



UNIVERSITI PUTRA MALAYSIA

***PURCHASE INTENTION TOWARDS EDIBLE BIRD'S NEST PRODUCTS
AMONG DIFFERENT GROUPS OF MALAYSIAN CONSUMERS***

NURUL NABILAH HUDA MOHAMAD SHUKRI

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By

NURUL NABILAH HUDA MOHAMAD SHUKRI

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

August 2020

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DEDICATION

I dedicate this diamond to my loving parents.



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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NURUL NABILAH HUDA MOHAMAD SHUKRI

August 2020

Chairman : Associate Professor Nolila Mohd Nawi, PhD
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Edible bird's nest (EBN) is a glutinous mucilaginous secretion produced by the salivary glands of male Swiftlets. Until today, EBN has been consumed as a health supplement to restore human body deficiency by supplying nutrients. The beneficial effects of EBN on human health proclaimed by traditional Chinese medicine practitioners have been proven with all the lab research conducted by previous studies. A growing number of investors and ranchers are being attracted to venture into the Swiftlet farming business because this industry possesses higher market value and is viewed as a million-dollar industry. This industry could be a new source of wealth and contribute to Malaysian economic growth. In 2011, this industry has experienced in price slump due to the high nitrate level found in raw EBN. This has significantly tarnished Malaysia's image. All ranchers and investors in this industry felt the vast impact from the price declination of EBN. As the contamination found in EBN has caused the price to fall steeply, the issue of adulteration in EBN with haram-related sources appears to be an ongoing discussion. These issues further heighten the fear and anxiety among consumers to consume EBN products. As a result, ranchers failed to survive since local EBN products could not be exported to China and also due to relatively low demand for EBN products in Malaysia. Therefore, this study aims to compare the difference in intention level between the groups of buyer and non-buyer, identify factors that influence intention to purchase and repurchase EBN products among non-buyers and buyers in Malaysia, discover potential and existing consumers, and investigate the differences between buyers based on their spending behaviours.

Purposive sampling was chosen as a sampling technique to select individuals from an entire group of residents in the Klang Valley region. The respondents selected for this study were divided into two groups, namely non-buyer and buyer. The respondents should also meet specific criteria by which they must be over 18 years old and earn a monthly income. These criteria were important to make sure the respondents were

qualified to make a purchase decision. Data collection was conducted in a self-administered questionnaire with an equal number of samples collected for both non-buyer and buyer groups. Mann-Whitney U test, Partial Least Square Structural Equation Model (PLS-SEM), Two-Step Cluster, and Multi-Group Analysis (MGA) were used in analyzing the data.

Mann-Whitney u test was performed to compare the difference in intention level between the groups of buyer and non-buyer. The result reveals that the intention level between the two groups is different. The buyer group has a greater intention to purchase EBN products compared to the non-buyer group. PLS-SEM was conducted to identify factors that influence the intention to purchase and repurchase EBN products among non-buyers and buyers, respectively. The results for the non-buyer group reveal that firstly, all factors from the marketing effort (product, price, promotion, and distribution) positively influence attitude; secondly, food safety and halal logo positively influence perceived behavioural control; thirdly, attitude, subjective norm, perceived behavioural control, and health consciousness favorably influence purchase intention; fourthly, health consciousness has not significantly influenced attitude. Meanwhile, the results for the buyer group reveal that firstly, only two factors from the marketing effort (price and distribution) have positively influence attitude; secondly, health consciousness has a stronger influence on repurchase intention compared to attitude; thirdly, other intended factors have similar findings with the non-buyer group. Two-Step Cluster was then employed to discover potential and existing consumers among the non-buyers and buyers, respectively. The results reveal that three clusters have been discovered for both groups. For the non-buyer group, cluster 1 and cluster 3 shared similar features, where they are both Malays, Muslims, and university graduates. However, consumers in cluster 1 are males, single, younger, and earn lesser monthly income compared to those of cluster 3. While, consumers in cluster 2 are non-Malays, single, young female, and earn less than RM3,500 monthly. For the buyer group, cluster 1 and cluster 2 are dominated by Malays and have spent less than RM100. But, cluster 1 and cluster 2 have a different level of income, marital status, and employment. Besides that, cluster 3 is non-Muslims, earns more than RM3,500, and can be classified as big spenders compared to other clusters. All of these three clusters are dominated by educated female and have purchased EBN products from the drug stores. Further investigation using MGA was performed to identify the differences between buyers based on their spending behaviour. The results support two hypotheses, which indicate significant differences between the high-spending and low-spending buyers in regards to EBN prices and products.

This study makes several practical implications and considers various decisions that are cost-effective for different groups to motivate buying behaviour. On top of that, the theoretical implication of this study provides evidence that there is a substantial difference between the explanatory power for the non-buyer and buyer models. In terms of policy implication, this study suggests that the government should encourage co-operatives or collaborations that involve Swiftlet ranchers, manufacturers, government agencies, higher-education institutions, and private sectors. These co-operative efforts will help to effectively prevent unhealthy activities and strengthening law enforcement to curb harmful practices and protect consumers from being deceived by unethical ranchers and manufacturers. In conclusion, this thesis filled the gap in the literature and lead to a deeper understanding of consumers' intention to purchase and repurchase EBN products.

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

NIAT PEMBELIAN SARANG BURUNG YANG BOLEH DIMAKAN DALAM KALANGAN KUMPULAN PENGGUNA YANG BERBEZA DI MALAYSIA

Oleh

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Ogos 2020

Pengerusi : Profesor Madya Nolila Mohd Nawi, PhD
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Sarang burung yang boleh dimakan (*EBN*) adalah rembesan *glutinous mucilaginous* yang dihasilkan oleh kelenjar air liur Burung Walit Jantan. Sehingga kini, *EBN* digunakan sebagai makanan tambahan untuk memulihkan kekurangan dalam badan manusia dengan membekalkan nutrien. Kesan bermanfaat *EBN* terhadap kesihatan manusia yang dinyatakan oleh pengamal perubatan tradisional Cina telah terbukti melalui penyelidikan makmal yang dilaksanakan oleh kajian lampau. Semakin ramai pelabur dan peternak tertarik untuk menceburkan diri dalam perniagaan penternakan burung walet kerana industri ini mempunyai nilai pasaran yang lebih tinggi dan dipandang sebagai industri jutaan Dollar. Industri ini berpotensi menjadi sumber kekayaan yang baru dan menyumbang kepada pertumbuhan ekonomi Malaysia. Pada tahun 2011, industri ini mengalami penurunan harga disebabkan oleh tahap nitrat yang tinggi telah dikesan dalam *EBN* mentah. Hal ini telah mencemarkan imej Malaysia. Semua peternak serta pelabur dalam industri ini merasakan kesan besar akibat penurunan harga *EBN*. Disebabkan pencemaran yang ditemui pada *EBN* telah mengakibatkan harga produk ini jatuh menjunam, isu pemalsuan *EBN* yang diperolehi daripada sumber yang haram menjadi perbincangan yang berterusan. Hal ini meningkatkan kebimbangan dan kegelisahan dalam kalangan pengguna untuk menggunakan produk *EBN*. Kesannya, peternak gagal untuk bertahan dalam industri ini kerana produk *EBN* tempatan yang dihasilkan tidak dapat dieksport ke China dan juga disebabkan permintaan yang rendah untuk produk *EBN* dalam Malaysia. Oleh yang demikian, kajian ini bertujuan untuk membandingkan perbezaan tahap niat antara kumpulan pembeli dan bukan pembeli, mengenal pasti faktor-faktor yang mempengaruhi niat untuk membeli dan membeli semula produk *EBN* dalam kalangan kumpulan bukan pembeli dan pembeli di Malaysia, mengenalpasti pengguna yang berpotensi dan pengguna yang sedia ada, dan mengkaji perbezaan antara pembeli berdasarkan tingkah laku perbelanjaan mereka.

Persampelan Bertujuan dipilih sebagai teknik persampelan untuk memilih individu dari seluruh kumpulan penduduk di Lembah Klang. Responden yang dipilih untuk kajian ini dibahagikan kepada dua kumpulan, iaitu bukan pembeli dan pembeli. Responden yang mengambil bahagian juga harus memenuhi kriteria tertentu seperti berumur lebih dari 18 tahun dan memperoleh pendapatan bulanan. Kriteria ini penting bagi memastikan responden dianggap berkelayakan untuk membuat keputusan pembelian. Pengumpulan data dilaksanakan dengan cara soal selidik yang dikendalikan sendiri (*self-administered questionnaire*) dengan jumlah sampel yang sama untuk kedua-dua kumpulan responden iaitu bukan pembeli dan pembeli. Ujian Mann-Whitney U, Model Persamaan Struktur Separa Terkecil (PLS-SEM), Kluster Dua-Langkah, dan Analisis Berbilang-Kumpulan (MGA) digunakan untuk menganalisis data.

Ujian *Mann-Whitney U* digunakan untuk membandingkan perbezaan tahap niat antara kumpulan pembeli dan bukan pembeli. Hasilnya menunjukkan bahawa tahap niat antara kedua-dua kumpulan itu berbeza. Kumpulan pembeli mempunyai niat yang lebih besar untuk membeli produk *EBN* berbanding dengan kumpulan bukan pembeli. PLS-SEM digunakan untuk mengenal pasti faktor-faktor yang mempengaruhi niat untuk membeli dan membeli semula produk *EBN* dalam kalangan bukan pembeli dan pembeli. Hasil untuk kumpulan bukan pembeli menunjukkan bahawa pertama, semua faktor daripada usaha pemasaran (produk, harga, promosi, dan pengedaran) mempengaruhi sikap secara positif; kedua, keselamatan makanan dan logo halal mempengaruhi persepsi kawalan tingkah laku secara positif; ketiga, sikap, norma subjektif, persepsi kawalan tingkah laku, dan kesedaran terhadap kesihatan mempengaruhi niat; keempat, kesedaran terhadap kesihatan tidak mempengaruhi sikap secara signifikan. Sementara itu, hasil bagi untuk kumpulan pembeli menunjukkan bahawa pertama, hanya dua faktor daripada usaha pemasaran (harga dan pengedaran) mempengaruhi sikap secara positif; kedua, kesedaran terhadap kesihatan mempunyai pengaruh yang kuat terhadap niat berbanding dengan sikap; ketiga, faktor lain mempunyai penemuan yang serupa dengan kumpulan bukan pembeli. Kluster Dua-Langkah kemudian digunakan untuk mengenalpasti pengguna yang berpotensi dan pengguna yang sedia ada dalam kalangan kumpulan bukan pembeli dan pembeli. Hasil kajian menunjukkan bahawa tiga kluster telah ditemui untuk kedua-dua kumpulan. Bagi kumpulan bukan pembeli, kluster 1 dan kluster 3 berkongsi ciri yang sama, di mana mereka terdiri daripada orang Melayu, Muslim, dan lulusan universiti. Namun begitu, pengguna dalam kluster 1 adalah lelaki, bujang, lebih muda, dan memperoleh pendapatan bulanan yang lebih rendah berbanding kluster 3. Manakala, pengguna dalam kluster 2 adalah bukan Melayu, bujang, wanita muda, dan berpendapatan kurang daripada RM3,500 sebulan. Bagi kumpulan pembeli, kluster 1 dan kluster 2 didominasi oleh orang Melayu dan mereka membelanjakan kurang daripada RM100. Tetapi, kluster 1 dan kluster 2 mempunyai tahap pendapatan, status perkahwinan dan pekerjaan yang berbeza. Manakala, kluster 3 terdiri daripada orang bukan Islam, memperoleh pendapatan lebih daripada RM3,500, dan boleh diklasifikasikan sebagai pembelanja besar berbanding dengan kluster yang lain. Ketiga-tiga kluster ini didominasi oleh wanita yang berpendidikan dan mereka membeli produk *EBN* dari kedai ubat-ubatan. Penyelidikan lebih lanjut menggunakan MGA dilakukan untuk mengenal pasti perbezaan antara pembeli berdasarkan tingkah laku perbelanjaan mereka. Hasil daripada penyelidikan tersebut menyokong dua hipotesis, iaitu terdapat perbezaan yang signifikan antara pembeli berbelanja tinggi dan pembeli berbelanja rendah berkenaan dengan harga dan produk *EBN*.

Kajian ini membuat beberapa implikasi praktikal dan mempertimbangkan pelbagai keputusan yang menjimatkan kos bagi kumpulan yang berbeza untuk mendorong perilaku membeli. Tambahan pula, implikasi teori kajian ini memberikan bukti bahawa terdapat perbezaan kuasa penerangan yang besar antara model kumpulan bukan pembeli dan pembeli. Dari segi implikasi polisi, kajian ini menunjukkan bahawa kerajaan harus mendorong koperasi atau kolaborasi yang melibatkan penternak burung, pengeluar, agensi kerajaan, institusi pendidikan tinggi, dan sektor swasta. Usaha kolaborasi ini akan membantu untuk mencegah aktiviti yang tidak sihat, secara berkesan, memperkuat penguatkuasaan undang-undang untuk membendung amalan berbahaya, dan melindungi pengguna daripada tertipu oleh pengeluar yang tidak beretika. Kesimpulannya, tesis ini mengisi jurang dalam literatur dan memahami dengan lebih mendalam mengenai niat pengguna untuk membeli dan membeli semula produk *EBN*.



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LIST OF ABBREVIATIONS

AF	<i>Aerodramus Fuciphagus</i>
AIC	Akaike Informartion Criterion
AM	<i>Aerodramus Maximus</i>
Anova	Analysis of Variance
AVE	Average Variance Extracted
BIC	Bayesian Information Criterion
CB-SEM	Covariance Based Structural Equation Model
CDM	Consumer Decision Model
CMB	Common Method Bias
CR	Composite Reliability
DIDD	Downstream Industry Development Division
DOSM	Department of Statistics Malaysia
DV	Dependent Variable
DVS	Department of Veterinary Services
EBN	Edible Bird's Nest
FAMA	Federal Agriculture Marketing Authority
FINS	Forensically Informative Nucleotide Sequencing
FDS	Forest Department Sarawak
FTIR	Fourier Transform Infrared
GC	Gas Chromatographic
HTMT	Heterotrait-Monotrait Ratio
H5N1	Avian Flu
IV	Independent Variable
LCDD	Livestock and Commodity Development Division
LL	Lower Limit
MAFI	Ministry of Agriculture and Food Industries
MDTCA	Ministry of Domestic Trade and Consumer Affairs
MGA	Multi-Group Analysis
MICOM	Measurement Invariance of Composites
MOH	Ministry of Health
MRM	Multiple Reaction Monitoring
NIR	Near-Infrared
NO ₂	Nitrite
NO ₃	Nitrate
PLS-SEM	Partial Least Square Structural Equation Model
SEM	Structural Equation Model
TBB	Theory of Buyer Behaviour
TPB	Theory of Planned Behaviour
TRA	Theory of Reasoned Action
UP	Upper Limit
VIF	Variance Inflator Factor

CHAPTER 1

INTRODUCTION

The first chapter of this thesis describes the background of the study and related issues. This is followed by problem statement, research questions, research objectives, scope of the study, significance of the study, and structure of the dissertation.

1.1 Edible Bird's Nest

Edible bird's nest (EBN) is a glutinous mucilaginous secretion produced by the salivary glands of male Swiftlets (Guo, Takahashi, Bukawa, Takahashi, Yagi, Kato, Hidari, Miyamoto, Suzuki, & Suzuki, 2006). The Swiftlets mostly roosting at night during the breeding season (Mane & Manchi, 2017). In Southeast Asia, two species of Swiftlet are identified, namely *Aerodramus Fuciphagus* (AF) and *Aerodramus Maximus* (AM), to capable of producing edible-nest (Babji, Yusop, & Ghassem, 2011). Both AF and AM produce white nest and black nest, respectively. Their diets comprised mainly of the morphotype insects such as coleopteran, diptera, ephemeroptera, hymenoptera, homoptera, and isoptera (Lourie & Tompkins, 2000; Langham, 1980). Swiftlets species live inside caves and might have existed before 1947 (Langham, 1980). Fossils of the colony were discovered in Palawan and their existence were reported more than 11,000 years ago (Reis & Garong, 2001).

The nest is made of solidified saliva built and attached at a high place to furnish a safe place for laying eggs, incubating, and raising their young bird until they can fly. The nest also helps prevent predators from eating their eggs and baby bird during the day-time when both parents leave to forage. EBN is mostly consumed by Chinese people because they highly regarded EBN as an expensive delicacy. Abdullah, Ibrahim, Tengku-Chik, and Ghazali (2011) emphasized that over 50% of the global market was not met. Due to the limited supply for this high-end product, man-made nesting houses are constructed with a similar environment to the cave. Ranchers can either modified shop-houses or build a new building with identical surroundings to the cave to attract Swiftlets into the man-made nesting house. Typically, the nesting houses are turned into the Swiftlet farm to increase production and meet growing demand.

Each nest is estimated to take at least 61 days to complete and form a U-shaped nest. The behaviour of Swiftlets is affected by the moon cycle, sunset period (before sunset), and the breeding stage when they return to roosting and building their nests. Particularly, Swiftlets tend to return late during a full moon because they are able to forage in bright moonlight. After the nests' building is completed, there is an incubation period of 23 days and then 36 days of nestling (Mane & Manchi, 2017). Unfortunately, farmers tend to snatch their nests before they can lay their eggs. Guo et al. (2006) reported that a pair

of adult Swiftlet can lay at least one or two eggs per brood and the babies are safely raised until they can leave the nest and be independent.

1.1.1 Nutritional Properties

Traditional Chinese practitioners have included EBN in medicine and nutraceuticals for hundreds of years since antiquity around 618 to 907 A.D. (during Tang dynasties). Until recently, EBN has also been consumed as a health supplement to restore body deficiency by supplying nutrients. However, despite the popularity of this salivary nest, the nutritional contents remain ambiguous (Marcone, 2005). Researchers have debated on the compositional properties of the edible-nest that is doubted as the 'Caviar of the East', which is one of the world's most expensive food (Lim & Cranbrook, 2002).

Significant number of studies have shown scientific proof of nutritional properties in EBN that are beneficial to health. Marcone (2005) reported that the composite of clean white EBN was predominantly protein with a range of 62%, followed by carbohydrates (27.30%), moisture (7.50%), ash (2.10%), and lipid (fat) (0.10%). Red EBN, on the other hand, contained protein (63.00%), carbohydrates (25.60%), moisture (8%), ash (2.10%), and lipid or fat (1.30%).

Recent studies have explored the contents of EBN collected from various places in Thailand revealed that protein composed between 60.90% to 66.90%, carbohydrates (25.40% to 30.70%), moisture (17.80% to 24.30%), ash (5.90% to 7.40%), crude fat (0.40% to 1.30%), and fiber (0.10%). These findings are consistent with Amiza, Oon, and Norizah (2019), Linh, Le son, and Ai (2019), Shi, Zhang, Li, Huang, Zou, Zhang, Holmes, and Chen, (2017), and Kuntjoro and Vitasari (2017). Thailand EBN was found to contain a higher amount of sulfur-containing amino acid, which ranged from 10.70 to 26.20 mg/g protein (Saengkrajang, Matan, & Matan, 2013) compared to Indonesia and Malaysia. Malaysian EBN has almost similar results with EBN from other countries with fat (0.01% to 0.09%), ash (3.00% to 9.50%), carbohydrates (11.00% to 13.00%), moisture (7.10% to 13.90%), and protein (57.90% to 65.80%), (Hamzah, Ibrahim, Sarojini, Hussin, Hashim, & Lee, 2013; Zainab, Jeyaraman, Nur Hulwani, Othman, Lee, & Kamarudin, 2013; Norhayati, Azman, & Nazaimoon, 2010).

There was also a disparity in property content between unclean and clean EBN. Differences in nutrient properties between Indonesia, Malaysia, and Thailand could be associated with breeding sites, climate, and diet or availability of food for *Aerodramus* (Norhayati et al., 2010). Studies revealed that the content of sialic acid ranged from 0.7% to 1.50% in Malaysia's EBN made by the AF (Marni, Marzura, Norzela, Khairunnisak, Bing, & Eddy, 2014; Kathan & Weeks, 1969). According to Quek, Chin, Yusof, Law, and Tan (2018), EBN produced by AF that live in the man-made house from Peninsular Malaysia produced EBN two times better than the others, 23% higher amount of amino acids, greater amount of antioxidant activities around 2.33–3.49 mg AAE/g, and higher sialic acid about 13.57 g/100 g. Whereas, AM that lives in a cave from East Malaysia contains greater amounts of minerals such as calcium and magnesium compared to

others. Therefore, EBN from Malaysia is able to compete in the market with EBN from other countries.

1.1.2 Medicinal Benefits

EBN is an important ingredient in Chinese cuisine and is commonly used in traditional medicine. Traditional Chinese practitioners believe that consuming EBN helps improve the skin complexion, promotes the regeneration of cells and tissues (Epidermal growth factor), increases the body's self-regulating activities and disease resistance, improves heart function and reduces blood pressure, assists in cancer prevention through rich antioxidants and for treatment, reduces fatigue, enhances the immune system of the body by encouraging cell division, aids in the cell regeneration and growth, and regulates blood supply throughout the body.

The increase in EBN prices raises skepticism among some researchers on the medicinal benefits of consuming EBN and its contribution to health. The reliability of the beneficial properties is priority not testified and only based on consumer experience, history, and anecdotal. Curiosity triggers some modern scientists to conduct laboratory experiments on living organisms (rats, pigs, flies) to demonstrate the effects of EBN. Mohamad Shukri, Nawi, Abdullah, and Man (2018) has succinctly reviewed and discussed the medicinal benefits of EBN from several studies carried up to 2016. The benefits are boost immune system (Cao, Xu, Wang, Yu, & Xue, 2012), inhibit influenza virus (Haghani, Mehrbod, Safi, Aminuddin, Bahadoran, Omar, & Ideris, 2016), produce cell proliferation (Rashed & Nazaimoon, 2010), insulin resistance (Hu, Li, Yao, He, Li, Liu, Wu, & Lai, 2015; Yida, Imam, Ismail, Ooi, Sarega, Azmi, Ismail, Kim, Hou, Yusuf, 2015), improve memory and increase brain function (Wang, 2012), strengthen the bone and promote anti-aging (Matsukawa, Matsumoto, Bukawa, Chiji, Nakayama, Hara, & Tsukahara, 2011),

The most recent study conducted by Daud, Sarbini, Babji, Yusop, and Lim (2019) has found that EBN could function as natural prebiotics. Glycan and glycopeptide were extracted from EBN were fermented prior to test on in vitro human colon model system. The research has reported a significant increase in bacteria growth that is good for the gut.

As quoted by Patel and Goyal (2012, p. 115), "prebiotics are being implicated in starter culture formulation, gut health maintenance, colitis prevention, cancer inhibition, immunopotential, cholesterol removal, reduction of cardiovascular disease, prevention of obesity and constipation". Bird's nest saliva has been proposed as a potential source for bioactive components in the development of nutraceuticals, food preservatives, and functional food (Babji, Ety Syarmila, Nur'Aliah, Nurul Nadia, Hadi Akbar, Norrakiah, Ghassem, Najafian, & Salma, 2018).

Other possible benefits that can be derived from the consumption of the EBNs include enhancing the reproduction and uterine function (Albishtue, Yimer, Zakaria, Haron,

Yusoff, Assi, & Almhanawi, 2018), averting the toxicity effect of lead acetate (Albishtue, Yimer, Zakaria, Haron, Babji, Abubakar, Baiee, Almhanana, & Almhanawi, 2019; Albishtue, Yimer, Zakaria, Haron, Yusoff, & Almhanawi, 2018), treating hypertension, prevent stroke, and myocardial infarction (Ramachandran, Babji, & Sani, 2018), exerting neuroprotection in Parkinson's disease (Yew, Koh, Chye, Othman, Soga, Parhar, & Ng, 2018), inhibits influenza virus infection (Nuradji, Dharmayanti, Mranata, Sudamika, Lukman, & Wibawan, 2018; Haghani, Mehrbod, Safi, Kadir, Omar, & Ideris, 2017), improve cognition and memory dysfunction associated with menopause (Hou, He, Imam, Qi, Tang, Song, & Ismail, 2017), enhance intellectual capacity and provide neuroprotection (Careena, Sani, Tan, Lim, Hassan, Norhafizah, Kirby, Ideris, Stanslas, Basri, & Lim, 2018), slowing changes in hepatic and atherogenesis (Akmal, Intan-Shameha, Ajat, Mansor, Zuki, & Ideris, 2018), reduce pigmentation and improve skins elasticity (Zeng & Lai, 2019a; 2019b), speed up wound healing process (Ofiwijayanti, Hidayat, & Khafidhoh, 2017), and improve the rate of embryo implantation and pregnancy success (Albishtue et al., 2019).

The long list of health benefits apparently convinced that the EBN has a highly nutritious function. The beneficial effects of EBN on human health proclaimed by traditional Chinese medicine practitioners have been proven with all the lab research conducted by the researchers.

1.1.3 Market Value

A growing number of investors and ranchers are being attracted to venture into the Swiftlet farming business because the industry possesses higher market value and is viewed as a million-dollar industry ("Bird's Nest Industry Booms", 2016). Swiftlet farms can be easily found in the city or the countryside, both in eastern and western Malaysia. The Swiftlet farming in Malaysia has expanded to about 60,000 ranchers in 2014 ("Stricter Rules", 2014). This proved that the bird's nest industry is experiencing its time of growth and prosperity. Ranchers are being encouraged to create varieties of products from EBN in order to help generates growth in the Malaysian economy and improve ranchers' living standards and quality of life.

The bird's nest industry is regarded as one of the high-value industries and being listed as one of the projects to be included in the Economic Transformation Programme (Tan, 2016). Therefore, this industry could be a new source of wealth and contribute to economic growth (Whitehead, 2019). The state government collects revenue from the bird's nests industry by charging RM100 per annum to each rancher to obtain a commercial wildlife farm permit or license, and RM50 is imposed on every kilogram for exportation (Forest Department Sarawak [FDS], 2019; Cheng, 2016).

In 2011, the Malaysian bird's nest industry has experienced in price slump due to the high nitrate level found in raw EBN (Wong, 2017; Cheng, 2016; "Stricter Rules", 2014). Consequently, ranchers were forced to shut down because they could not repay the loan ("Talks on Raw Bird's Nest", 2018). As a result, raw EBN was banned to enter the China market and the nitrate issue has caused the price of raw EBN to drop by half from the

original price (Wong, 2017). Datuk Fadilah Baharin from the Department of Statistics Malaysia (DOSM) clarified that the EBN in the form of processed or ready to drinks was not affected (“New Standards”, 2015).

In 2014, the price for unprocessed nest has reported to be approximately RM2,500 to RM4,000 per kilogram, while the processed nest is traded between RM3,000 to RM7,000 per kilogram (Department of Veterinary Services [DVS], 2014; Wong, 2015) as shown in Table 1.1. The increasing interest in beauty and health has driven the demand for EBN products across Asia to widen, particularly after the nitrate issue is slowly tackled. For that reason, the price of EBN has risen to a historic six-year high (Wong, 2017). The price of clean EBN in 2018 has reached RM9,000 to RM10,000 per kilogram which is higher than in 2010 (Ministry of Agriculture and Food Industries [MAFI], 2018; “Talks on Raw Bird’s Nest”, 2018) during the booming period and prior to the nitrate issue.

Table 1.1: Market Price of Bird’s Nest in Malaysia (RM)

Category	Year			
	2010	2011	2014	2018
Raw EBN	RM4,500 – RM5,000	RM1,300 – RM2,000	RM2,500 – RM4,500	RM5,000 – RM6,000
Clean EBN	RM7,000 – RM8,000	RM2,000	RM3,000 – RM7,000	RM9,000 – RM10,000
Source	Wong (2017)	Wong (2015)	DVS (2014)	MAFI (2018)

(Source: Compiled by Author, 2019)

In the beginning, this industry is expected to bring RM1.5 billion profits after a deal with China was inked to ship EBN to the People’s Republic of China (Wong, 2017). The EBNs were mainly exported through third countries such as Hong Kong and Vietnam, but now producers are now hoping to export directly to China for more stable and fairer prices (“Talks on Raw Bird’s Nest”, 2018) after the agreement concealed.

In early January of 2018, the Malaysia ministry has signed an agreement with China to resolve issues related to EBN products and end conflicts between the two countries (Whitehead, 2019). The agreement is called Protocol of Inspection, Quarantine, and Veterinary Hygiene Requirements and it is a compulsory protocol for exporting raw or uncleaned EBN to China (Wong, 2017). About 10,000 EBN ranchers are advised to sell their raw EBN products to the ministry. The untouched EBN products will be sent to China for cleaning and processing in Qinzhou before selling them to Chinese consumers. The China-Malaysia Qinzhou Industrial Park has shifted to “an international value chain of edible bird’s nest” in order to increase production. The purpose of this park is to process raw EBN into products that can be easily consumed. The China-Malaysia Qinzhou Industrial Park is a free-trade zone located in Qinzhou’s prefecture, along with Nanning and Chongzuo on the border with Vietnam (He, 2019).

Today, Malaysian suppliers are also equipped with EBN based food, beverage, and cosmetics brands (Whitehead, 2019). Recently, Malaysian Small Medium Enterprises are partnering with Alibaba to grow export markets. Malaysia products are said to be superior to their competitors and have earned their trust in terms of product quality (Mohd Kamaruzaman, 2019). For example, 80,000 bottles of birds' nests from Malaysia were sold in five minutes and in another session about RM5 million worth of EBN were sold in 10 minutes during a live stream of 'Malaysia Week' in the annual campaign of Alibaba Group's (Chou, 2019).

1.2 Issues in Edible Bird's Nest

The Ministry of Agriculture and Food Industries (MAFI) intends to help increase demand for EBN in order to protect the local Swiftlet ranchers through the Department of Veterinary Services (DVS). The functions of DVS are to (1) control, prevent, and eradicate zoonotic and animal disease, (2) facilitate production of livestock and animal feeds, (3) inspect ranching farm and manufacturing plant, (4) control export and import of livestock, (5) provide training for livestock sector, (6) facilitate product development and animal health and wellbeing as public health, (7) conduct research on animals related and genetic diseases and (8) control animal welfare and genetic materials (DVS, 2019). The DVS has two divisions, namely Downstream Industry Development Division (DIDD) and Livestock and Commodity Development Division (LCDD). The main role of these departments is to assist the Swiftlet ranchers in sustaining the quality of local products in the market (DVS, 2019). On top of that, they also provide financial incentives to Swiftlets' ranchers for market positioning and product development. In order to expand the product range of EBN, the Malaysian government has allocated RM8.2 million research funding for product safety and innovation (Tey, 2015) through the DVS. This funding is due to the emerging contamination and adulteration issues in EBN products are threatening the bird's nest industry in Malaysia.

1.2.1 Contamination and Potential Hazard in Edible Bird's Nest

As the contamination found in EBN has caused the price to fall steeply, thereby affecting the industry severely. Eating tainted or contaminated food is hazardous to human health and can lead to death. Despite that, contamination sources could have originated from ecosystem conditions in which living things and the non-living environment (soil, air, water) connect as a system. The most popular contamination is the emission of heavy metal has discoursed among researchers because it is always associated with soil pollution. Particularly in agricultural products, the penetration through the food chain posed a potential risk to human health (Tangahu, Sheikh Abdullah, Basri, Idris, Anuar, & Mukhlisin, 2011). Langham (1980) described the *Aerodramus* as insectivores that prey on insects and plants for food. For example, *Hexagenia rigida*, also known as mayflies, is a common prey insect for the AF and studies revealed mercury can be found in this species (Saouter, Hare, Campbell, Boudou, & Ribeyre, 1993).

Previous studies also revealed traces of heavy metal in the salivary nest and this has become a great concern as it could jeopardize human health. Other sources of heavy

metal contamination could be caused by the location of the nesting house in urban areas, due to the exposure of certain element emission from factories, major road systems, and during the preparation process (Chen, Lim, Wong, & Mak, 2014). Examples of metals found in EBN include arsenic, cadmium, copper, iron, lead, mercury, and tin. Arsenic, cadmium, mercury, and lead are considered as toxic and hazardous to human health (Ha, Basu, Bose-O'Reilly, Dórea, Mcsorley, Sakamoto, & Chan, 2016; Jarup, 2003).

Specifically, exposure to cadmium can result in hypertension (Kopp, Glonek, Perry, Erlanger, & Perry, 1982) and osteoporosis (Honda, Tsuritani, Noborisaka, Suzuki, Ishizaki, & Yamada, 2003). While exposure to mercury can cause neurological damage and adverse impact to the pregnant woman, fetus, newborn, children, and even adults (Debes, Budtz-Jorgensen, Weihe, White, & Grandjean, 2006; Grandjean, Weihe, White, Debes, Araki, Yokoyama, Murata, Sorensen, Dahl, & Jørgensen, 1997; Harada, 1995; Bakir, Rustam, Tikriti, Al-Damluji, & Shihristani, 1980). Psychiatric symptoms include cognitive deficiency or behavioural dysfunction stem from the after effect (Yorifuji, Tsuda, Inoue, Takao, & Harada, 2011; Jedrychowski, 2006).

Comparatively, lead toxicity caused damages to the intellectual or cognitive ability which affects memory (Koller, Brown, Spurgeon, & Levy, 2004; Rosen, 1995). Exposure to a high dose of copper and arsenic can lead to Wilson disease (Huster, Purnat, Burkhead, Ralle, Fiehn, Stuckert, Olson, Teupser, & Lutsenko, 2007) and cancer (Chen, Chen, Wu, & Kuo, 1992; Jarup, 2003) and usually lead to fatalities. In contrast, iron is a necessary element for the production of red blood cells and dieticians encourage patients to include food containing iron. Herbert (1987) clarified the health aspect caused by iron toxicity is uncommon and tin also has been exempted in attributing adverse role (Prasad, 2013) in human health. Other traces of metal found, but in very low amounts, were antimony, beryllium, boron, bismuth, lithium, nickel, silver, strontium, uranium, vanadium, zirconium, and titanium are relatively harmless.

Due to the high nitrate contents in EBN products, China prohibited EBN from Malaysia to enter their market (Cheng, 2016) and the restriction was completely removed in June 2018 (“Talks on Raw Bird’s Nest”, 2018). The nitrate content was above the permissible level of 34 ppm set by the World of Health Organization. By all means, exposure to high nitrate content can cause chronic health outcomes. The risk was associated with suffering in hypertrophy of the thyroid (Van Maanen, van Dijk, Mulder, De Baets, Menheere, van der Heide, Martens, & Kleinjans, 1994). Also, exposure to nitrate exceeds the average limit for more than 10 years, relatively risk for colon cancer (De Roos, Ward, Lynch, & Cantor, 2003), gastric cancer, and prostate cancer, which subsequently lead to mortality (Morales-Suarez-Varela, Llopis-Gonzalez, & Tejerizo-Perez, 1995). It is also threatening to newborn to suffer from cyanosis or skin disease (Comly, 1995). Therefore, this issue resulted in a great loss by the restricted export of EBN to the largest importers. China buyers also refused and afraid to purchase EBN from Malaysia. This significantly tarnishes Malaysia’s image and all ranchers and investors in this industry felt the vast impact from the price declined in 2011 (Cheng, 2016).

Nevertheless, the presence of nitrate also can be found in any animal products (Dinckaya, Akyilmaz, Kemal Sezgintürk, & Nil Ertaş, 2010) and crops (De Martin & Restani, 2003).

To clarify, the level of nitrate increases as an upsurge in fertilizer made from the excrement of animals or humans in agricultural practice. In this case, nitrate contents were caused by the environmental factors in the cave or condition of the house farm. The cave is not only a living space for Swiftlets, but also a habitat for other creatures such as bats, snakes, rats, giant centipedes, scorpions, and cockroaches that emit a strong ammonia smell (Patrick, 2019). The accumulated feces can generate high nitrate levels. Raw EBN harvested from the cave has high nitrate contents than from house farm (Hamzah, et al., 2013). Though, past studies found EBN from house farm give an unexpected result and it could cause by the cleanliness of their operation area. The nitrate content can be traced by examining the nest's color. The brighter and more yellow nest had higher nitrate content (Quek, Chin, Yusof, Tan, & Law, 2015). For this reason, chemicals are used to preserve the color of the swallow nest (Law, Ong, & Yong, 2011).

The avian flu (H5N1) in Kelantan also triggered temporary bans for 90 days ("China Lifts Ban", 2017). The bird flu was first detected in February 2017 that mainly infects chickens, ducks, and geese (Mohd Shahar, 2017). However, there were no reports of avian flu infected the Swiftlet (Mohd Shahar, 2017; "Bird Flu in Kelantan", 2017). Nonetheless, the outbreak resulted in an export sanction for the EBN ("China Lifts Ban", 2017). Countermeasures were undertaken where EBN from the state of Kelantan was subjected to 3.5 seconds of heat treatment (70 degrees Celsius) to eliminate contamination (Mohd Shahar, 2017).

The Malaysian Ministry of Health (MOH) enforced strict standard operation procedures to ranchers and producers to ensure the presence of contamination in raw and commercial EBN below the permissible level. Proper handling from the scratch is vital to ensure the quality of EBN. After the outbreak, different microbiological and chemical parameters were adopted as part of the inspection standard ("Stricter Rules", 2014) and new criteria for packaging and labeling to monitor quality and authentication of EBN have been implemented ("New Standards", 2015).

Several studies have also been conducted to assess the presence of nitrate and nitrite (Zuki, Tan, Azmi, Heng, Chong, & Tajuddin, 2018) and improve the quality attributes of EBN by developing an advanced method of cleaning (Utomo, Rosyidi, Radiati, Puspaningsih, & Proborini, 2018; Rahayu, Suhartono, & Suryapratama, 2017a; Rahayu, et al, 2017b), drying (Gan, 2017; Gan, Ong, Chin, & Law, 2017a-2017c), and sterilization technology (Than, Nguyen, Van Tran, Ngo, & Pham, 2017). With numerous efforts, it is hoped that the public's anxiety can be reduced.

1.2.2 Adulteration in Edible Bird's Nest

The definition of food adulteration is referred to as food adulterated by mixed and packed with other substances to reduce or increase the quality and value of the food, which may eventually cause inferiority or harm to health. Unknown substances, usually not written on the package label, have been added with the intention to reduce the cost and subsequently increases the profit of the company. Food adulteration, also known as food

fraud (Spink & Moyer, 2011), has not only given rise to public concern on food safety but has also become a global issue.

Over the last decades, several countries such as the United States of America, Australia, Brazil, China, Canada, European Union, Japan, and Malaysia, enforced laws and regulations to protect consumers from unsafe or harmful foods by ensuring the quality and value of the agriculture-based foods and products. The major issues affecting the industry are not only contaminated EBN, but also counterfeit EBN that is equally important. Unknown materials such as agar, egg white, karaya gum, tremella fungus, pig-skin, and red seaweed were mixed in the products. The presence of macro minerals in commercial EBN is questionable because elements such as phosphorus, magnesium, calcium, sodium, and potassium cannot be traced in raw EBN (Chen, et al., 2014). In other studies, the presence of calcium, magnesium, and potassium in raw EBN were detected (Saengkrajang et al., 2013) and the findings support Marcone (2005).

Relatively, the purpose of adulteration in the EBN products is to deceive consumers by increasing the net weights and nutritional contents. Also, counterfeit EBN is prevalent in the markets due to high economic value and the limited supply of genuine EBN. Enormous demand in EBN creates an adverse circumstance that harms peoples' health. For this reason, once again, it has been a growing concern because public health and lives are at stake.

Contrary to its highly beneficial effects, trading fake EBN in the market can lead to potentially life-threatening if consumed, notwithstanding the purported belief of the products that promote longevity. Previously, intoxication was reported after consuming EBN products (Luong & Nguyen, 1999) and fake EBN was first erupted in China in 2009 ("Stricter Rules", 2014). White bird's nest was chemically bleached to a red blood or terracotta color, as red bird's nest is more expensive and scarce in the market. The long-term consumption of chemically bleached EBN can cause adverse health issues.

In fact, several scientific studies have been conducted to examine the difference between genuine EBN and adulterant EBN. In the past, multiple detection methods were established to differentiate authentic from fake EBN and have been used to this day. For example, EBN samples were examined using the gas chromatographic method (GC) to detect five monoses (D-mannitose, D-galactose, N-acetyl-Dgalactosamine, N-acetyl-D-glucosamine, and N-acetyl neuraminate) which can be regarded as EBN's fingerprint (Chan, Zheng, Zhu, Dong, & Tsim, 2013; Marcone, 2005; Yu-Qin, Liang, Hua, Hui-Xing, Xin-Fang, & Bu-Sen, 2000). Anatomical traits were observed, and protein bands were used to determine the adulterant in the sample of EBN (Wu, Chen, Wang, Bai, Ge, & Yuan, 2010; Lin, Zhou, Lai, Hou, Xian, Chen, Wang, Zhou, & Dong, 2009). Specific genetic detection (DNA extracts) was performed for reliable investigation of authentic EBN such as the mitochondrial gene, cytochrome *b* genes, and fibrinogen gene (Wang, Guo, & Hou, 2019; Lee, Huang, Lien, & Sheu, 2019; Chen, Liu, Chen, Chieng, & Jiang, 2017; Wu et al., 2010; Lin et al., 2009; Thomassen, Wiersema, de Bakker, de Knijff, Hetebrj, & Povel, 2003).

Recent studies have extended the detection and authentication method with additional approaches for precise findings. For example, verified genuine EBN via a holistic approach (physical-chemical characteristic) and GC for established EBN's fingerprint (Yang, Cheung, Li, & Cheung, 2014) provides more accurate quality assurance of EBN. Another example, identification of adulterated through genetic detection with a new TaqMan-based real-time polymerase chain reaction (Guo et al., 2014) is capable of distinguishing adulterant components in commercial EBN samples efficiently. Besides, Fourier Transform Infrared (FTIR) technique (Jamalludin & Tukiran, 2018; Guo, Wu, Liu, Ge, & Chen, 2018) and multiple reaction monitoring (MRM) transitions (Ma, Zhang, Liang, Xig, Han, Guo, & Chen, 2019) have also been reported to be reliable in determining the cheaper components that are used to substitute EBN.

Further, Quek, Chin, Tan, Yusof, and Law (2018) classified the raw and commercial EBNs based on species and origins with Forensically Informative Nucleotide Sequencing (FINS) and SYBR green I based real-time polymerase chain reaction. These approaches have been shown to be efficient in differentiating genuine EBN from counterfeiting, identifying the EBN from a cave or man-made house, and discovering EBN produced by AF and AM. Several studies have also suggested a low-cost approach to detect adulterants in EBN such as a smart system with a colorimetric sensor array (Huang, Li, Zou, Shi, Tahir, Xu, Zhai, & Hu, 2019) or by examining glycoprotein (Xu, Zheng, Xie, Zeng, Fan, Zheng, & Zhang, 2019). Meanwhile, some researchers also have proposed quick and simple techniques such as by thermal analysis (Shim, Chandra, & Lee, 2017) and near-infrared (NIR) spectroscopy and chemometric (Zhang, Sun, Wang, Wang, Zhang, & Hu, 2018; Shi et al., 2017).

With all these scientific methods established, monitoring the fake EBN on the market could be helpful. The studies performed on adulteration identification and quantification can be a guideline for protecting the public from food fraud. Preventing fraud and exposure to food poisoning or other food-borne diseases could relieve the consumers' anxiety.

1.2.3 Halal Status of Edible Bird's Nest

The issue of adulteration in EBN with haram-related sources appears to be an ongoing discussion. It was first reported in 1998, where the salivary nest was replaced with other substituted ingredients such as agar, natural gum, and pork skin (Su, Liu, Shiau, Lee, & Chou, 1998). Goh, Chua, Chew, Liang, Seow, Ou, Yi, and Lee (2001) suspected and believed that gelatin (porcine and bovine), feather, or additives were present in EBN. However, allergic patients showed a negative response to these allergens, and it was concluded that food allergen could be possibly caused by different sources.

However, Guo et al. (2018) argued that the adulterated EBN may gradually become close to authentic EBN as the concentration of adulteration decreases. In 2005, three new EBN contaminants were identified by Marcone. There are red seaweed, tramella fungus, and egg white. The presence of white fungus was identified using stereoscopy by Lin, Zhou, and Lai (2006). On the other hand, the presences of tramella fungus, egg white, rice,

soybean, and milk were revealed by Wu et al. (2010). More recently, EBN was found to be adulterated with porcine, gelatin, and egg white (Tukiran, Ismail, Mustafa, & Hamid, 2016). These problematic ingredients further heighten fear and anxiety among Muslims to consume the purported nutritious products that have caused much distress due to ambiguities and subsequently cast doubts over the halalness of EBN products.

Contamination and adulteration issues in EBN have become a global concern and caused confusion among consumers. The presence of unidentified ingredients not only creates immense anxiety in food safety issues but also their doubt on the halalness of EBN. Muslims in Malaysia always demands and ensure that their food and dietary are halal as obligated in the Quran. This is also parallel with the findings of Mohamed, Shamsudin, and Rezai (2013) whose study centered on how halal labeled food may affect consumers' decision to purchase. Halal products are also well accepted by non-Muslim consumers in Malaysia as they have become familiar with the context of halal. Prior research also revealed that non-Muslims are willing to purchase and perceived positively towards halal labeled food products (Haque, Sarwar, Yasmin, Tarofder, & Hossain, 2015; Ayyub, 2015; Ismail & Nasiruddin, 2014; Mathew, 2014; Rezai, Mohamed, Shamsudin, & Chiew, 2010). Indeed, halal food provides assurance in terms of quality, safety, and hygienic aspects of the food.

Halal and haram are terms that exclusively used in Islam and one of the fundamental principles in Islamic law (Jallad, 2008). The word halal, as used by Muslims, refers to any act that is deemed to be permissible under Islamic law, whereas the word haram is defined as an act that is considered forbidden (Jallad, 2008). The term permissible is expressed by something lawful, pure, and clean, whereas the term forbidden applies to something unclean, impure and unlawful, but not necessarily in its physical condition (Jamalluddin, Tukiran, Fadzillah, & Fathi, 2019). The Quran states that the food must be lawful and good as well (Tieman, 2011; World Halal Forum, 2009), which is known as halalan toyyiban. Toyyiban emphasizes that food quality and safety are ensured before consumption. Whereas, the halalan-toyyiban is a concept that indicates food must be permissible to be consumed, hygienic, safe, nutritious, quality, and beneficial to the consumers as well (Omar & Jaafar, 2011). For example, nutritious products containing only halal ingredients and also not containing any substances (such as additives) that can threaten consumer health are in compliance with Islamic guidelines and principles.

As consumers become increasingly more sensitive and interested in their diet and health, there will be a growing need for adequate information to be provided on the label to convince the consumers (Pomarici, Amato & Vecchio, 2015). The scientific ingredients listed on the label will be too difficult for consumers. As a result, they may not purchase the product because the ingredients trigger doubts in their mind. However, a halal certified product with a halal logo will eliminate their doubt and uncertainty over the product. A product certified and labeled with a halal logo will give the consumer peace of mind and reassure them that the product is halal and compliant with Shariah (Bashir, 2019).

1.3 Research Gap

A research gap is an area that has limited information or yet to be explored in a particular field of study. To put it simply, a specific question has not been addressed properly for particular issues in a respective field. This study reveals an empirical gap through a systematic process by identifying gaps or areas that have not been explored in previous studies related to EBN.

This study adapts the Four-Phase PRISMA flow diagram to trace a gap in the study of consumer behaviour explicitly for EBN products. The Four-Phase PRISMA flow diagram and PRISMA checklist are originally from the PRISMA statement with the aim to reporting systematic reviews and meta-analyses (Moher, Liberati, Tetzlaff, and Altman, 2009). However, this study only adapts the Four-Phase PRISMA flow diagram to systematically and thoroughly search for existing literature related to EBN.

The Four-Phase PRISMA flow diagram consists of identification, screening, eligibility, and included. The first step involves identifying potential research keywords or strings to be retrieved from several journal databases, namely Scopus, Web of Science, Science Direct, and Taylor & Francis. Various keywords were used to narrow down the studies related to the EBN as can be seen in Table 1.2.

Table 1.2: The Search String for Identification

Database	Keywords used
Scopus	ALL (("edible*" OR "consum*" OR "eatable*") AND ("bird* nest*") AND ("swiftlet*"))
Web of Science	TS = (("edible*" OR "eatable*" OR "consum*") AND ("bird*" OR "nest*") AND ("swiftlet*"))
Science Direct	edible; consumable; bird nest
Taylor & Francis	edible; consumable; bird nest

Figure 1.1 shows the number of studies or articles that can be found in Scopus (125 articles), Web of Science (43 articles), Science Direct (158 articles), and Taylor & Francis (168 articles).

The second step involves the screening process by reading each abstract found in the first step. The articles that did not meet inclusion criteria were removed such as duplicate articles (52). The search string was limited only to research articles (evidence-based), English, and a timeline from 2000 to 2018. This resulted in an exclusion of 311 articles.

Full-text articles were assessed for eligibility and about 40 articles were omitted due to not based on empirical evidence and not focused on the EBN. Finally, there were 90 articles reporting on the biological and clinical benefits of EBN, such as nutritional contents, medicinal benefits, contamination, adulteration, and detection techniques.

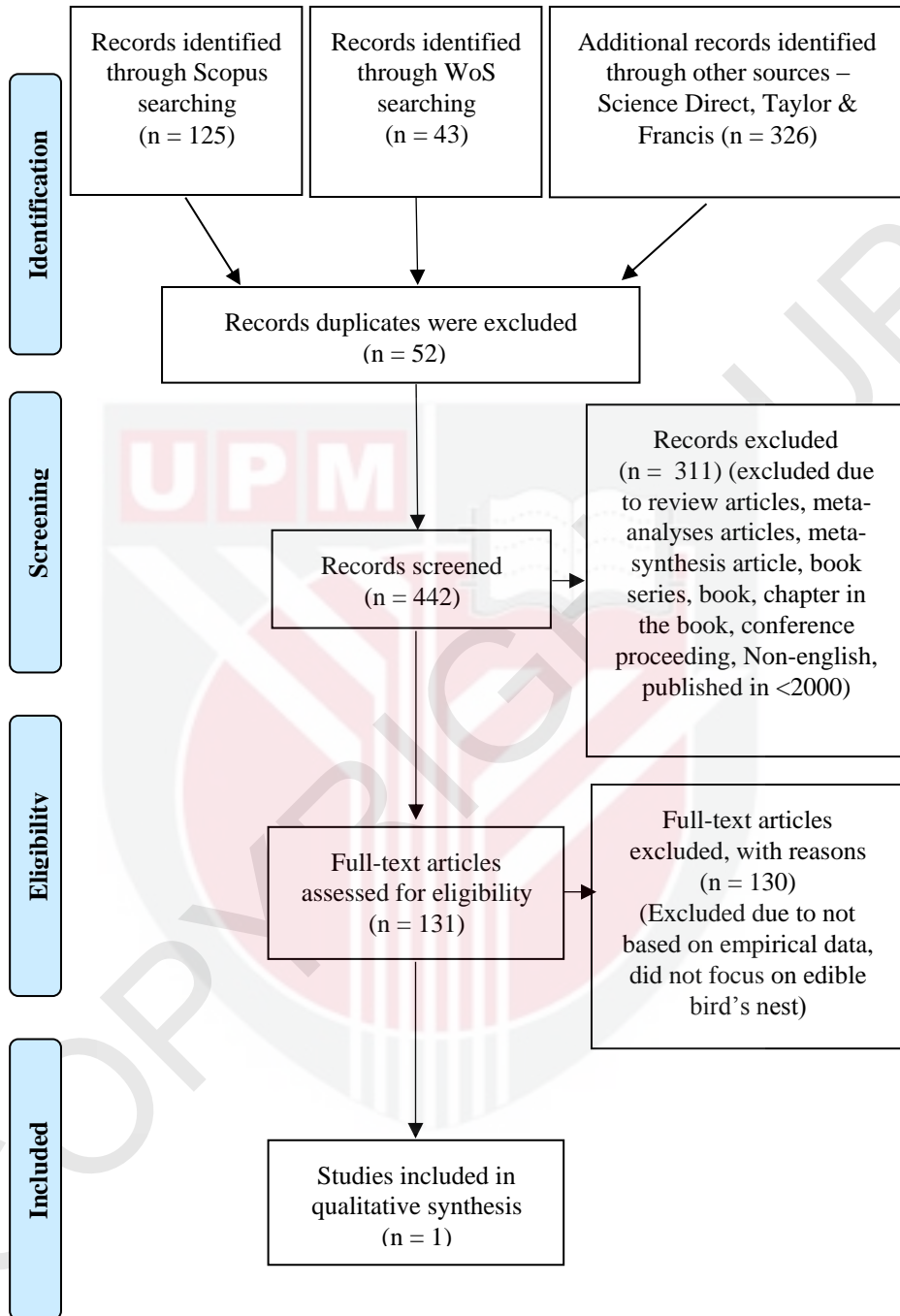


Figure 1.1: The Four-Phase PRISMA Flow Diagram
 (Source: Adapted from Moher et al., 2009)

However, only one social science study was found in the Taylor & Francis journal that focused on the behavioural intention of Malaysian consumers to purchase EBN products. A study by Sharifuddin, Ramalingam, Mohamed, and Rezai (2014) has adopted the Theory of Planned Behaviour and explored how attitude, subjective norm, and perceived behavioural control can influence the intention of Malaysian consumers to purchase EBN products. Structured questionnaires were used as an instrument to collect data and afterward the data were analyzed using multiple regression analysis. The results from multiple regression analysis showed that intention to purchase EBN products among Malaysian consumers was significantly influenced by attitude, subjective norm, and perceived behavioural control.

A study by Sharifuddin et al. (2014) was conducted after the nitrate issues emerged in 2011 which caused EBN prices to fall and no similar study was conducted thereafter. This justifies a limited study was conducted in exploring and evaluating the behaviour pattern and psychology of the consumers to purchase EBN products in the aftermaths of contamination issues and the post settlements in early 2018 (Whitehead, 2019).

1.4 Problem Statement

The contribution of the bird's nest industry to the Malaysian economy is estimated to be RM4.5 billion (US\$ 1.1 billion) in 2019 (Whitehead, 2019). According to Dr. Afif Bahardin (Chairman of the Penang Health, Agriculture, Agro-Based Industry and Rural Development Committee), the industry has recorded an export value of RM1.32 billion only in 2018 to several destinations such as China, Hong Kong, Laos, South Korea, the United States of America, and Taiwan (Chern, 2019). In fact, with 60 tonnes of processed nests exported annually, Malaysia has become the second-largest global supplier after Indonesia (Whitehead, 2019).

The Malaysian government has encouraged ranchers and investors to venture into this industry and build more Swiftlet houses. The reason is to increase production and also provide employment opportunities for the locals. Notwithstanding, the Swiftlet farming in Malaysia is reported to have shrunk from 60,000 ranchers in 2014 ("Stricter Rules", 2014) to 20,000 ranchers in 2019 (Whitehead, 2019). This is due to the fact that China has only issued 33 licenses for Malaysian companies to process and export EBN products (Jaafar, 2019). According to Chief Financial Officer of Enest Group, Christopher Tan Yew Leong stated that Malaysia's market generates 3.41% revenue for the company, while China contributes 91.11% (Jaafar, 2019). Yet, as staggering as this number, it reflects that the bird's nest industry in Malaysia is starting to recover due to the expected return of growth in export. However, about 40,000 ranchers failed to survive since local EBN products could not be exported to China and also due to relatively low demand for EBN in Malaysia.

The challenges in the bird's nest industry are not merely caused by the contamination in EBN, but also due to the fabrication of ingredients by some producers to take advantage of the rising market price. Datuk Seri Ahmad Shabery Cheek, the Former Minister of Agriculture and Agro-Based Industry (now known as Minister of Agriculture and Food

Industries) has prohibited ranchers from cleaning their own bird's nest because it could deteriorate the quality of the product. The EBN products could be exposed to the risks affecting halal and food safety, which may become barriers in consumers' intention to purchase and consume EBN products. The minister was also quoted "Now we have a platform to do everything legally that fulfill quantity standards, so what happen 3 years ago won't happen" ("Deal with China", 2016).

As mentioned earlier, only one study was found to have addressed the consumer behavioural intention towards EBN products and the study was conducted in 2014, which gives wider scopes to study further. The issues of contamination in EBN has been slowly resolved since 2016 ("Happy Days are Back", 2017) and completely settled in early 2018 (Whitehead, 2019). However, the intention of consumers to purchase EBN products after the issues resolved remains unexplored.

Apparently, the prior study did not address the concerning issues related to EBN and how much these issues can affect the intention of consumers to purchase EBN products. The unexplored dimensions related to the concerning issues should be further explored to extend the research in the behavioural intention to purchase EBN products. As Mayer and Sparrowe (2013) describe the integration theories creates something new and novel, which enables important research questions to be better answered. Moreover, the prior study has only covered the intention to purchase EBN products among non-buyers. The intention to repurchase EBN products among buyers as well as differences in buyers' spending behaviour are currently undiscovered.

Most of the studies provide demographic profiles of respondents, instead of a profile for each category of the segment. The proposed theory can be successful and effective when the targeted samples are recognized and implemented the strategy to the intended samples. Teh and Ma (2018) asserted that only privileged groups can afford to purchase EBN products due to the hefty price. This hasty statement was made without sufficient research to support it and little is known about the profile of non-buyers and buyers of EBN products.

1.5 Research Questions

In view of the preceding discussion of the issues raised above, the following research questions are designed for further investigations:

- 1) **Research Question 1:**
What is the difference in intention level between groups of non-buyer and buyer to purchase EBN products?

- 2) Research Question 2:
 - a. What are the underlying factors influencing non-buyers' intention to purchase EBN products?
 - b. Who are the potential consumers that have a high intention to purchase EBN products among non-buyers?

- 3) Research Question 3:
 - a. What are the underlying factors influencing buyers' intention to repurchase EBN products?
 - b. Who are the existing consumers that have the intention to repurchase EBN products?
 - c. What are the differences between the effects of the underlying factors on buyers' repurchase intention based on their spending behaviour?

1.6 Research Objectives

The general objective of this study is to investigate factors that influence the purchase and repurchase intention of edible bird's nest products among different groups of Malaysian consumers. The specific objectives of this study are:

- 1) Research Objective 1:
To compare the difference in intention level between the groups of buyer and non-buyer

- 2) Research Objective 2:
 - a. To identify the factors that influence non-buyers' intention to purchase EBN products
 - b. To discover potential consumers that have high intention to purchase EBN products among non-buyers

- 3) Research Objective 3:
 - a. To identify the factors that influence buyers' intention to repurchase EBN products
 - b. To discover existing consumers that have the intention to repurchase EBN products among buyers
 - c. To investigate the differences between the effects of the underlying factors on buyers' repurchase intention based on their spending behaviour

1.7 Scope of the Study

The scope area of the study is focused on EBN based products packaged and sold in tablet, capsule, sachet, bottle drink, including clean raw EBN or any other convenient format. Since the main objective of the study is to investigate factors that influence purchase and repurchase intention of edible bird's nest products among different groups of Malaysian consumers, purchase behaviour is not included in the conceptual framework of this study.

Moreover, the respondents selected for this study are divided into two groups, namely non-buyer and buyer. The participated respondents should also meet specific criteria by which the respondents must be over 18 years old and earn a monthly income. These criteria are important to make sure the respondents are qualified to make a purchase decision.

This study will conduct a survey through a questionnaire as an instrument to collect information from the targeted respondents. The survey will be conducted in the public area around the Klang Valley region such as shopping malls and supermarkets. The survey is expected to start in February 2018.

1.8 Significance of the Study

This study will contribute to the literature in several ways and can benefit all key players along the bird's nest supply chain, including Swiftlet ranchers, manufacturers, retailers, marketers, and consumers. Firstly, this study will contribute to the literature by extending the theoretical knowledge and improving better predictions of behavioural intention. This study extends the research carried out by Sharifuddin et al. (2014) to identify possible factors affecting the intention to purchase EBN products. Thus, this study expands knowledge on purchase and repurchase intention and highlighted the important factors of purchase and repurchase intention.

Secondly, from a practical perspective, this study will help focus on important factors and provide recommendations on new areas for expansion based on analytical findings gathered from consumers' opinions. Considering that market research plays an important role in understanding consumers better and finding more opportunities in the marketplace, this study may provide the strategic direction for ranchers and manufacturers to develop and offer a new product that meets consumers' needs in Malaysia. This subsequently provides a clearer picture for all key players to stay in business and remain relevant in the marketplace.

Thirdly, this study will help to map out the profile of the ideal consumers and focus on important attributes that trigger consumers to purchase and repurchase EBN products. The findings will assist ranchers, manufacturers, and retailers in deciding the target market by narrowing down the specific target as well as positioning the product in better

target audiences. Finally, this study will provide a guideline for future research in the areas of market research, consumer behaviour, and preferences in regards to EBN products.

1.9 Structure of the Dissertation

The dissertation is organized into five chapters. Chapter One presented the background of the study and introduced the main issues related to the bird's nest industry including potential conflicts concerning EBN products. The chapter also provided research gaps and persuasive problem statements to justify the related controversial issues engaged. Several research questions and research objectives have been identified and need to be addressed. The significance and scope of the study have also been discussed before the chapter ended. Chapter Two provides a comprehensive review of the relevant literature pertaining to behavioural intention (purchase and repurchase intention). This chapter also provides a review of the main theories and a model used by previous studies and constructs incorporated in this study. Chapter Three begins with a research framework and hypotheses to be tested. The subsequent sections focus on the research design and methodology, which includes comprehensive explanations of the sampling procedures, questionnaire development, the techniques used for analyzing the collected data, and the rationale for the chosen methods. Chapter Four presents the results and discussion. This chapter is divided into three parts. Part one describes the socio-demographic of respondents. Part two elaborates on the differences between the two groups (non-buyer and buyer). Part three proceeds by testing the hypotheses for the non-buyer and buyer groups and distinguishes the consumers' profile. Chapter Five concludes with a summary, significant implications, research limitations, and recommendations for future research. Finally, the chapter ended with concluding remarks.

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BIODATA OF STUDENT

The student, Nurul Nabilah Huda Mohamad Shukri was born on 28th March 1990 in Kuala Lumpur, Malaysia. She attended her primary school at Sekolah Kebangsaan Tun Abdul Aziz Majid from 1997 until 2002. She did her secondary school at Sekolah Menengah Kebangsaan Dusun Nanding from 2003 until 2005 and Sekolah Menengah Saujana Impian from 2006 until 2007. After she finished her secondary school, she further her study at Universiti Teknologi Mara for her Diploma in Business Study, Bachelor Degree in Operation Management, and Master Degree in Quantitative Sciences that she completed in 2015. As her master degree completed, she continued to join Universiti Putra Malaysia for PhD in Agribusiness.

The reason she pursued her study in agribusiness is to understand better how to do agriculture business in Malaysia, especially in Swiflet farming industry. She has been helping her father since 2011 to manage swiftlet houses at Marang, Terengganu. Subsequently, her interest grew over time that led her to venture into this business and at the same time doing market research while attending Universiti Putra Malaysia. Currently, she is the founder of the Prestij Walet Herb that has been established since 2016 and the company produces three types of EBN products, such as uncleaned raw EBN, EBN essence, and drinks.

LIST OF PUBLICATIONS

Research Paper

- Mohamad Shukri, N. N. H., Mohd Naw, N. M., Abdullah, A. M., & Man, N. (2018). Consumer's Perception on the Quality of Controversial Contents in Edible Bird's Nest Products. *Pertanika Journal of Scholarly Research Reviews*, 4(1), 1-9.
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