INFLUENCE OF SUPPLY CHAIN INTEGRATION, ISLAMIC HUMAN CAPITAL AND HALAL SUPPLY CHAIN INTEGRITY ON HALAL HERBAL-BASED FOOD SMEs' PERFORMANCE

By

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

September 2020

IPPH 2020 6

Abstract of this thesis presented to the senate of Universiti Putra Malaysia in fulfilment of the requirements for the degree of Doctor of Philosophy

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Chairman : Assoc. Prof. Nitty Hirawaty Kamarulzaman, PhD
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Both Muslims and non-Muslims perceive halal herbal-based food products to be clean, hygiene, and nutritious. Although halal certification and logo provide a promising assurance that the whole supply chain complies with the Shariah law, however, several unethical cases have affected the herbal-based food products. The supply chain activities possess a high potential to influence halal integrity along the herbal-based food products supply chain. All players in the herbal-based food products supply chain should take responsibility to preserve integrity as it cannot be guaranteed if the other players do not practice similar halal practices. In the halal business, the business owner or manager should be equipped with the technical knowledge, skills, and experience based on the Islamic view to manage and execute the halal business and services. Hence, the objective of this study is to investigate the influence of the supply chain integration (SCI) and Islamic human capital practices on the halal supply chain integrity (HSCI), and its influence on herbal-based food SMEs' performance. Three prominent theories, namely Strategy-Structure-Performance (SSP), Resource-Based View (RBV), and Human Capital Theory were employed to describe the variables. Seven hypotheses were proposed to determine the relationship between the supply chain integration (SCI), Islamic human capital, halal supply chain integrity (HSCI), and herbal-based food SMEs' performance. A quantitative methodology was applied, and data were collected using an interviewer-administered questionnaire. The convenience sampling technique was employed to choose 176 halal herbal-based food SMEs located in Peninsular Malaysia. Both SPSS and Partial Least Squares-Structural Equation Modelling (PLS-SEM) were used for data analysis. The key finding revealed that both the SCI and Islamic human capital positively influenced the HSCI. Moreover, the HSCI has also positively influenced the herbal-based food SMEs' performance. Further analysis also supported the mediating effect of HSCI in influencing herbal-based food SMEs' performance. Practically, the inputs gained from this research could potentially be beneficial to various stakeholders, specifically academics, practitioners, (halal manufacturers, business owners, or managers) and policymakers. Based on the theoretical implications, this study

has specifically extended several theories such as the Strategy-Structure-Performance (SSP), Resource-Based View (RBV), and Human Capital Theory into the halal product management and halal supply chain integrity (HSCI) within the field of halal supply chain management. Furthermore, the study has provided implications for the halal herbal-based food SMEs in terms of prioritizing on cross-functional integration within the firms and further improvement on the Islamic human capital development with halal supply chain knowledge and religious orientation. Lastly, this study contributed to policymakers that herbal-based food production should be focused on the aspects of halal product management with the application of Islamic principles.

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

PENGARUH INTEGRASI RANTAIAN BEKALAN, MODAL INSAN ISLAM DAN INTEGRITI RANTAIAN BEKALAN HALAL TERHADAP PRESTASI PKS MAKANAN HALAL BERASASKAN HERBA

Oleh

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Pengguna Islam dan bukan Islam beranggapan bahawa produk makanan halal berasaskan herba adalah bersih, suci, dan berkhasiat. Walaupun pensijilan halal dan logo halal memberikan jaminan bahawa seluruh rantaian bekalan mematuhi undang-undang Syariah, namun, terdapat kes-kes yang telah mempengaruhi integriti produk makanan halal berasaskan herba. Aktiviti-aktiviti rantaian bekalan amat berpotensi untuk mempengaruhi integriti halal disepanjang rantaian bekalan produk makanan berasaskan herba. Kesemua pemain dalam rantaian bekalan produk makanan halal berasaskan herba harus memainkan tanggungjawab untuk mengekalkan integriti kerana integriti produk tidak dapat dijamin sekiranya pihak lain tidak mengamalkan konsep yang sama. Dalam perniagaan halal, pemilik atau pengurus perniagaan harus mempunyai pengetahuan teknikal, kemahiran, dan pengalaman dari segi Islam untuk mengurus dan melaksanakan perniagaan serta perkhidmatan halal. Justeru itu, objektif kajian ini adalah untuk mengenalpasti pengaruh integrasi rantaian bekalan dan pengaruh amalan modal insan Islam keatas integriti rantaian bekalan halal dan pengaruhnya terhadap prestasi PKS makanan halal berasaskan herba. Tiga teori iaitu *Strategy-Structure-Performance* (SSP), *Resource-Based View* (RBV), dan *Human Capital Theory* dirujuk dan digunakan untuk membincang pemboleh ubah kajian. Tujuh hipotesis telah dicadangkan bagi tujuan penentuan hubungan antara integrasi rantaian bekalan, modal insan, integriti rantaian bekalan halal, dan prestasi PKS makanan halal berasaskan herba. Kaedah metodologi kuantitatif telah diaplikasikan dan data dikumpul melalui kaedah soal selidik. Teknik persampelan mudah dipraktikkan bagi tujuan pemilihan responden iaitu seramai 176 PKS makanan halal berasaskan herba di Semenanjung Malaysia. Kaedah SPSS dan *Partial Least Squares-Structural Equation Modelling* (PLS-SEM) digunakan untuk tujuan menganalisis data. Penemuan utama kajian ini menunjukan bahawa integrasi rantaian bekalan dan amalan modal insan Islam mempengaruhi secara positif terhadap integriti rantaian bekalan halal. Tambahan pula, integriti rantaian bekalan halal juga mempengaruhi prestasi PKS makanan halal berasaskan herba secara positif. Analisis lanjutan juga menyokong kesan pengantaraan integriti rantaian bekalan halal dalam

mempengaruhi prestasi PKS makanan halal berasaskan herba. Secara praktikal, input yang diperoleh daripada kajian ini berpotensi memberi manfaat kepada pelbagai pemegang taruh khususnya ahli akademik, pengamal (pengeluar produk makanan halal, pemilik perniagaan, atau pengurus) dan penggubal dasar. Berdasarkan implikasi teori, kajian ini secara khususnya telah memperkembangkan pengaplikasian teori *Strategy-Structure-Performance* (SSP), *Resource-Based View* (RBV), dan *Human Capital Theory* di dalam bidang pengurusan produk halal dan integriti rantaian bekalan halal khususya di dalam bidang pengurusan rantaian bekalan halal. Selanjutnya, kajian ini memberi implikasi kepada pengusaha-pengusaha produk makanan halal berasaskan herba dari segi mengutamakan integrasi di dalam firma dan pembangunan modal insan dengan pengetahuan rantaian bekalan halal profesional dan orientasi agama. Akhir sekali, kajian ini juga menyumbang kepada penggubal dasar bahawa pengeluaran makanan halal berasaskan herba harus memberikan tumpuan kepada aspek pengurusan produk halal dengan penerapan prinsip-prinsip Islam.

ACKNOWLEDGEMENTS

I wholeheartedly thank my mighty God for giving me the vision, power, spirit, and endurance to complete my PhD journey successfully. For me, a PhD is not just a piece of degree, but the "sweetest and biggest fruit" that I have ever wanted to give to my dad who never fails to dream of my PhD completion. My journey is a mix of a painful and enjoyable experience. It's just like climbing a high peak, step by step, accompanied by bitterness, hardships, frustration, encouragement, and trust and with so many people's kinds of help. Although it won't be enough to express my gratitude in words to all those people who continuously support and helped me, I still want to thank all these people for giving me many, many thanks.

First of all, I'd like to give my sincere thanks to my main supervisor, Associate Professor Dr. Nitty Hirawaty Kamarulzaman. I have found guidance, friendship, discipline, and unconditional love in one person and that person is Dr. Nitty. Her supports, advice, and guidance always guiding me in the right direction. Her encouragement and help made me feel confident to fulfill my desire and to overcome every difficulty I encountered. I've learned a lot from her, without her help I could not have finished my educational journey successfully. The one and only supervisor who guided me from Bachelor's degree to a PhD degree.

I also appreciate the advice of the committee members, Professor Dr. Azmawani Abd Rahman and Associate Professor Dr. Amin Mahir Abdullah for their critical comments, which enabled me to make the necessary improvements according to their comments. Furthermore, I'd like to convey my heartfelt thanks to my home university, Universiti Putra Malaysia for offering *Geran Putra – Inisiatif Putra Siswazah (IPS)* for my research.

Last but not least, I am greatly indebted to my husband Mr. Segar, and my two little daughters. They form the backbone and origin of my happiness. Also, I am very grateful to my family members especially my loving mother, dad, aunty, and cousin sister. Their understanding and kind-hearted has affected me to be steadfast and bend to difficulty. Being a full-time lecturer, as a mother and wife and a PhD candidate was not an easy thing for me without these great people. They joined to take the responsibility to take care of my daughters when I need to concentrate on my research. Their love and support without any complaint or regret have enabled me to complete this PhD. I owe my every achievement to all of them.

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LIST OF ABBREVIATIONS

9MP	Ninth Malaysia Plan
AVE	Average Variance Extracted
CFA	Confirmatory Factor Analysis
CR	Composite Reliability
EPP1	Entry Point Project
ETP	Economic Transformation Program
f-2-f	Farm-to-Fork
FB	Facebook
FDI	Food-Drug Interface
FRIM	Forest Research Institute Malaysia
FSQD	Food Safety and Quality Division
GAP	Good Agricultural Practices
GDP	Gross Domestic Product
GMP	Good Manufacturing Practices
GN1	Gross National Income
HDC	Halal Industry Development Corporation
HMP	Halal Master Plan
HOC	Higher-Order Components
HSCI	Halal Supply Chain Integrity
HTMT	Heterotrait and Monotrait
IMP2	Second Industrial Master Plan
IMP3	Third Industrial Master Plan
ISO	International Standard of Organisation
JAKIM	Department of Islamic Development Malaysia
MARDI	Malaysian Agricultural Research and Development Institute
MITI	Ministry of International Trade and Industry
MOH	Ministry of Health Malaysia
MS	Malaysian Standards
NAP	National Agriculture Policy
NKEA	National Key Economic Area
NPCB	National Pharmaceutical Control Bureau
NPRA	National Pharmaceutical Regulatory Agency
NRE	Ministry of Natural Resources and Environment
PLS-SEM	Partial Least Squares - Structural Equation Modelling
R&D	Research and Development
RBV	Resource-Based View
SCI	Supply Chain Integration
SCM	Supply Chain Management
SEM	Structural Equation Modelling
SMEs	Small and Medium Enterprises
SSP	Strategy-Structure-Performance
VIF	Variance Inflation Factor

CHAPTER 1

INTRODUCTION

The first chapter of this thesis consists of the introduction, problem statement, research questions, research objectives, the significance of the study, the scope of the study, terms and operational definitions, and organisation of the thesis. In the introduction section, discussion on the Malaysian herbal industry and halal industry were presented and followed by the problem statement. The research questions, objectives, and significance of the study were described in the following sections. The final section describes the scope of the study, terms, and operational definitions, as well as the organisation of the thesis.

1.1 Overview of Malaysian Herbal Industry

Herb refers to any form of a plant or plant product which includes leaves, stems, berries, flowers, roots, and seeds (Bent, 2008). These plants could be sold as raw materials or in the form of extracts, in which the plant will be soaked in water, alcohol, or other solvents to extract some of its chemicals. These value-added processes result in finished products such as herbal-based food products, herbal-based cosmetics products, herbal health care, and nutritional supplements. Herbal-based products which possess medicinal values are classified under drugs, medicines, or dietary supplements. Herbal-based products convey a range of therapeutic claims on its enablement to treat several sicknesses, such as fever, high blood pressure, diabetes, and even critical disease such as cancer (Merrills & Fisher, 2013).

As early as the 19th century, chemists had already begun to carry out researches on plants by extracting and modifying the active ingredients from plants and produce their plant compounds. Almost one-fourth of the pharmaceutical drugs are derived from botanical sources. It is estimated that approximately 80% of the world population depends on herbal-based medicines and supplements as an alternative to modern medication for their healthcare (Ekor, 2013). Herbs and herbal products are continuously used in every country around the world. Countries like India, China, Japan, Thailand, and Germany improved their traditional herbal medicines for health maintenance and healing purposes (Ahmad et al., 2015). The growing trend in the herbal industry led the consumers to exhibit interest in herbal supplements, health functional food, herbal-based energy drinks, and skincare products (Rizal et al., 2010; Ahmad et al., 2015). Furthermore, previous studies by Coppens et al. (2006) and Van Den Berg et al. (2011) reported that the use of plant ingredients such as vegetables and fruits, herbs and spices in food products has steadily increased since the last decade.

The rise on demand for herbal-based medicines, supplements, foods, beverages, and cosmetic products have been attributed to several factors, some of which include (i) various claims on the usefulness and efficacy of the herbal-based products, (ii) impression that the herbal-based products are superior than manufactured products, (iii)

general perception that herbal-based products are safe and without side effects due to its natural characteristics, (iv) high cost and side effects of most modern drugs, (v) improvements in the quality, efficacy, and safety of the herbal-based products with the development of science and technology, (vi) herbal-based products as another alternative, and (vii) a movement towards self-medication (Bandarnayake, 2006). It is important to reiterate the staggering rate at which the interest and use of herbal-based products expand.

Malaysia is well known for its rich natural resources and dense forests. According to the Malaysian Agricultural Research and Development Institute (MARDI), the rich flora of Malaysia includes 15,000 known plant species, of which 2,000 species possess medicinal value and carries the high potential to be used for commercialization. As herbs are known as plants with aromatic properties, used to flavor and garnish food, as fragrance and medicine in general, herbal-based products generate gross profits in excess of RM5.4 billion per year. Herbal-based products are also used in food supplements, pharmaceuticals, cosmetics, in the chemical industry, for personal care, and as medicine (Zakaria et al., 2019). Table 1.1 shows the classification of Malaysian herbs by product groups.

Table 1.1: Malaysian Herbs Classification by Product Groups

Classification	Product groups
Flavors and Fragrance	a. Cosmetics
	b. Perfumes
	c. Essential oil
	d. Beverages
Pharmaceuticals/Herbal	a. Remedies/Drugs
	b. Vitamins/Supplements
Health/Functional Food	a. Health food
	b. Herbal teas
	c. Herbal supplements
Bio-Pesticides	a. Insect repellent
	b. Crop pesticides
	c. Household pesticides

[Source: Zakaria et al. 2019]

The most popular herb used by the Malaysian herbal industry for the development of herbal-based products are *Belalai Gajah*, *Dukung Anak*, *Gelenggang*, *Halia*, *Hempedu Bumi*, *Kacip Fatimah*, *Karas*, *Makhota Dewa*, *Mas Cotek*, *Mengkudu*, *Merunggai*, *Misai Kucing*, *Pegaga*, *Peria Katak*, *Rozel*, *Sambung Nyawa*, *Senduduk Putih*, *Serai Wangi*, *Sirih*, and *Tongkat Ali* (Forest Research Institute Malaysia [FRIM], 2015)

Realizing the economic potential, Malaysia has initiated the high-value herbal product initiatives under the National Key Economic Area (NKEA). The Malaysian government

has chosen the herbal industry as the first Entry Point Project (EPP1) for the nation's Agriculture New Key Economic Area (NKEA). The EPP1 emphasizes the improvement of product quality and marketing efforts in order to tap into the healthy food and supplements global demands, as well as the botanical drugs in the herbal supply chain. The EPP1 mainly focuses on four objectives, namely: (i) to achieve Gross National Income (GNI) of RM2.2 billion by 2020; (ii) to produce safe, high quality, and efficient high-end herbal products; (iii) to strengthen the supplies across the value chain and (iv) to enhance Research and Development (R & D) in herbs.

In the beginning, there were only five types of herbs focused on achieving the EPP1 objectives. The five types of herbs that were aimed to generate the national income were Tongkat *Ali, Kacip Fatimah, Misai Kucing, Hempedu Bumi,* and *Dukung Anak*. Then, six more herb species were added to the project: *Mengkudu, Roselle, Ginger, Mas Cotek, Belalai Gajah,* and *Pegaga.* The EPP1 is a Malaysian government initiative to transform the herbal industry into a dynamic, competitive, and profitable industry. The EPP for high-value herbal products could be considered a major deliverable and challenging project.

The Ministry of Natural Resources and Environment (NRE) forecasted expansion in the herbal local market by 15% a year from RM7 billion in 2010 to around RM29 billion by 2020 (Ahmad et al., 2015). The rapid expansion of the herbal industry is seen through its trading in Malaysia. According to Zakaria (2015), herb trading values recorded an annual growth rate of 45% for imports and 54% for exports between 2009 and 2014. In 2014, the highest import and export values were USD 2,077 million and USD 441.7 million, respectively (Zakaria, 2015). The international trade value indicates the potential of Malaysian herbal industry. The herbal industry which is penetrated by both the local and international players indicated a high potential growth in the herbal business in the future (Saleh, 2013).

1.1.1 Classification of Herbal-Based Products

Herbs from medicinal and aromatic plants could be found in three forms, namely raw materials (plants dry), extract (semi-finished products), and finished products (product food). In general, herbal-based products can be divided into three groups, namely herbal-based medicines, herbal-based foods, and food-drug interfaces (Pin, 2013). The herbal-based medicines were composed into two main groups, namely traditional herbal medicines and modern pharmaceutical herbal-based medicines. In the production of traditional herbal medicines, specific parts or the whole plant will be used. Meanwhile, in the production of herbal-based pharmaceuticals, only identified active compounds will be used once the metabolite in the herb is extracted, exiled, and purified.

Many botanical and herbal extracts such as Kacip Fatimah (*Labisia pumilla*), Misai Kucing (*Ortosiphon stamineus*), Tongkat Ali (*Eurycoman longifolia*), Mas Cotek (*Ficus deltoidei*), Kunyit (*Curcuma longa*), Pegaga (*Centella asiatica*), and Hempedu Bumi (*Andrographis paniculate*) were developed as herbal medicines (Ismail & Ehsan, 2010). For instance, *Orthosiphon Stamineus* or also known as Misai Kucing among Malaysians

is usually consumed as herbal tea. Commonly, the leaves of Misai Kucing which carries diuretic properties are used as Java Tea, which appears in many products as a health drink to remove kidney stones, gall stones, bladder inflammation, hypertension, water retention, diabetes, detoxification, and rheumatism (Almatar et al., 2014). In addition to that, the herbal drink is also believed to promote health and well-being.

In food preparation or the development of the herbal-based food products, herbs (fresh, dried, extract, and essential oils) were added as an ingredient to add flavor or aroma only. In this context, herbs that were not used for therapeutic purposes is referred to as botanical product, which is generally recognized to be safe for food and beverages. In Malaysia, food products are controlled under the Food Act 1983 and Food Regulations 1985. However, Pin (2013) claimed that there are no specific categories for herbal-based food products in food regulation. Therefore, approval is not required before the product is marketed (National Pharmaceutical Regulatory Agency [NPRA], 2018). These rules are in line with the standards and requirements of the specific labelling by product category. For example, botanical or herbal drinks are subjected to the regulation and general standards under the soft drink category.

Lastly, there is a wide range of health products or dietary supplements available in the market. These products are used for maintenance, prevention, and even treatment of chronic diseases. However, some of these products are not clearly marketed as "food" or "drugs". Such products are usually marketed without a clear status either as food products or pharmaceutical products. This scenario raises doubts and confusion among consumers. Therefore, these have been termed as "food-drug interface (FDI) products" and are included in many types of health products. To overcome this issue, the Ministry of Health Malaysia (MOH) has introduced a classification system (Figure 1.1) for food or food interfaces. Under the system, the herbal product will be categorized as a pharmaceutical product and controlled under the Drug Act by the National Pharmaceutical Control Bureau (NPCB) if the product meets any of the following criteria:

(i) If the product content is close to 100% of active ingredients e.g. amino acids, fatty acids, collagen, and others.

(ii) A product content that is close to 100% of herbs or a mixture of herbs that are not traditionally used as food and possesses medicinal values e.g. Aloe Vera, Mas Cotek, Misai Kucing, Royal Jelly, Rooibose tea, Tongkat Ali, and others.

(iii) Products containing a mixture of food ingredients with active ingredients and/or herbs identified in (i) and (ii) above shall be classified according to the 80:20 ratio general rule, unless otherwise specified;

   a. If a product contains more than 20% of the active ingredients or natural ingredients with pharmacological and/or therapeutic properties;
   b. If a product contains specific active ingredients which possess high pharmacological or therapeutic potencies.

Pin (2013) claimed that herbal-based food products are getting more attention due to its safety and quality. Thus, this study mainly focuses on herbal-based food products only. For herbal-based food products, it must contain a mixture of more than 80% of food ingredients with a minimum of 20% of active ingredients and/or herbs (Pin, 2013).

Coffee *Tongkat Ali*, ginger candy, *Merunggai* juice, turmeric powder, *Kacip Fatimah* energy bar, and Roselle tea are among examples of herbal-based food. While some herbal-based food products comprise promising potentials and are widely used, most of them are perceived to possess lower market value since they do not have strong scientific evidence (Ekor, 2013). Many local herbal-based food products failed to penetrate the international market due to the disability of the local industry to obtain relevant scientific evidence on the effectiveness of the product.

Although some herbal-based products like medicines, supplements, or healthcare food and drinks possess a promising potential and are widely used, many of them remain untested and their usage unmonitored (Raynor et al., 2011). The safety of traditional and herbal-based food products has, therefore, become a major concern to the consumers (Kasilo & Trapsida, 2011). Thus, to expand into the global market, herbal-based food products should improve its quality, standards, effectiveness, and safety (Ismail, 2010; Raynor et al., 2011; Ekor, 2013). In the upcoming years, consumers might be committed to the creation of high quality, clean, safe, and halal products which meet the international and local standards.

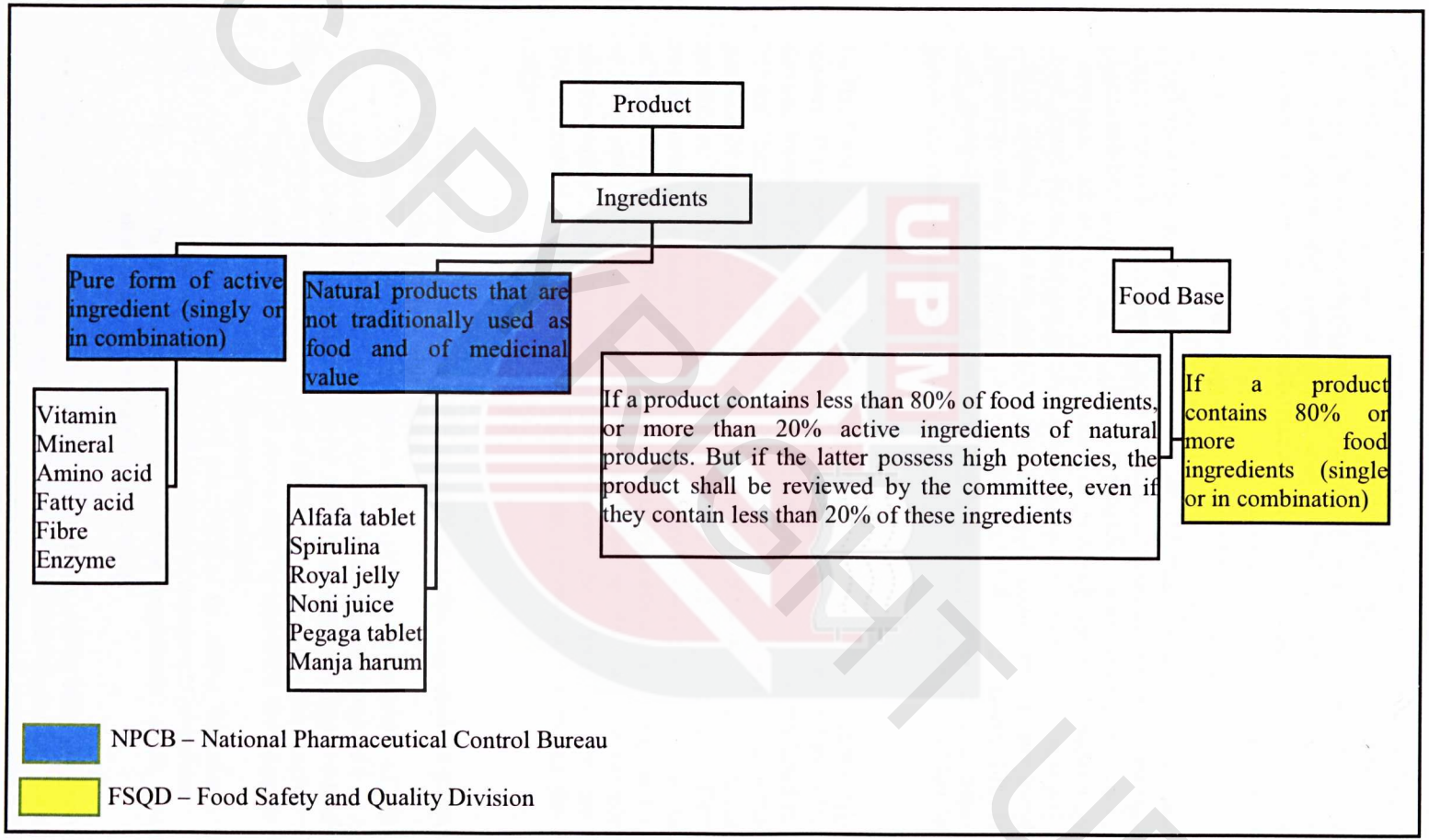

Figure 1.1: Guide to Classification of Herbal Food-Drug Interphase Products
[Source: NPRA, 2018]

1.1.2 Herbal Industry Supply Chain

The Malaysian government has identified the herbal industry as one of the economic drivers that could potentially be a significant addition to the Malaysian economic growth. Under the Economic Transformation Programme (ETP), herbal products are recognized and identified as a major player in creating the country's wealth. To achieve this status, the herbal industry supply chain is very important. Zakaria (2015) indicated that the supply chain of herbs in Malaysia consists of four levels. In most cases, the source of herbs originated from the local farm (planted by farmers), forest revenue collection (wild herbs), and imports. The supply of herbs will be distributed to the manufacturers who would transform the raw materials into finished goods. The finished goods will then be distributed to collectors/wholesalers, or distributors. Finally, the finished goods will be moved to the retail sectors, such as the local grocery shops and pharmacies where consumers could either purchase the herbal-based products from the wholesalers or/and retailers. The supply chain of herbs in Malaysia is illustrated in Figure 1.2.

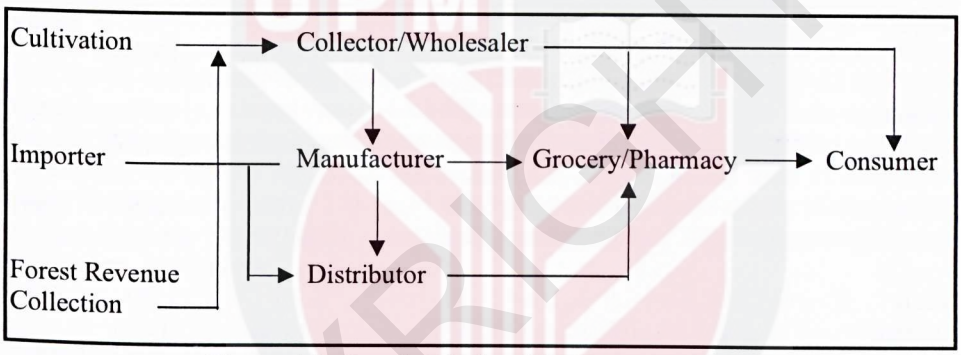

Figure 1.2: Supply Chain of Herbs in Malaysia
[Source: Zakaria, 2015]

Based on the herbal industry chain system (HerbaXpress) developed by the Forest Research Institute Malaysia (FRIM), there are a total of 6,174 herbal industry players comprising of 158 planting material suppliers, 338 planters, 357 manufacturers, 316 wholesalers, and 5005 retailers. Table 1.2 describes the distribution of herbal supply chain players by states in Malaysia. It shows that Selangor has the majority (1,269) players in the herbal industry. Next, Johor and Perak with 1,139 and 734 players, respectively. Overall, the herbal retailers make up the largest number, which comes up to 5,005 herbal supply chain players.

Table 1.2 exhibits that Perak, Pahang, and Selangor are among the top planting material suppliers in Malaysia with total suppliers of 26 (16.5%), 25 (15.8%), and 24 (15.2%) respectively. The state of Pahang is the main herb planter with a total number of 93 planters (27.5%), followed by Selangor, Johor, and Perak with the total planters of 72 (21.3%), 54 (16%), and 46 (13.6%). As shown in Table 1.2, Selangor ranks with the highest number of herbal-based products manufacturers of 75 (21%) while Kedah and Johor have 51 (14.3%) and 45 (12.6%) manufacturers respectively. Terengganu has the

least number, 5 (1.4%) of the manufacturers of the herbal-based products.

Furthermore, the downstream activities were mainly focused on the two major cities, which are Selangor and Johor. Selangor has dominated 79 (25%) of the wholesale activities for the herbal-based products in Malaysia. While Johor contributes 47 (14.9%) of the wholesale activities in Peninsular Malaysia. (Table 1.2). Meanwhile, the retailing activities were also dominated by Selangor, Johor, Perak, and Kuala Lumpur. Based on Table 1.2, Selangor records the largest number of herbal-based products retailers (1,019, 20.4%), followed by Johor and Perak with 973 (19.4%) and 601 (12%) respectively, and 549 (11%) herbal-based products retailers in Kuala Lumpur.

Table 1.2 : Distribution of Herbal Supply Chain Players by State

State	Planting Material Supplier	Planter	Manufacturer	Wholesaler	Retailer	Total
Johor	20 (12.7%)	54 (16%)	45 (12.6%)	47 (14.9%)	973 (19.4%)	1,139
Kedah	4 (2.5%)	9 (2.7%)	51 (14.3%)	39 (12.3%)	353 (7.1%)	456
Kelantan	16 (10.1%)	10 (3.0%)	36 (10.1%)	16 (5.1%)	288 (5.8%)	366
Kuala Lumpur	2 (1.3%)	0 (0%)	14 (3.9%)	41 (13%)	549 (11%)	606
Melaka	15 (9.5%)	17 (5%)	27 (7.6%)	10 (3.2%)	155 (3.1%)	224
Negeri Sembilan	12 (7.6%)	22 (6.5%)	16 (4.5%)	15 (4.7%)	254 (5.1%)	319
Pahang	25 (15.8%)	93 (27.5%)	12 (3.4%)	10 (3.2%)	259 (5.2%)	399
Perak	26 (16.5%)	46 (13.6%)	40 (11.2%)	21 (6.6%)	601 (12%)	734
Pulau Pinang	3 (1.9%)	6 (1.8%)	30 (8.4%)	28 (8.9%)	336 (6.7%)	403
Selangor	24 (15.2%)	72 (21.3%)	75 (21%)	79 (25%)	1019 (20.4%)	1,269

Terengganu	11 (7.0%)	6 (1.8%)	5 (1.4%)	7 (2.2%)	153 (3.1%)	182
Perlis	0 (0%)	3 (0.9%)	6 (1.7%)	3 (0.9%)	60 (1.2%)	72
Putrajaya	0 (0%)	0 (0%)	0 (0%)	0 (0%)	5 (0.1%)	5
Total	15	338	357	316	5,005	6,174

[Source: HerbaXpress, 2019]

The herbal industry supply chain players in Malaysia are dominated by the three main ethnic groups which are Malay, Chinese, and Indian. Based on the statistics published by FRIM in 2015, it is found that the Malay community leads the herbal industry. Out of the total of 5,743 herbal supply chain players, 3,287 (57.2%) were Malays. Meanwhile, a total of 2,219 (38.6%) Chinese players were involved with the upstream and downstream activities in the herbal industry. Only a small group of Indian communities (199, 3.5%) contributed to the herbal chain (Table 1.3). Meanwhile, only 38 (0.7%) of other ethnicities (e.g Orang Asal) who live in remote areas collect herbs from the natural forest or plants around their home compounds for their daily healthcare. Herbs and spices are popular among the Malaysian community and are commonly used in their daily meals. Besides that, a total of 375 out of 5,743 players in the herbal supply chain operates as more than one player, which comprises a combination of suppliers, manufacturers, wholesalers, or retailers.

Table 1.3: Ethnicity of Main Owner by Category of Herbal Supply Chain Players

	Malay	**Chinese**	**Indian**	**Others (*Orang Asal*)**	**Total**
Planting material Suppliers	34 (53.1%)	23 (35.9%)	0 (0%)	7 (11%)	64 (100%)
Planters	243 (69.2%)	38 (10.8%)	69 (19.7%)	1 (0.3%)	351 (100%)
Manufacturers	175 (70%)	69 (27.6%)	5 (2%)	1 (0.4%)	250 (100%)
Wholesalers	68 (52.3%)	57 (43.8%)	5 (3.9%)	0 (0%)	130 (100%)
Retailers	2,471 (54.0%)	1,967 (43.0%)	112 (2.4%)	23 (0.6%)	4,573 (100%)

Combination	296 (78.9%)	65 (17.3%)	8 (2.1%)	6 (1.7%)	375 (100%)
Total	3,287 (57.2%)	2,219 (38.6%)	199 (3.5%)	38 (0.7%)	5,743 (100%)

[Source: FRIM, 2015]

Over the past decade, there has been an increment of local herbal products in the market. However, those products remain at the lower end of the value chain (Aziz et al., 2010). This is because the local herbal producers were mainly focused on primary activities, such as production and extraction, but not on other high-value additional activities. Notwithstanding this, there is a noticeable increase in the performance of the herbal industry through product development, good manufacturing practices (GMP), and international marketing, as well as the distribution activities (Aziz et al., 2010).

In line with this, the herbal industry closely fixates its attention towards the whole supply chain quality control, which means from "seed to shelf". The growing interest in the potential of the market has quickened the move towards the development of global standards. Each stage in the supply chain was controlled by a certification standard, such as the Good Agricultural Practices (GAP), Good Manufacturing Practices (GMP), International Standard of Organisation (ISO), and the halal certification to obtain a consistent quality and reliability of the finished herbal products (Booker et al., 2012; Abdul Aziz et al., 2014). In modern Islamic countries, halal herbal-based food products are fast becoming a key product among Muslims and non-Muslims. This is a good indicator for developing and promoting the halal herbal-based food products for the global market. One of the main key drivers of the halal industry is its recognition for safety, hygiene, quality, plus toyyib by the Muslims and other religions, in which is also referred to as halalan toyyiban products.

1.2 Global Halal Industry

The global halal industry is expected to be valued at around USD3.7 trillion by the year 2019. With an estimated annual growth rate of 20%, the industry is worth around USD560 billion a year (Elasrag, 2016). Today, halal has become one of the fastest growing consumer markets in the world. Around 1.6 billion Muslims around the globe making up 23% of the global population with an average growth rate of 3% annually demands for halal food and other halal-related products. If the trend continues, Pew Research Forum (2009) projected the global Muslim population to increase to 2.2 billion by the year 2030. According to the Pew Research Forum (2009), approximately 60% of Muslims will live in the Asia-Pacific region, while around 20% will live in the Middle East and North Africa. Meanwhile, the Muslim population in Saharan Africa is forecasted to increase in 20 years. Furthermore, Muslim communities in Europe and America will remain the minority, but they are expected to create a growing share of the total population in these regions.

The halal industry market does not only gain popularity among the Muslims, but non-Muslims around the world have also shown a vast interest in halal products and services (Elasrag, 2016) as highlighted in the World Halal Conference 2016. The halal products and services which gained popularity and demands from both the Muslims and non-Muslims community reflect the fact that halal is no longer religious compliance. It is part of a business and trade strategy. Today, halal is becoming a global symbol of quality assurance and lifestyle choice. These facts cause the attention of the halal products to rise as the consumers are always on a lookout for high quality, safe, and ethical products (Zulfakar et al., 2014). This led the halal industry to expand by focusing on sectors other than food, such as pharmaceuticals, cosmetics, health products, and toiletries; as well as service sectors such as financing and logistics. Furthermore, the halal industry has also expanded into halal tourism and hospitality services, as well as fashion. Eventually, this growth is caused by changes in the consumer's mindset when it comes to ethical consumerism.

The halal food market continues to expand throughout the global food supply chain. The halal food market has generally expanded over the past decade and is worth around USD667 million in 2016 (Elasrag, 2016). Halal food accounts for nearly 20% of the global food industry. While population and income were projected to rise, and food demand is projected to rise by more than 70% by 2050, the potential demand for halal food is also predicted to be high. Halal food products are not limited to meat and poultry, but also include other food items such as confectionery, canned and frozen food, dairy products, baking products, organic foods, beverages, and herbal products (Elasrag, 2016). Table 1.4 describes the global interest in the halal food industry.

Table 1.4: Global Interest in the Halal Food Industry

Country	Description
UK	The value of imported halal food is estimated to be GBP18 billion per annum.
USA	The halal market is estimated at USD18 billion.
China	To become the net importer of food products, including halal foods and beverages (F&B) within the next decade.
Japan	Halal to become one of the key contributors to Japan's economy by 2020.
UAE	The country aims to be the Sharia-compliant center of the world, especially for Islamic banking and halal businesses.
Brazil	To become the world's second top exporter of meat and poultry to Muslim majority countries.
Australia	The world's top halal meat producer and exporter since the 1980's, followed by Argentina, Brazil, New Zealand and the United States of America; 65% of Australia's beef was exported to Indonesia, Saudi Arabia and Malaysia.
Thailand	The domestic halal food market grows by approximately 20% per year, with 8000 companies involved in the halal food production.
Malaysia	Malaysia became the largest exporter of halal ingredients, with major export destinations consisting of China, USA, Indonesia, and Japan.

[Source: MITI, 2016]

Pharmaceutical and health products, on the other hand, are both major growth areas in the global halal industry. The demand for halal pharmaceutical, generic medical, wellness, and healthcare products was estimated to be around USD555 billion in the Muslim-majority countries (Elasrag, 2016). This sector received attention from countries like Malaysia, Egypt, and Singapore. Although the global demand for halal cosmetic products is projected to hit USD53 billion by the end of 2023, there is a promising accelerated growth rate of 14.1% over the forecasted period of 2016 to 2023.

Halal tourism has also been featured prominently and is now increasingly becoming a new trend in the general tourism industry. The halal tourism market represents 12.3% or USD126.1 billion of the total global outbound tourism markets and is growing at 4.8% in comparison to the global average of 3.8% (Dar & Azami., 2013). In 2011 alone, Muslim travellers spent about USD126 billion. This figure is expected to reach USD419 billion by 2020.

Globally, as a pioneer in the halal industry, Malaysia has been aggressively promoting itself to become the major halal products exporter. The statistics of the top ten importers of Malaysia's halal products (Table 1.6) showed that China is on top of the list as an importer of halal products with a total value of approximately RM13.7 billion from the year 2010 until 2013. From the Halal Industry Development Corporation [HDC] (2014) report, it is notable that only four countries were developing countries, namely China, Indonesia, Thailand, and India. According to HDC (2014), halal export started to skyrocket around the year 2010. Prior to the year 2010, halal products export activities were not the focus of the government. The export trend has gone up in the year 2012 by 34% in comparison to the year 2011, and a 56.9% increase from the year 2010 to the year 2011. The following year (2013), the exporting activities dropped lower in comparison to the year 2012. Overall, exports of halal products accounted for RM32.8 billion in 2013, an increase of 2.7% in comparison to the year 2012. The details of the halal export values by categories of products were shown in Table 1.5.

Table 1.5: Top Malaysia's Halal Product Import Origin (2010-2013)

Rank	Country	Nation Status	Total Halal Import from Malaysia (RM)
1	China	Developing	13,783,320,570
2	United States	Developed	9,688,525,657
3	Singapore	Developed	8,761,066,185
4	Netherlands	Developed	7,258,963,582
5	Japan	Developed	6,306,680,493
6	Indonesia	Developing	5,777,830,275
7	Thailand	Developing	5,024,292,301
8	India	Developing	4,737,787,541
9	South Korea	Developed	4,199,030,001
10	Australia	Developed	3,237,944,429

[Source: HDC, 2014]

According to the Ministry of International Trade and Industry [MITI] (2015), food and beverages were among the most exported products with value reaching up to RM15.5 billion in 2014. Next on the list were ingredients that contributed to the figure of approximately RM12.2 billion. The halal export values of other categories, such as the palm oil-based products and industrial chemicals made up to RM5.3 billion and RM1.9 billion respectively. The export value of cosmetics and personal care products was around RM2.3 billion and pharmaceutical products at only RM0.5 billion (Table 1.6).

Table 1.6: Malaysian Halal Export Values in 2014

Major Halal Exported Products	RM (billion)
Food and Beverages	15.5
Ingredients	12.2
Palm Oil Derivatives	5.3
Industrial Chemical	1.9
Cosmetic and Personal Care	2.3
Pharmaceutical	0.5

[Source: MITI, 2015]

1.3 Malaysian Halal Industry

Under the Second Industrial Master Plan (IMP2), 1996-2005, the National Agriculture Policy (NAP), 1998-2010; the Ninth Malaysia Plan (9MP), 2006-2010; and the Third Industrial Master Plan (IMP3), 2006-2020, the Malaysian government has identified the halal industry as a high income and profitable industry. The halal industry is known as a key growth area for their small and medium enterprises (SMEs), which is aligned with the vision towards becoming an International Halal Hub (Bank Negara Malaysia, 2007; Bohari, 2013). Based on the SME definition, halal manufacturing firms with sales turnover not exceeding RM50 million, or the number of full-time employees not exceeding 200 are categorized as a small and medium enterprise (SME) (SME Corporation Malaysia [SME Corp. Malaysia], 2019). Detailed definition of categories, namely micro, small, and medium are as in Table 1.7.

Table 1.7: Definition of SME by Category

Category	Sales Turnover (RM)	No. of Employees
Micro	Less than RM300,000	Less than 5
Small	RM300,000 to RM15 million	From 5 to 75
Medium	RM15 million to RM50million	From 75 to 200

[Source: SME Corp. Malaysia, 2019]

In line to achieve the vision of the Malaysian halal industry in becoming the World Halal Hub, in May 2008, the Malaysian government has approved the Halal Master Plan (HMP), which is mainly focused on three phases (Table 1.8). As reported by MITI (2020) the phase begins with the development and preparation of the industry, followed by self-

establishment, and later broadens the geographical coverage as a global hub. The master plan covers certification issues, sector growth, halal integrity, implementation, timelines, and responsibilities.

Table 1.8: Phases of Halal Master Plan for Malaysia

Year	Phase
2008-2010	Phase 1 Develop Malaysia as a global centre for halal integrity and prepare the industry for growth
2011-2015	Phase 2 Establish Malaysia as one of the preferred locations for halal-related business
2016-2020	Phase 3 Broaden geographic footprints of home-grown companies

[Source: MITI, 2020]

In September 2006, Halal Industry Development Corporation (HDC) has been established to initiate the overall coordination and development of the national halal industry. The HDC plays a major role, such as assisting the SMEs, work with all the relevant ministries and agencies, facilitate and support halal entrepreneurs, and act as market intelligence. HDC also assists the entrepreneurs to expand their halal market to go global through branding, marketing, and promotional campaign of the halal products (HDC, 2012).

Ultimately, Malaysia's halal industry primarily focuses on a range of sectors including food and non-food related products such as food and beverages, food ingredients, additives and supplements, toiletries and cosmetics, animal feed, drugs and vaccines, Islamic finance, pharmaceuticals, insurance, leather products, and logistics (HDC, 2012). According to the HDC (2015) statistics, there were a total of 4,081 halal-certified SMEs in Malaysia in the year 2014. The top three states with the highest number of certified companies were Kedah (1,111, 27.2%), Johor (552, 13.5%), and followed by Kuala Lumpur (391, 9.6%). The rest of the states contributed to a smaller percentage towards the number of certified companies (Table 1.9).

Table 1.9: Halal Certified SMEs by State in 2014

State	No. of SMEs	Percentage (%)
Johor	552	13.5%
Kedah	1,111	27.2%
Kelantan	70	1.7%
Kuala Lumpur	391	9.6%
Labuan	387	9.5%
Melaka	232	5.7%
Negeri Sembilan	139	3.4%
Pahang	380	9.3%

Perlis	168	4.1%
Perak	3	0.1%
Pulau Pinang	8	0.2%
Putrajaya	13	0.3%
Sabah	165	4.0%
Sarawak	133	3.3%
Selangor	99	2.4%
Terengganu	192	4.7%
Total	4,081	100%

[Source:HDC, 2015]

The halal industry is projected to make a significant contribution to the country's Gross Domestic Product (GDP) by 2020. However, a constantly changing business environment requires organizations to implement successful action plans and strategies. According to Tahir et al. (2016), the halal SMEs should be able to adapt to the environmental changes to sustain their competitiveness and businesses. Among the strategies for further developing and promoting Malaysia as a global halal hub is by ensuring product quality and safety (Bohari et al., 2013). This is because a shift in the consumption of halal foods and beverages by consumers not only implemented to Muslims but now also extended to non-Muslims. The halal concept has been widely accepted by non-Muslim consumers (Ismail et al., 2010). Indeed, halal foods and beverages have a very significant response from consumers who believe that the halal concept imposed on manufacturing processes is associated with healthy, safety, and quality. Hence, to thrive in the halal industry, SMEs must be agile, responsive, and highly competitive as a key prerequisite for achieving their desired business results.

1.4 Halal and Halalan Toyibban Concept

The halal concept originated from an Arabic term which means allowed, permissible, lawful, or legal (Talib et al., 2010; Ahmad Tarmizi et al., 2014). This term specifies that the goods or services are not harmful and safe to be consumed as stressed by the Shariah law thus, is permissible or allowed. In brief, the Arabic word "halal" means something that is permissible. From the viewpoint of the Islamic Jurisprudence (Fiqh), the word halal explains that one is given a choice either to do or not to do it (Mohamad et al., 2015). However, many understood the term in an opposite manner, that the food is considered as halal if it does not contain pork or liquor. The term "halal" is widely used in the food industry for the purpose of trading or commercialization. Even other terms such as 'Guaranteed Halal" or, "*Ditanggung Halal*" and "*Makanan Halal*" are commonly used to convey foods that can be consumed by Muslims. In other words, the foods are permissible and allowed by religion. According to the Manual Procedure for Malaysia Halal Certification (Third Revision) 2014, halal foods must comply with the following conditions:

(a) Does not stem from or consists of any parts of from animals that are forbidden to Muslims, or animals that have not been slaughtered according to the Shariah law.
(b) Does not contain any substance that is considered impure in the Shariah law.
(c) Is not prepared, processed, or manufactured using equipment or utensils that are

not free from impurities as defined by the Shariah law.

(d) That, in the preparation, processing or storage stages, does not come in contact with or is stored near any kind of food that does not meet the requirements of para(s) (a), (b) or (c) or any substances that are considered impure by the Shariah law.

The opposite of halal is haram or non-halal which means forbidden, unlawful, or illegal (Mohamed et al., 2016). It is understood that something must be avoided according to Islamic principles (Mohamad et al., 2015). Commonly, foods that are contaminated with any haram items, for instance, pig and alcohol will turn out to be prohibited and unlawful. In general, halal and haram become an important key element to be considered in the Muslim lifestyle. The Muslim community wants assurance that the products they consume does not only follow the Shariah law but must also be toyyib, which means pure and good (Supian, 2016; Mohd Yunus et al., 2010; Tieman, 2011). The word halal and toyyib were repeatedly mentioned in the Holy Qur'an, but many Muslims interpreted that food is only halal if it is free from pork or liquor (Mohd Yunus et al., 2010). This is how most Muslim consumers commonly perceive halal (Mohd Yunus et al., 2010).

With the introduction of halalan toyibban, halal concept is not only focused on Muslims but also non-Muslim consumers. Furthermore, the halal concept is also expanded to the non-food sectors, such as pharmaceuticals, cosmetics, financial services, logistics, and other services, which also includes the supply chain. In regards to this, the application of the halalan-toyyiban concept of the supply chain is believed to be important. The word toyyibban means wholesomeness, good, superb, and a pure product which comprises quality, cleanliness, and safety for all (Omar & Jaafar, 2011). According to Ab. Karim et al. (2016), the word "toyyib" is also referred to as "Ihsan" and "Itqan", which means "competent and in an orderly manner".

The facts revealed that the status of a product, either halal or haram could not be evaluated alone based on the ingredients or substances used in the production of a product. Yet, there are a number of considerations that should be applied to judge the quality or value of the halal or haram of a product, whereby the toyyibban concept also stressed on the process of preparation, processing, handling, storing, and transportation (Arif & Sidek, 2015). It can be claimed that the concept of halal toyyibban is applied along the supply chain from the initial stage of sourcing the raw materials, right to the point of consumption (Omar et al., 2013). Here, the concept indicates that all the activities in the supply chain not only be halal, but also incorporates toyyib in order to ensure the end customers obtain a halal, superior, hygienic, and safe food product. Furthermore, with the addition of the toyibban concept, it provides a guarantee to the consumers that the food is healthy, nutritious, and is not harmful to the body (Arif & Sidek, 2015; Ab. Karim et al., 2016).

Particularly, in the herbal industry, halalan toyibban supply chain safeguards the industry from processing dangerous herbal plants in producing herbal-based food products. Herbal plants such as berberis, valerian, ephandra herbs, and foxglove leaf are among the list of prohibited herbal plants as they contain poisons (Ismail, 2010). In other aspects,

some of the herbs have been categorised as intoxicant due to the fact that the herbs contain *khamar*-like effect. Those herbs have also been prohibited because it may affect the human's central nervous system. Therefore, any dangerous or harmful ingredients or substances in the production of the herbal products should be avoided as it is not safe to be consumed.

Apart from that, based on Ismail (2010), halalan toyibban along the herbal products supply chain will also ensure that the suppliers and manufactures comply with the standards related to good practices in farming (Good Agricultural Practices, GAP), post-harvesting, extraction, and drying, formulation, and manufacturing (Good Manufacturing Practices, GMP). On the other hand, the downstream activities which include handling, storing, and delivery processes should also be carried out in line with the halalan toyibban concept where the goods should be handled, stored, and delivered separately from the non-halal goods to avoid any cross-contamination. Therefore, a different pallet, warehouse, and truck are required to fully comply with the halalan toyibban concepts. Obviously, the possibility of a violation of halalan toyibban is possible at all stages of the supply chain.

From the earlier discussion, it is understood that any food products that are labelled halal, generally have complied with the Shariah law. It means that the food products are free from any prohibited ingredients according to the Shariah law. Although they are certified, if consuming that food or product is unhealthy and could lead to health issues or harm the consumers, it is considered not toyyib. Thus, that food might be halal, but not toyyib. So, focusing on the study context, any herbal-based foods or herbal-based nutritional products that are certified halal, must ensure to not contain any substance that could endanger human health and life.

1.5 Halal Integrity

Halal integrity practices are becoming a part of the competitive strategy in enhancing firm coordination and harmonization in the halal food supply chain (Mohd Salleh & Supian, 2015). Halal integrity is becoming one of the key successes for the performance of SMEs. Halal integrity possesses the potential to improve sales performance (Mohammad & Hassan, 2011). However, halal integrity has become a serious problem in the food manufacturing industry, particularly in the production of halal foods (Hassan & Khan, 2012). Halal integrity is questionable whether halal food products can remain halal throughout the supply chain (Mohamed et al., 2016). Consequently, the integrity of the halal food comes to be a worrisome matter (Zailani et al., 2010; Lam & Alhashmi, 2008).

If the halal status is violated, the consumers will lose trust and confidence in the halalness, safety, and quality of the product (Arshad et al., 2018). This scenario causes lower demand for halal food products. This would bring a negative effect on the SMEs' performance, in terms of lower sales, profits, and low-quality products. Hence, all businesses, regardless of the types of products, size, or financial constraints, should manage their halal integrity practices as it is a key factor in halal business strategies.

In line with that, maintaining the integrity of halal food products has become a priority for the government and consumers in Malaysia (Bahrudin et al., 2011; Tieman, 2013). Besides, there are various obstacles, misconceptions, and fallacies in the supply chain regarding halal integrity. Ensuring halal integrity along the supply chain is a rigorous and ongoing process of complying with halal concepts that may affect individuals and the supply chain players' firm performance (Supian, 2016). Halal integrity will ensure the status of the product remains halal from the suppliers till reaches to end consumer without any contamination, intentionally or unintentionally.

However, some halal food manufacturers, particularly the SMEs, did not aware of the practice of halal integrity throughout the supply chain (Supian, 2016). The halal food manufacturers should not only ensure halal food products are free from *haram* or prohibited components, carrion, blood, pig, permitted animals slaughtered incorrectly, and intoxicants (Soon et al., 2017), but also pay attention to other supply chain activities including handling, packaging, and distribution. For example, halal food SMEs should segregate halal food products and non-halal food products in the warehouse, such as halal zone, dedicated pallets for halal products, and dedicated vehicles to transport halal food products (Tieman, 2011). Furthermore, the production of halal foods also should free from *najs* or contamination and harmful germs (Ambali & Bakar, 2014). The food SMEs should ensure the consumers receive clean, nutritious, and quality food for consumption. Therefore, the halal food manufacturers should play a huge responsibility to maintain the quality, safety, processes, storage, and delivery are according to Shariah law to preserve the halal integrity of the products (Mohamed et al., 2016).

In the context of this study, herbal-based food products were found to be associated with halal integrity issues due to several unethical practices. The herbal-based food products are exposed to toxic substances, either from the herbal ingredients itself or from the exposure to pollutants in the herbal-based food products (Ya'akob et al., 2018). Some herbal-based food products contain powerful and pharmacologically active compounds that could be hazardous in many ways, some might even present a potential risk to human health. Ya'akob et al. (2018) indicated herbal-based food products are associated with intentional or unintentional usage of prohibited ingredients, the substitution of ingredients, contamination with a toxic substance, and differences between labelled and actual contents. Ahmad et al. (2015) revealed herbal-based food products sold in Malaysia are low-claim products, without any guarantee of efficacy. All those problems are associated with quality and safety due to unregulated herbal-based food products (Ya'akob et al., 2018). Therefore, it implies a sign of deterioration of halalness, safety, and quality (toyyib). Table 1.10 lists some of the cases that violate the halal integrity of herbal-based foods.

Table 1.10: Cases that Violate Halal Integrity of Herbal-Based Foods

Year	Country	Product	Description	Source
2019	-Malaysia	(i) Natural Herbs Coffee (Kopi Panggung Al-Ambiak)	These food products are found to contain poisonous elements such as tadalafil and	Official Public Health Malaysia

		(ii) Hamer (Ginseng and Coffee) Red Packaging and Gold Packaging	sibutramine which might cause dangerous and harmful side effects to consumers	Facebook (FB) (2019)
2017	-Malaysia -Vietnam	(i) Pepper and Spice	In the pepper and spice industry, fraud occurred when cheaper ingredients or dust were added to the ground pepper and then shipped across the world. Furthermore, the location of which the grinding process took place remained the most susceptible to contamination. Chickens were seen in the footage to be running around while the process of grinding, storing, and drying was taking place in the pepper company. Chicken carries salmonella. Besides that, peppers were bleached in mass with Hydrogen Peroxide in which looked like a cement mixer.	Elliot (2017)
2017	-Malaysia and other Asian countries (Indonesia, Thailand)	Tongkat Ali based food products (coffee, tonic, candies and beverages premixed)	Tongkat Ali based products contaminated with heavy metals and adulterated with certain type of synthetic drugs.	Abu Bakar et al. (2017)
2016	-Singapore	Fake herbal teas	Fake herbal tea imports being sold in Singapore and was reported that the Malaysian government seized the imitation food products in a raid in 2015	PwC's Food Supply Chain and Integrity Services (2016)

2014	-Malaysia and other Asian countries	Tongkat Ali and its herbal medicinal products	Detection of sildenafil-like compound in some of the *Eurycoma longifolia* (Tongkat Ali) herbal medicinal products purchased online.	Mohd Said et al. (2014)
2009	-Malaysia	Health products using pig gelatin	30% of 100 health products tested at Universiti Sains Malaysia's (USM) Pharmaceutical Science Studies Centre laboratory was found not to be halal as gelatin from bovine was used in making the product capsules.	Abdul Aziz et al. (2014)

[Source: Compiled by the author, 2019]

1.6 Influence of Halal Supply Chain Integrity

Several studies have revealed that all players in the supply chain should take responsibility without having to leave the enormous tasks to a single player (Zulfakar et al., 2013; Melatu Samsi et al., 2011). The halal integrity of a product is only intact when the product is still in the custody of an organisation (Jaafar et al., 2011). The quality assurance of the product relies on the next player who handles the product until the product reaches its end customer. Practically, the integrity of the product could not be guaranteed unless the other players in the supply chain practice similar halal concepts. The long and complex halal supply chain remains an obstacle in ensuring halal integrity due to the many players involved in producing and manufacturing the products, both the suppliers and the producers/manufacturers. This situation led to food integrity risks in the supply chain.

In the context of this study, the halal herbal-based food products supply chain has similar fundamental principles as the other food supply chains that are of the "from farm to fork" concept. The halal herbal based-food SMEs need to maintain transparency throughout the entire manufacturing process and must ensure that all the other players in the supply chain are sufficiently aware and understand the entire halal supply chain fundamentals to ensure that the halal product integrity is preserved till the point of consumption. The players in the halal herbal-based food supply chain must, therefore, ensure that there is no intentional or unintentional contamination in the manufacturing process of the products.

In addition, the Islamic practices of business owners or managers were also expected to influence halal integrity practices among SMEs. Aziz (2010) highlighted that halal food is not solely dominated by the Muslims, but has spread to international markets, where also made up of non-Muslims. Therefore, training, education, experience, and motivation

from an Islamic perspective is important to both Muslim and non-Muslim food manufacturers, particularly SMEs owners and managers (Yunus et al., 2014; Rafiki & Wahab, 2013). This is because halal integrity is a holistic approach that does not only focus on the product's physical characteristics but also emphasizes the moral behavior involved throughout the supply chain. Elias et al. (2017) addressed that both the management and operation staff are equally important to ensure the integrity of the halal food products along the supply chain. In many organizations, integrity influences the values and decisions made by an individual worker or in groups regardless of their positive or negative effects, as well as emphasizing that integrity influences most of the individual work conduct (Zarim & Zaki, 2016).

Hence, through supply chain integration (SCI), including integration with internal functions within firms and with the suppliers and customers may influence halal supply chain integrity (HSCI) (Ali et al., 2014; Supian, 2016). Additionally, with Islamic human capital, business owners, and managers would understand and implement halal supply chain integrity (HSCI) to ensure the products comply with halal requirements and toyyiban (wholesomeness). With the existence of halal supply chain integrity (HSCI), halal SMEs enable to achieve superior performance.

1.7 Problem Statement

The consumers often viewed herbal-based food products as natural and safe and believed it promotes healthier living (Ekor, 2013). However, the general consumers' perception that halal herbal-based food products are very safe and are with no side effects has led to many misconceptions about the products. Although halal certification and halal logo provide promising assurance that the whole supply chain comply with Shariah law, but several cases have violated the halal integrity of herbal-based foods (Refer to Table 1.10, page 27-28).

The integrity issues in halal herbal-based food products have become a worrying matter (Zailani et al., 2010; Lam & Alhashmi, 2008). Consumers are now more worried about halal matters and pay attention to the safety of finished products for consumption (Kim & Chung, 2011). The violations of halal integrity in herbal-based food products which are associated with quality and safety have resulted in a lack of trust and confidence among the consumers about halal herbal-based foods wholesomeness (toyyib) (Arshad et al., 2018). These led to lower demands for halal herbal-based food products which may directly reduce the sales and profits of the SMEs. Moreover, halal integrity issues possess the potential to limit the herbal-based SMEs opportunities to involve with export activities and expand their market internationally.

However, matters related to halal supply chain integrity are very limited to be the focus, specifically from the SMEs perspective due to lack of understanding in the halal supply chain (Ali et al., 2014). If the halal supply chain integrity issues are not encountered, the halal herbal-based food SMEs may not liable to reach the growth in their business performance. As a result, the industry is competing and struggling to reach consumers

with values, ethics, and confidence, as Malaysia is the main driver of the halal industry (Mahathir, 2010).

The length and complexity of the herbal supply chain that involves various handling activities as the product moves across great distances before reaching the end consumers are one of the main key factors influencing halal supply chain integrity. It remains an obstacle to ensure halal integrity, due to the involvement of multi-players including suppliers, producers, or manufacturers. The integrity of a product could not be guaranteed if the other players in the supply chain do not practice similar halal practices. The halal herbal-based food products supply chain has similar fundamental principles with other food supply chains that use the same "from farm to fork" concept. A product would not be considered halal if it is not handled, stored, or transported accordingly. Some manufacturers and suppliers are unaware and do not know the procedures in handling the halal food process (Supian et al., 2018). Thus, the halal integrity practices subject disembarks.

Jaafar et al. (2011) viewed that the halal integrity of a food product is only intact when the product is in the custody of an organisation. Once a product is moved along the supply chain, the quality assurance depends on the next player who handles that product. Talib et al. (2013) added that once the responsibility is passed on to a different party, if that party does not practice the halal approach, it will break the halal integrity. Many studies revealed the responsibility and huge tasks to preserve the halal integrity were solely depend on the manufacturers (Melatu Samsi et al., 2011; Jaafar et al., 2011; Zulfakar et al., 2013; Ali et al., 2013). The task of ensuring the halal integrity along such supply chain is a humongous task to manage and monitor.

The several cases which violate the halal integrity of herbal-based food products have raised questions on the credibility of the halal status of the halal herbal-based food products. All these will certainly lead to creating some doubts in the mind of consumers who practices a halal and healthy lifestyle (Salleh & Ramli., 2012). Ali et al. (2014) mentioned that production or manufacturing is the most critical stage in the halal food supply chain to determine the quality and integrity of the food. The production of halal food requires a very meticulous understanding throughout the supply chain in sustaining the integrity of the halal food. Jaafar et al. (2011) further indicated, halal supply chain is easily breached during the delivery and distribution stage. Ngah et al. (2014) claimed that there is no guarantee that the products are halal at the point of consumption with the absence of the halal services in between factories, right to the end-consumers. Furthermore, from the halal transportation providers' point of view, the adoption of halal transportation among certified halal manufacturers in Malaysia is still relatively low compared to the total number of halal manufacturers (Ngah et al., 2014; Ahmad Tarmizi et al., 2014). Furthermore, Ngah et al. (2014) claimed that the Malaysian halal manufacturers lack intention to adopt the halal transportation service.

Previous studies by Bahrudin et al. (2011), Tieman (2013), Ali et al. (2013), and Supian and Abdul Rashid (2018) pointed out that there are various barriers and assumptions in the halal supply chain about the halal integrity practices. Therefore, it is necessary for SMEs to ensure whole supply chain activities are not only complying with Shariah law

but also must be wholesomeness (toyyib) to enhance the halal supply chain integrity (HSCI) as it moves upstream to downstream along the herbal-based food products supply chain, which starts from the procurement of raw materials until the stage of finished products for the consumers' consumption. Through the supply chain integration (SCI) consists of internal integration, supplier integration, and customer integration, all processes and functions to be worked together in ensuring the halal food integrity, which may bring upon positive outcomes for the firm.

Apart from those issues discussed earlier, in the context of the study, it is also argued that the lack awareness of the halal concept and understanding of the halal supply chain among the SMEs, including the process involving procurement of raw materials, storage, and transportation had influenced the halal supply chain integrity (Ernest & Lau, 2012). The lack of halal related knowledge or Islamic education among the management and staff could result in some manipulation of the halal business by some businesses to make a profit (Department of Standards Malaysia [DSM], 2010). In the halal business, both the Muslims and non-Muslims business owner or manager should be equipped with the adequate training, technical knowledge, education, skills, and good values as taught in the Islamic religion for managing and executing the halal business and services (Shariff et al., 2016; Rafiki & Abdul Wahab, 2016). Alina et al. (2013) highlighted the need for knowledgeable personnel to be equipped with halal-related education because the halal industry in Malaysia faces a shortfall of halal knowledgeable personnel. Halal knowledgeable personnel is important for further strengthening of the integrity practices of the halal herbal-based food SMEs from manufacturing, marketing, all the way to the distribution activities. Therefore, it is crucial to effectively utilize Islamic human capital towards achieving the halal supply chain integrity.

In acknowledging the problems exists, the supply chain integration (SCI) and Islamic human capital are sought to address the halal supply chain integrity (HSCI). According to Wan Omar et al. (2015), research in the field of halal is emerging with a primary focus on various aspects of halal, such as marketing, consumer behavior, and certification. However, less research was done on the issues of the halal supply chain. Talib & Chin (2018) further argued that the literature on halal focuses more on the downstream players, especially the consumers. But studies concerning halal food supply chain from the perspective of the upstream players like manufacturers or producers remain limited. Moreover, there is also a lack of studies from the manufacturing perspective on the halal supply chain, particularly in investigating halal integrity.

Thus far, the halal integrity studies have been carried out to investigate the influences of the halal integrity on the product adaptation strategy for the global trade (Mohamad & Hassan, 2011); the influence of halal traceability in enhancing halal integrity for the food industry (Mohamed et al., 2016); the relationship of supply chain integration (SCI) towards halal food supply chain integrity and firm performance with firm size as a moderator variable (Ali et al., 2017); and the influence of halal practices integrity (HPI) on the halal food supply chain with the halal supply chain trust as a mediator between halal integrity practices and supply chain performance (Supian et al., 2018). Previous halal integrity studies have been developed in different directions, cover different scopes, and apply different methods. Indeed, in the present, research in the halal supply chain integrity (HSCI) is considered still in its infancy stage. A good understanding of factors

that influences the halal supply chain integrity (HSCI) and SMEs' performance is yet to be extensively studied. In a nutshell, integrity problems in the halal industry, gaps in the literature, and inconsistent and inconclusive research findings were gaps identified and thus provides the rationale to conduct this study.

1.8 Research Questions

In line with the halal issues raised in the earlier discussions, the following specific research questions were formulated:

i. Does supply chain integration (SCI) influence SMEs' performance?
ii. Does Islamic human capital influence SMEs' performance?
iii. Does supply chain integration (SCI) influence halal supply chain integrity (HSCI)?
iv. Does Islamic human capital influence halal supply chain integrity (HSCI)?
v. Does halal supply chain integrity (HSCI) influence SMEs' performance?
vi. Does halal supply chain integrity (HSCI) mediate the relationship between supply chain integration (SCI) and SMEs' performance?
vii. Does halal supply chain integrity (HSCI) mediate the relationship between Islamic human capital and SMEs' performance?

1.9 Research Objectives

The general objective of this study is to investigate the influence of supply chain integration (SCI) and Islamic human capital on the halal supply chain integrity (HSCI) and its influence on the SMEs' performance. The specific objectives of this study are:

i. To examine the relationship between supply chain integration (SCI) and SMEs' performance.
ii. To investigate the relationship between Islamic human capital and SMEs' performance.
iii. To examine the relationship between supply chain integration (SCI) and halal supply chain integrity (HSCI).
iv. To investigate the relationship between Islamic human capital and halal supply chain integrity (HSCI).
v. To examine the relationship between halal supply chain integrity (HSCI) and SMEs' performance.
vi. To examine the mediating role of halal supply chain integrity (HSCI) on the relationship between supply chain integration (SCI) and SMEs' performance.
vii. To determine the mediating role of halal supply chain integrity (HSCI) on the relationship between human capital and SMEs' performance.

1.10 Significance of the Study

The findings of this study will reflect on the benefits to several stakeholders, mainly halal food SMEs, JAKIM, and society, considering that integrity plays a major role in the

herbal-based food products supply chain today. In general, the study has theoretical, managerial, and policy implications, particularly towards the halal food SMEs (firm owners, managers, and manufacturers) as well as JAKIM. From the theoretical perspective, this study contributes to the research and literature by framing HSCI from supply chain management and Islamic human capital perspective based on the Islamic view in one framework (Zulfakar et al., 2014; Supian, 2016; Ali et al., 2017; Zailani et al., 2010; Tieman, 2011).

The study also adds value to the theory building of the HSCI by combining three prominent theories namely Strategy-Structure Performance (SSP), Resource-Based View (RBV), and Human Capital Theory in explaining the influence of SCI, Islamic human capital on HSCI and its influence on the SMEs' performance. The previous studies only tested SSP and RBV (Ali et al., 2017) and RBV (Supian & Abdul Rashid, 2018) to explain the relationship between SCI, HSCI, and the SMEs' performance. Furthermore, this study aims to introduce HSCI as an important medium in enhancing SMEs' performance. Thus, its role as a mediator will be measured through Hierarchical Component Model (HCM) - Higher-Order Model (HOC), which adds a significant contribution to the theoretical.

Findings from this study shall assist owners, managers, and manufacturers of the halal herbal-based food products to acquire insights in regard to the integrative influence of the supply chain integration (SCI), Islamic human capital, and halal supply chain integrity (HSCI) on the SMEs' performance. In regard to this, it must be made clear to the owners or managers that the new element should be included in the SMEs' performance measurement systems in order to improve the supply chain of the halal food industries. Integrity is the platform on which successful performance is built (Palanski & Yammarino, 2011). This helps to ensure that the supply chains are not only efficient, but also effective in protecting and sustaining halal integrity and robust in its supply chain execution. Hence, it is essential to have well-integrated supply chain strategies in the halal food supply chain to achieve superior performance in the halal business.

Besides, JAKIM can benefit from the outcome of this research. As Malaysia pioneers the globalization of halal certification, JAKIM should take the first step to introduce a blueprint to provide a clearer objective, standard-operate-procedure, and unified halal certification for the globe to implement the HSCI system in the halal industry. Lastly, findings from the study would also significantly impact the Muslim and non-Muslim consumers through improved quality, safe, nutritious, and hygienic herbal-based food products.

1.11 Scope of the Study

Malaysia wants to position itself as the halal hub of the world. With a more comprehensive halal ecosystem in the halal industry in comparison to other countries, the halal industry has become a key player in Malaysia's economic growth. However, in this era of globalization, the business reaction towards the halal supply chain is questionable. Furthermore, the halal supply chain integrity is a new trend in the halal

industry (Tieman & Che Ghazali, 2013). The latter is critical because without practicing all the activities along the supply chain according to the Shariah law, the halal supply chain integrity will be broken at any stage of the supply chain. Therefore, the approach to enhance the halal supply chain integrity is the focus of this study.

The unethical cases in the herbal-based food product, such as a mixture of poisonous elements and contamination with heavy metals in coffee *Tongkat Ali*, fake herbal teas, and usage of pig gelatin in herbal-based products violates the integrity of the halal herbal-based food product. The outcome of these unethical cases has acquired the need to maintain and sustain the integrity of the halal herbal-based food product. Halal should not only be focused on the aspect of food safety and quality but should also emphasize the process of manufacturing, handling, storing, and distribution according to the Shariah law. Therefore, supply chain integration (SCI) comprised of internal integration, supplier integration, and customer integration is determined as the influence of HSCI. Additionally, the success of every halal organisation also depends on Islamic human capital. An adequate training, formal or informal Islamic education, experience in halal business, and motivation from an Islamic view would influence the business owners or managers' practices in their firms. Hence, supply chain integration (SCI) and Islamic human capital are crucial elements in enhancing the halal supply chain integrity (HSCI). Meanwhile, HSCI has become an important key driver to foster halal SMEs' performance.

In the context of this study, business owners or managers will be the representative of halal herbal-based food SMEs to provide an accurate response about their halal businesses and also to understand their practices towards the halal supply chain integrity (HSCI) along the halal herbal-based food supply chain. Hence, this study mainly employed a quantitative approach to understanding the halal supply chain integrity (HSCI) among the herbal-based food SMEs. This study also aimed to examine the halal herbal-based food SMEs supply chain integration (SCI) and Islamic human capital practices in enhancing the halal supply chain integrity (HSCI) and its influence on the SMEs' performance.

1.12 Operational Definition of Key Terms

The following definitions of the key terms were intended to create a consistent understanding of the main concept of the study.

a. Halal

Halal are things or actions that are allowed, permissible, lawful, or legal according to the Shariah law (Department of Islamic Development Malaysia [JAKIM], 2019; HDC, 2019; Supian et al., 2018).

b. Halalan Toyibban

Halalan toyyibban means wholesomeness, good, superb, and the purity of a product which comprises quality, cleanliness, and safety for all (HDC, 2019; Omar & Jaafar, 2011; Supian et al., 2018).

c. Herbal-based Food Products

Herbal-based food products are in reference to a product, which contains 80% or more food ingredients (single or in combination) with herbs (e.g. fresh, dried, extract or essential oils) that were added as an ingredient to add flavor or aroma only. In this context, herbs that were not used for therapeutic values are referred to as botanical products, which are generally recognized to be safe for use in food and beverages (Food Act 1983 and Food Regulations 1985).

d. Small, Medium and Enterprises (SMEs)

Based on the SME definition, halal manufacturing firms with sales turnover not exceeding RM50 million or full-time employees not exceeding 200 are categorized as a small and medium enterprise (SME) (SME Corp. Malaysia, 2019).

e. Supply Chain Integration (SCI)

Supply chain integration is to be referred to as a strategy, a process of interaction and collaboration within all dimensions, whereby all processes and functions cooperatively worked together in ensuring the halal food integrity, which may bring upon positive outcomes for the firm (Basnet, 2013; Frohlich & Westbrook, 2001; Narasimhan& Kim, 2002; Pagell, 2004).

f. Islamic Human Capital

Islamic human capital is a collection of resources embedded in people physically and spiritually. It consists of knowledge, talents, skills, abilities, experience, intelligence, training, wisdom, and good values as taught in Islam religion (Shariff et al., 2016; Rafiki & Abdul Wahab, 2016).

g. Halal Supply Chain Integrity (HSCI)

HSCI refers to the means of ensuring that the process, resources, and people that deliver the integrity of the halal products are Shariah-compliant along the supply chain (Supian & Abdul Rashid, 2018; Ali et al., 2017).

h. SMEs' Performance

Performance, in general, is the extent to which a firm's goals were achieved (Ellinger et al., 2000). Qrunfleh & Tarafdar (2014) emphasized that supply chain performance represents the overall efficiency and effectiveness of an organisation's performance. In this work, performance is measured as a firm's overall performance in terms of operational performance and financial performance, which indicates the firm's success level. A firm's operational performance includes both quality and cost reduction. Meanwhile, measures such as profitability, sales volume, return on investment (ROI), and return on asset (ROA) is used to evaluate a firm's financial performance.

1.13 Organisation of the Thesis

This thesis consists of five chapters. Chapter 1 discusses in detail the background of the study, problem statement, research questions, research objectives, as well as the significance and scope of the study. In Chapter 2, an extensive review of the relevant literature on the halal supply chain, halal supply chain integrity, supply chain integration, Islamic human capital, and SMEs' performance were presented. This study used three underpinning theories: The Strategy-Structure-Performance (SSP), Resource-Based View (RBV), and Human Capital Theory. All theories were discussed to further develop the conceptual framework and the research hypothesis for this study. Chapter 3 discusses the research methodology comprising of research design, sampling procedures, research instrument, data collection process, and statistical analysis. In Chapter 4, the thesis covers the results of the statistical analyses and discussions. Finally, Chapter 5 presents the summary of findings, implications, recommendations for future research, limitations, and conclusion of the study.

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