IF4	In Kelantan, there are many birds and the place is clean, with cute supplies, food and more... perfect for the birds. Sometimes the place is saturated with birds. Now, we already know that Kuala Krai is saturated. I've also heard that it is saturated in Muar. A lot of faithful employees have started to leave these places. We do not know when these places became saturated with birds, when others do at the same place whether things (matters) are the same, whether these places have the same concept, whether the birds got in... these saturated places do not earn much. The location is quite important, quite important, quite important, and we Malays have an advantage in terms of location.
IF5	The most major thing is the place... During a course that I took, I remember the teacher writing on a piece of paper, telling us that when we want to build a bird house, we must choose the location that is filled with swiftlets, with birdlife, and not just to pick a land that we have. After the course, I tried birdcalling in Aring 4, and I saw a great potential in that area.

Feedback from IF1 showed that locations and routes of birds are very important in determining the success of the SBH business. He explained that the bird routes and the location of the entrance hole would affect the population of the birds. The main entrance hole is very important because it is the first thing that attracts birds into the birdhouse. A similar response was obtained from IF2, where he mentioned that the route of birds is very important because birds are always looking for food. The best location would be a place with an abundance of food sources. In addition, IF2 also mentioned the importance of building an inlet in the direction of the birdhouse. According to his observations, if there was a “back door” it would be more accessible for the swiftlets, because they do not need to turn back to get into the hole that is in the opposite direction when they enter their nest in the evening. This information was obtained through observations and research carried out by his long involvement in the field of swiftlets. This was in line with recommendations by the [5, 6, 10, 11] which argues location is key in the success of EBN industry.

IF3 also agreed that location plays a big role in the success of the SBH industry. He stated that location plays a main factor because the location has a strong relationship with the weather. The weather factor is a fundamental aspect to a sustainable living for the swiftlets. Interviews with IF4 showed some new information when he stated that there were more birds in Kelantan (a state in East Malaysia) because this area was cleaner and has many natural food sources. IF4 made a comparison between several SBHs because he owns several SBHs in other states such as Selangor and Perak. Even so, he also became aware of the saturation phenomenon occurring in the EBN industry. Areas become saturated when too many of SBHs are closely built. This occurs because there is an increase in SBHs disproportionate than the increase in bird populations. Based on his

observations, several areas in Malaysia have saturated bird populations, such as Kuala Krai (Kelantan), Muar (Johor), and Taiping (Perak).

IF4 believed that if new SBHs were built in an area that has already been saturated with birds. That made it more difficult to get the attention of the swiftlets because most birds already have their own birdhouse. This information is very useful as a guideline to new entrepreneurs to help them choose the right area. He also agreed that the most important elements in the bird nest industry are location. He emphasized this when he repeated “location, location and location”. As far as location is concerned Malays entrepreneurs have an advantage because most of them live in rural areas. IF5 shared this knowledge that when he was trying to build swiftlet houses previously he subscribed to the words of reminder that were obtained through his teacher during a swiftlets bird course that he took not long ago. He still remembers that the teacher told him that “when we want to build a bird house, we must choose the (right) location that is filled with swiftlets, with birdlife, and not just to pick a land that we have”. IF5 said that he did his own experiment in Gua Musang amongst many places to try and find a suitable location to build SBHs there.

All informants agreed they had to carefully examine potential locations through a technique, called “birdcall”. The purpose of this test is to fathom at the bird population, then to make decisions either suitable or not to erect SBH. IF4 believed that it is important to choose a location that is not yet saturated. He believed that if the region in the interior is clean and has more food, it would attract the birds to nest there. In summary, the most appropriate place to build SBHs in Malaysia is the inland. Thus, this provides justification that location plays a major role in the success of SBHs. The location that has enough food sources facilitates efforts to attract birds to nest. All informants have ascertained that the main factor to succeed is making SBH as like the caves, as the original as they can be in terms of bird habitats.

### SIZE AND STRUCTURE

Another important knowledge that contributes to the success of the industry is the right structure of the building of SBH. All informants gave good responses about the positions and structures of the buildings. This knowledge was classified as the macro and micro aspects of the technical knowledge.

Table 2: Structure and building size

Informants	Building Size ( Feet)
IF1	20x40x1 (built on own residence)
IF2	30x80x3 4 level 20x15 inlet (roving room)
IF3	16x40x2,, 60 x20x1 (on business primes) 40x20x1 (on business primes) Parallel architecture-building affected by the rising sun and exposing the surface length of the building to sunlight, this can lead to heated buildings.
IF4	Existing 20x80, 20x70 and 20x50 two unit. Actually, 6 unit but became 4 after hacked the wall.
IF5	- Most ideally should be 20x60 it does not seem to be too large nor too small 20x50 see if it fits but it should be a little small, S: Why we do we build 20x60 size? A: The reason when we do 20x60? We can see the back more or less within 20 feet of birds. We have 2-3 pieces of bird's nest because the birds do not sleep there. -The most suitable one seems to be 20x60 - We saw it, we knew though. All kinds of badminton hall empty, and we already know this birds prefer to nest and breed in dark. And why bright? Why we do not cover all the holes?

The feedback obtained led to the search of the appropriate size to build SBH. According to [6], the ideal SBH size is 20x40 and 30 feet tall. Each level within should be around 10 feet. However, according to the fieldwork, the researchers found the ideal SBH agreed size is 20x60x30 feet. This is based on observations made by IF5. He also added that birdhouses built in sizes 20x50 was a bit small for bird nesting. Small SBH prevent swiftlet birds to fly freely and this condition is not conducive enough for them.

IF2 believed that larger buildings will make the birds more comfortable, likely would make them want to stay. Therefore, he believes the size of 30x80 is the ideal size for the swiftlets. They will be able to move freely and it is the nature behaviour of swiftlets. He built a building with a height of 40 feet. Moreover, at the top of the swiftlets' house, he built a space known as the roving room. A roving room is a structure that allows birds swing before flying into the swiftlet house.

IF4 was aware of the importance of appropriate size for SBH when modified the size of the SBH. He hacked the concrete wall structure of the original building. At first, he had six SBHs but when two adjacent buildings were hacked, it turned the SBH into four units only. The reason he did this because he wanted to give more space to them, and enabled the swiftlets to be more comfortable. IF5 admitted that the Lumut Perak SBH was built like a badminton hall and it was too bright. The original habitat of the swiftlets as in cave, they prefer dark environment. This showed that IF5 was aware of the need to build nests and SBH according to

specifications of the original habitat of swiftlets' caves. This is the main reason why both entrepreneurs are more successful than other SBH entrepreneurs.

### ARTIFICE SOUND

Table 3: Importance of artifice sound

Informants	Feedback
IF1	At the SBH we use artificial voice...they create their own and buy from friends.
IF2	We do not use the sound of little swiftlets crying, because these sounds are just for bird calls only. And after that, the parent birds will flee. There were only two types of bird sounds; the first is the external sound and the second is the internal sound. There are other various names for these, but essentially there are two sounds only.
IF3	The knowledge about the sound system, settings and all. - In other words, it is all about knowledge about the swiftlets and it is very important.
IF4	The sound of birds will start just after dawn until last screen Gharib. If you open the bird houses all the night, it will attract owls to the birdhouses.
IF5	- He did not know any bird sounds, and kept calling for 24 hours. The only problem was the timer, it was distributed by a person next door and he did not know how to handle it and this is normal and always like this. - It will be such a problem to society. The right way to call and we already know the issues. We call in the morning from 8 am until 1 am, after that we rest. And we start again at 4 am until 8 am. - After 8 am only internal sound in SBH played. He did not know anything and how to handle this.

According to [6], swiftlets are quick to respond to the sound of their partners. The resulting sound is able to attract swiftlets to approach and subsequently occupy the SBH. IF1 confirmed that he uses a synthesized voice obtained from friends to persuade swiftlets to enter the SBH. IF2 stated that there are two types of swiftlet voices used to persuade the swiftlets to nest. The first voice is called the external sound. The external sound is composed of the voices of male and female swiftlets. In addition, the other sound is a voice to imitate the colony or the sound of baby swiftlets to encourage nesting.

IF3 also agreed that this skill is an important aspect that needs to be mastered. Detailed about this described by IF4 and IF5 shown in Table 3. They explained the rules of sound, switched on after dawn and at dusk every day off after using the timer. Imitating the sounds is not an option at night because it can attract owls, the natural predators to the SBH. The knowledge about how the system works is very important, and it should be known by entrepreneurs. Entrepreneurs should not just rely on their employees for this. IF5 was aware of this situation and believed that most of the swiftlets' houses that failed were built by wealthy people who do not care about these things and had left it to the hand of keepers of the SBH to do.

### TEMPERATURE AND HUMIDITY

Swiftlets breed under the hot and humid environment, temperature of 28°C to 30°C and humidity about 90% [6, 9, 10, 12, 13]. Thus, it is a challenge and a necessity for entrepreneurs to provide habitats according to this temperature. Most entrepreneurs are aware of the importance of this factor, to regulate the temperature and the humidity in SBH. This is evidenced by the summary of the interview that is included in Table 4.

Table 4: Importance of temperature and humidity

Informants	Feedback
IF1	- Temperatures suitable for swiftlets is 28°C to 30°C - It is suitable for the swiftlets to nest
IF2	Yes, when we saw anything-foreign objects -we must take it and throw it away. Water is the most important to take care of...if there is a humidifier...okay...the birds will feel more comfortable and more at home with their original habitat. We must always be alert and take care of the SBH. For example, we have to look out for the ventilation hole sack, as well as water circulation. The birds will not sleep or stay in the birds' nest if they don't have the right habitat for them.
IF3	- Temperature 26°C to 30°C - Humidity in 90% to 95%
IF4	The birdhouse must be dark. Then, it will prevent other birds not to fly in or stay. There is something special about swiftlets, they can fly in the dark.
IF5	We have to know what they need. Sometime our SBH, the swiftlets like it cold, neutral- bird does not like the cold and bright very much.

IF1 realized that it was vital for maintaining the SBH according to the conditions specified. Dealing with animals and maintaining their habitat becomes a unique challenge because they also have their own requirements. IF1 mentioned that the temperature suitable for SBHs is 28°C to 30°C, but IF3 had different opinion which was that the temperature should be around 26°C to 30°C and humidity of the SBH should be around 90% to 95%. This is to produce high quality white bird's nest so that it does not easily break when harvested.

For IF2, he believed that using an instrument known as humidifiers will allow the temperature and humidity EBN remain in natural habitat required by the swiftlets. The humidifier equipment is connected to the water pipeline, maintaining this equipment is very important to keep it functioning, making sure that there is no leakage or excessive moisture. IF5 shared the same view, where he added that SBH cannot be too cold and damp because it can affect the quality of EBN. These conditions have been recommendations were by [6, 5, 10]. IF4 shared the view that a successful SBH environment should be dark because swiftlets are the only birds that can fly and nest in dark conditions within the family kite bird species. Swiftlets are able to fly in the dark using echolocation to nest as described by [10].

### IMPORTANCE OF ENTRY HOLE

The importance of entry doors for swiftlet birds as prescribed by informants is shown in Table 5.

Table 5: Importance of entry door

Informants	Feedback
IF1	We must know the birds' flying path, as bird routes are very important in determining whether the bird is about to enter or not to our swiftlet house. Bird routes will also determine the position of the entrance.
IF2	There are two types of entrance holes. First is external entrance and the second is inside the SBH entrance.
IF3	The rating of 45° position with first and second entrance hole. The size of the entrance hole is 3x4 feet.
IF4	Wind direction will help the decision of where to build entrances because birds fly following the wind, then the door of swiftlet houses must pass wind.
IF5	Size entrance hole is 2x4 feet.

IF1 confirmed that the entrance of the SBH should take into account aspects of the birds return path. This is in line with the habits of the swiftlets and it allows the swiftlets to fly to and fro directly from the SBH. IF2 explained that the SBH doors should have two layers, namely the entrance and two doors to the nesting plank. This means that there is a space called a roving room that allows birds to hover before entering the SBH. This two-door position also allows the SBH to be built in the dark because the door is built first and cross-built comes second.

IF3 explained that the angle of the first door and a second position by 45°. This position allows the birds to fly in comfortably and without any disruption. IF4 believed that the wind direction helps determine the location of the doors that should be built. SBH doors must be opened by the route of the winds as the bird flies upwind. Even so, IF3 and IF4 had different opinions on the size of the doors. IF3 said that the ideal size is 3x4 feet while saying IF2 ideal size 2x4 feet. Although the information obtained was different or conflicting, this information comes from successful entrepreneurs with proven techniques and methods that they have been using with effectiveness.

According to [6] the bird entrance is divided into two sides of the entrance. First called "dragon hole" entrance and the second call "side door" [5]. According to [10], each door has its own advantages. The top door is used to lure adult husband swiftlets ranching and can avoid interference problems by owls because owls do not descend vertically. On the other hand, the side door is preferred by young swiftlets, but it vulnerable to threats because owls are perched outside these holes.

Barriers at the entrance are an aspect that should be taken into account by EBN entrepreneurs. Swiftlets requires roving room areas about 20 feet before entering into the SBH. Therefore, any restrictions should not exist at a distance of 20 feet in front of the entrance to the SBH. Barriers in front of the entrance such as branches and electric poles also facilitate predators, especially owls that wait in front of the entrance and this can be daunting for the swiftlets [10].

### THREATS AND ENEMIES

These aspects of knowledge are deemed essential for an EBN entrepreneur. These also involve technical skills, and an understanding of the things that contribute to the preservation of the SBH environment. Among the threats described by the informants include the threat of theft, owls, snakes, civets, bats and others. Technical problems such as leakage of water pipes and building leakages are also problems as these problems relates to the maintenance of SBH. Another thing included in the maintenance is to ensure that the sounds always work accordingly, according to the programmed time.

Table 6: Enemy and threats knowledge

Informants	Feedback
IF1	Thieves and predators
IF2	- Actually...birds really like things clean. If there are any contaminants, it will affect the quality of the nest. - We have to protect the birds from predators and make it comfortable for them They like hygiene and it will help bird to sleep in the SBH.
IF3	- There is a threat inside the birdhouse. Sometime the predators go inside and kill the birds. If the bird dies naturally, it ok. But if die by the hands of predators, we must keep eyes on that and fix the problem.
IF4	Maintenance is fairly simple, we harvest the nest, take care of it, we clean the area around the SBH and keep look out for germs, toxins and enemies.
IF5	Sometimes, natural enemies issues are all there is to it, and we must take care of it. Maintenance is us taking care of the water problem, either there is a rupture, and whether there are any incoming enemies, like owls, snakes, bats, yes! Bats eat swiftlets too.

IF1 had to deal with the problem of theft in the EBN. When thieves enter the SBH, they end up disrupting and damaging the habitat of the SBH cycle and building. IF2 also explained that swiftlets actually like clean SBHs. Clean conditions would create whiter and better quality EBN. If the EBNs are not cleaned enough and kept in dirty conditions, it will degrade and contaminate the birds’ nests.

As for IF3, he keeps on vigilant and monitors EBN to notice any unusual changes that occur. He gave an example when there are many swiftlets fly off remarkably. An entrepreneur must find the cause of the problem and solve it. Attention should be given to the adult birds’ nest because they are more durable than the little bird's nest.

IF4 had the opinion that EBN was easy to maintain because he only needs to collect the nest and clean the area around the SBH. This includes the care of germs, mites, pesticides, which may often disrupt enemy EBN ranching. IF5 also agreed that attention should be given to the enemies of farming such as owls, bats, snakes and building maintenance. This recommendation is similar to that proposed by the researcher's nest like this before [5, 6, 8,10,13,14].

**RESULTS AND DISCUSSION**

The study brought together some hidden aspects and detailed knowledge related to science of Swiftlets industry. Overall, SBH's success depends on its ability to provide habitat in accordance with the swiftlets’ needs. Figure 1 explains the aspects that are critically needed. Mastery of technical knowledge allows the continuation and sustainability of Malays entrepreneurs who involved in this business.

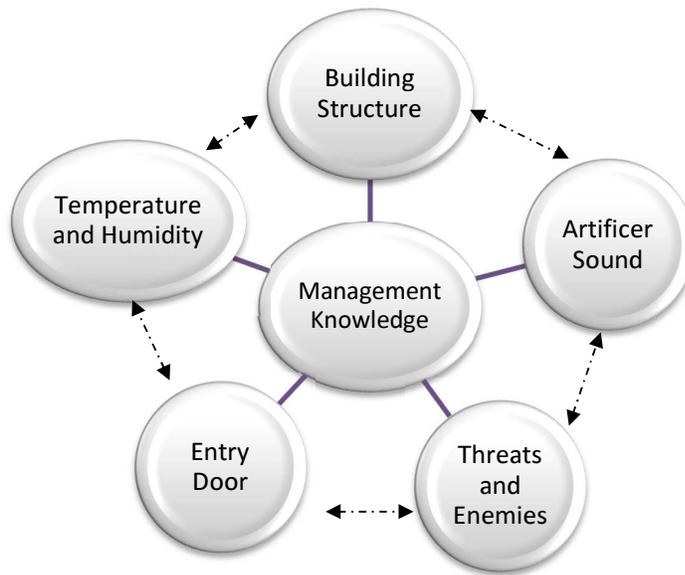


Figure 1: The need of bird nest management knowledge toward business sustainability

**CONCLUSION**

Research fieldwork that was conducted has shown the importance of management of the SBH. All informants recognize the importance of knowledge and skills because they can create the establishment of the basic habitat of the swiftlets. Mastery of this knowledge has been the key to success in the SBH industry. Understanding field or site selection, bird’s population, the size and structure of the building, imitate the bird’s

sound, temperature and humidity, the entrance, and the threat of the enemies have allowed successful entrepreneurs to build a habitat similar to the original habitat of cave swiftlets. It is observed that learning through experience and observation is indeed paramount for swiftlet bird industry. This is in line with [15] view that experience is the best teacher to mankind.

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