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MALAYSIAN JOURNAL OF AGRICULTURAL ECONOMICS

Original Research Article

Agri-tourism Preferences Factors Among Urban Dwellers

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Abstract: Agri-tourism is a catalyst for initiation of the sustainable tourism activities and diversifying rural activities. As agriculture is the fourth contributor to the country's economic development, this sector has vast areas to offer the tourists to feel the excitement from the farm and its resources. Agriculture and tourism have their own ability to develop and grow. The collaboration of both strong industries has strengthened the tourism industry in Malaysia. The objective of this study was to determine the agri-tourism preferences among urban dwellers in Kuala Lumpur, Selangor, and Putrajaya. The findings revealed that most of the respondents agreed that payments for agri-tourism activities should be reasonable and satisfactory as it has been supported by the highest mean score (4.41). This means that the payments charged to the customers must comply with the agri-tourism services and activities offered to them. Most of the respondents also agreed that finding agri-tourism locations through modern applications like Google Maps and Waze should be easy as it has the highest mean score (4.54). This was supported by the current trends of the public who are always connected to these applications through their mobile devices to easily locate any places at any time. Most of the respondents agreed that agri-tourism's products and activities should be suitable for all age range. This is because the public perceive tourism and leisure time as valuable time to spend with family members and friends from different age group to tighten the relationship. Around 89.1% of respondents agreed that the major challenges in agri-tourism were the issues of lack of information and publicity on agri-tourism itself. Results from this study will serve as a guide for public and private agencies in finding ways on how to promote agri-tourism industry in Malaysia.

Keywords: Agri-tourism; Preference Factors; Urban Dwellers; Agriculture; Malaysia

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1. Introduction

1.1 Tourism in Malaysia

For decades, tourism has become one of the greatest and the most rapidly growing economic sectors in the country that its contribution to the economy is the second largest after the manufacturing industry. Malaysia is one of the countries that have transformed their economies by developing its tourism potential through the full utilization of its resources. Tourism has a superior capacity to create large-scale employment and additional sources of income for the skilled and unskilled workforce in both urban and rural areas. The concept of traditional tourism has evolved and catered and specially customized to people's preferences, budgets and purpose. For that, the tourism industry has diversified and emerged into new areas such as eco-tourism, medical tourism, geo-tourism, culinary tourism, rural tourism, and agri-tourism which are the subset of rural tourism. Agri-tourism is a kind of tourism that encourages tourists to visit a working farm or agri-entrepreneur area for learning or sometimes for experiencing the farm's life through farm stays. Agri-tourism promotes sustainable tourism as it gives positive impacts on the environment, society, and economy of a country.

The tourism industry in Malaysia is an important foreign exchange earner that contributes to economic growth by attracting investments and providing employment opportunities domestically and internationally. This is one of the main objectives of TDC in Malaysia. The warm weather of Malaysia, eco-diversity, and retail landscape has helped in attracting over 25 million tourist arrivals per year from inside and outside the country and have been contributing more than RM 60 billion in receipts (DOSM, 2020).

Potential agri-tourism destinations in these regions has been pointed out as places of attractions and upgraded to enhance the urban sustainability and suitability of the residents as well as to attract tourists and migrants to visit. The gap in basic services has been addressed to ensure the development of a city is suitable for living and works well. The improvement will not only increase the livability, but also enhance the commercial and tourism potential of the regions, which subsequently create job opportunities for the community. The potential for the agro-tourism industry to expand is wide open and the opportunity should be grabbed. According to the Domestic Tourism Survey conducted by the Department of Statistics Malaysia (DOSM, 2020), Selangor is among the top five states that received the highest number of tourists in 2019 at 33.6 million. Table 1 shows the number of domestic visitors increased relatively in three states in 2019 with Selangor having the most visitors (33.6

million), followed by Kuala Lumpur (22.6 million) and Sabah (22.0 million), Perak (21 million) and Pahang (18.5 million). The development of tourism is one of the key elements for each development plan in Malaysia. For that, the government has been giving special emphasis to the tourism sector during each plan period such as adopting and formulating various laws and regulations that ensure the sustainability of tourism development as well as implementing appropriate policies. Finally, Malaysia has targeted to achieve 36 million and RM168 billion in receipts by 2020 (EPU, 2013) and targeted to be within the top 10 countries in the world in terms of international tourist arrivals through various development plans.

Table 1. Number of domestic visitors by state visited (2017–2019)

State	Number of Visitors ('000)		
	2017	2018	2019
Selangor	25,491	30,179	33,589
Kuala Lumpur	19,049	19,165	22,633
Sabah	17,792	20,360	22,035
Perak	20,110	17,553	21,071
Pahang	16,491	18,111	18,498

Source: Department of Statistics Malaysia (2020)

1.2. Urban Areas, Urban Dwellers and Tourism

An urban area is a chosen spot for human settlement with high population density, complete facilities, and infrastructure. Urban areas are very well developed and will continue to grow from time to time. This means that urban areas are filled up with a density of human structures such as houses, commercial buildings, roads, bridges, railways and many others. The attributes of an urban area are different from one country to another country and vary over the years depending on its accomplishment in economics, infrastructure development, and population growth. Therefore, it is hard to directly compare an urban area from one to another. The three factors mentioned earlier are correlated as they are dependable on each other to build an urban area. However, for the hierarchy of an urban area, it is commonly associated with its population. An urban area will continue to grow in accordance with its population size. The dominant pattern of migration within countries has been similar throughout the world as the migrants commonly move from rural to urban areas. This is because the rural areas are the opposite of urban areas which have lower population density and greater numbers and areas of undeveloped land. Typically, the difference between a rural area and an urban area is clear and distinguishable. The migration pattern is partially driven

by the perception of greater job scopes and economic opportunities due to the development of many amenities and improved technology in the cities by most of the people that chose to migrate to urban areas. An urban area containing a large number of people, formed by various towns growing and joining together. In 2019, Kuala Lumpur has a population number of around 7.8 million, Georgetown (2.4 million), Johor Bharu (1 million), and Kuantan (0.5 million) (DOSM, 2020).

Cities provide some of the worst as well as some of the best atmospheres for human health and well-being. Today, more than 50% of the population worldwide live in urban areas. By 2050, it is predicted that this number might upsurge to more than 70% (United Nation, 2014). This rapid global urbanization which causes increasing environmental stressors and increasing socioeconomic disparities are associated with urban health and urban well-being. However, the so-called "urban advantages" describes that the health and well-being of city dwellers are better compared to those living in rural regions. Most people think that tourism is only impactful to the economy, jobs and taxes. Nevertheless, the impact of tourism is way powerful, and its range of influence is wider and beyond those commonly associated with tourism. The impacts of tourism can be arranged into seven general categories as follows: 1) Economic; 2) Environmental; 3) Social and cultural; 4) Crowding and congestion; 5) Services; 6) Taxes; and 7) Community attitudes. There are a lot of positive effects of tourism towards urban residents who are seeking time out, relaxation, stress relief, and escape from everyday routine. Therefore, the effect-recovery theory (Meijman & Mulder, 1998) and the conservation of resources theory (Hobfoll, 1998) recommend that taking a leisure trip offers opportunities for relaxation, detachment from work, mastery experience, and personal control (Chen *et al.*, 2016). It was found that all four dimensions of tourism recovery experiences had positive impacts on life contentment. The outcomes also revealed that even a weekend get-away can help one to recuperate from work stress, while longer trips offer more chances for recovery of experiences.

1.3 Agro-tourism in Malaysia

Agri-tourism can be defined as a park with a working farm or any agricultural, horticultural, or agribusiness operations, which is opened for a visit with the purpose of education, visitors' enjoyment, or active involvement in the activities of the farm or operations. It can also be a sub business for farmers to gain more profits. The Ministry of Tourism, Arts, and Culture Malaysia stated that agri-tourism is a tourism concept that is

swiftly getting popularity in Malaysia as it offers tourists an assortment of agricultural-related activities. Moreover, Malaysia is a nation that has plenty of agricultural resources and that should be entirely utilized. In Malaysia, the Ministry of Agriculture and Food Industry (MAFI) is the main agency that is fully responsible for developing agri-tourism, while the Ministry of Tourism, Arts, and Culture (MOTAC) plays an important role in promoting it both locally and globally. The concept of agri-tourism covers a broad range of agricultural-related activities amongst which is to encourage visitors to experience agricultural life themselves. Agri-tourism is a way of sustainable tourism development as this sector enables the tourists to gain real life experience about agricultural areas, agricultural occupations, local products, traditional food, and the daily life of the rural people, as well as the cultural elements and the traditions of the local communities. In 2018, the Ministry of Agriculture and Agro-Based Industry estimated about 12 million tourists from inside and outside Malaysia will come and experience agri-tourism in Malaysia. There are 83 agri-tourism locations all around Malaysia, which offer various activities that are suitable for all range of age that can be visited by the tourists. Many government agencies and private sectors realized the potential of the agro-tourism industry and had been giving huge support in developing this sector. However, to deliver the right product to the customers, understanding tourists' needs and wants is a must so that the agri-tourism industry in Malaysia will always be relevant in the upcoming years ahead. According to the Domestic Tourism Survey conducted by Department of Statistics Malaysia (2020), the percentage of tourist that prefers to experience homestay and vacation homes showed some increment from 2.4% (2018) to 4.3% (2019). While Sabah also showed an increment from 3.4% to 4.5%. This shows a good prospect in the agri-tourism sector in the upcoming years.

Agri-tourism, as stated earlier, has many contributions to the development of the country specifically in the economics and social sector. In Malaysia, even though the agri-tourism industry seems to have a bright future and has been showing a good record in terms of growth and development, there is a need to study in encountering some of the problems that are currently faced by this industry to maintain its suitability and sustainability. Since most of the agri-tourism places are located further in rural areas, a good transportation link is required to encourage visitors to these places. Thus, government agencies need to consider this matter in promoting more tourists to the location of the rural tourism areas. For instance, the transportation link should be easily accessed from or to the rural tourism areas as most tourists spend only a few days for traveling purposes. Other than that, basic tourism amenities such as local transportation, comfortable accommodation, and basic food service should also

be available for tourists as this would add value to the agri-tourism destinations. If a product is not easily accessible by the public, it would be tough to market. Dwellers in urban areas are typically living a hectic life as most of their time is spent on works and day-to-day routine. The time constraint problem they face makes them think twice to participate in any agri-tourism events as most of the agri-tourism destinations in Malaysia are located far from urban areas, which will make them think whether it is worth the expenses. Besides, lack of promotion and under-developed marketing strategies are other limitations in the agri-tourism sector as they hinder the development of the agro-tourism sector. Nowadays, social networks and the internet which are among the best tools for product promotion play a crucial role in marketing this agri-tourism sector. However, there are still not many agri-tourism destinations in Malaysia can be found through world wide web search. This causes the public to have insufficient information about the agri-tourism destinations in Malaysia. If there is some information given, it may still not be interesting and fascinating enough to attract tourists. In this case, the owners of the agri-tourism destination themselves need to invest some money in marketing their products and services so the public would be aware and attracted to visit their places. Urban dwellers are usually unwilling to take the risk of spending on something that they are not sure of or familiar with. They prefer to go to the places that are mostly visited and nearby the place where they live in such as amusement or theme parks, shopping malls and entertainment related tourisms.

The agri-tourism industry which has a lot of resources has plenty to offer to the tourists. However, this plenty of offer makes the scope of agri-tourism unclear and becomes overshadowed by other tourism sectors. Thus, government support is required here to guide the agri-tourism service providers who are mostly just small farmers that lack management knowledge. Besides that, the government should also teach them to do some research and development to understand more about the needs of their consumers towards this industry. This effort will aid in explaining more detail and clearer information to the agri-tourism providers about the scope of this industry in Malaysia. The main objective of this study is to identify the agri-tourism preferences among urban dwellers in Kuala Lumpur, Selangor, and Putrajaya. The specific objectives for this study are 1) to identify the respondents' profiles, 2) to examine the preferences of respondents in agri-tourism, and 3) to determine the participation of respondents in agri-tourism.

2. Literature Review

Gupta (2016) stated that agri-tourism is the added practice from the regular agricultural practices in the farm for attracting visitors and travelers to agricultural areas,

generally based on three scopes of agri-tourism, which are for direct market, educational, and recreational and also for recreational and event purposes. Many farmers especially those with small land, family-owned farms, and small business farms had to explore new means of making profits when the economic challenges and changes hit the farming and livestock industries globally. The hardships faced by the small farmers created an opportunity to venture into the agri-tourism industry that is now highly demanded by tourists. In many countries, agri-tourism is a fundamental part of the economy in rural areas. The instantaneous cause of this process is due to the change in tastes amongst the urban population who are concern about spending free time and a constant increase in the cost of holidays in well-known resorts. Nowadays, a modern tourist is looking for places which are free from pollution, offer active leisure activities or provide new and unique lifestyle experience, which is completely different from what has been commonly offered in other places in the city. It should also be pointed out that potential tourists appreciate peace, quiet and direct contact with nature. Agri-tourism meets those expectations. Lamb (2008) stated that the scope of agri-tourism varies significantly depending on the farm type, available land, and how much of the business is aimed at the agri-tourism market. Table 2 lists the scope of agri-tourism that depends on the tourists' preferences.

Table 2. Example of activities in different scopes of Agri-tourism

Scopes of Agri-tourism		
Direct Market	**Education and Experience**	**Recreational and Event**
U-pick operations	School tours	Riding animal
Farm-related crafts/gifts	Agricultural technical tours	Agrorace
On-farm sales	Farm stay	Jungle trekking
Farm-related product	Feeding animal	Fishing and hunting
Fruit stall	Plant it right	Camping and picnicking
	Agriculture exhibits	Enjoying flora and fauna
	Eating fresh fruit	Boating and kayaking
	Harvest festival	Cultural show

Source: Lamb (2008)

a) Direct Market

Direct market agri-tourism refers to the farmers that sell goods and farm-based production such as gift and crafts, canned items, and other organic products directly from their farm to consumers either at markets, fairs, and exhibitions or on the farm itself. According to Lamb (2008), farmers' product has the added value of coming directly from a local farm even though they may be selling an organic product similar to what consumers

could find at a typical grocery store. Hence, agricultural goods may be marketed as an organic and all-natural product to be more attractive and appealing to some consumers. This scope shows some differences in agri-tourism compared to other mainstream tourism, thus increase the chances of being the tourists' preferences.

b) Recreational and Event

Another scope of agri-tourism that offers recreational and event held on farm land may encourage more tourists to visit and enjoy the farm's atmosphere. Other activities are often more dependent on the farm structure itself. However, Lamb (2008) stated that long-term relationships can be forged once an association has been made between the consumers and the farm. These loyal customers and repeat business are the keys to the success of many agritourism businesses. In some cases, families or individuals interested in supporting the local agriculture sector will commit by creating recreational and event to a farm in exchange for a regular subscription of certain products or goods. This is a great opportunity for the farmer and the management to build a good relationship and engagement with the customers.

c) Education and Experience

Mazlan and Abdul (2014) stated that the scope of agri-tourism concerning education and experience is a scope of agritourism that aims to provide the guests with a hands-on education in real farm life and practices. In this case, the farm itself is marketed as a tourist destination. Regardless of how much agritourists pay for the packages or activities; the main reasons are to deliver the first-hand experience to them. Lamb (2008) revealed that tourists may be more interested to buy agricultural products once they are better familiar with the farm.

d) The Four Ps (4Ps) Components of People Preferences

Kotler *et al*. (2016) suggested that the preferences of people towards those things or matter should be known to determine the potential of certain things or matters. Understanding the complexity and diversity of the people's preferences is very significant to ensure the growth of the agri-tourism industry is on the right track. Sheth and Sisodia (2012) shared that poor information because of not knowing what drives people's preferences will lead to failure in determining the potential and strategy. The same goes for the agri-tourism industry, it is very important to determine the four P (4Ps) components of people's preferences which are product, price, place, and promotion from the very beginning. These four components play a different distinctive role however are closely related to each other.

i. Product

Products that are produced by the agri-tourism sector play a vital role in attracting more people to experience it. In this study, the product of agri-tourism is more towards preparing services for the people. The preferences aspect of the product through its benefit and reliability was the way to increase the level of acceptability of the people towards the product provided (Sheth & Sisodia, 2012). The higher the level of acceptability of the product, the higher the chances to meet the people's preferences.

ii. Price

Price is surely related to the products that want to be provided. To get the product or to enjoy some activities, how much people are willing to pay (psychological) and their ability to pay (economical) is important (Sheth & Sisodia, 2012). Apart from the tourists' affordability factor, sometimes comes into their mind whether the product is worth to be purchased or not. This is one of the problems faced by the agri-tourism industry now. The best way to promote customer satisfaction is by providing an affordable price which is equivalent to what the product offers.

iii. Place

According to Sheth and Sisodia (2012), places are referred to as the degree of accessibility the people go and get the provided product or services. The availability of the place to be accessed by the people also plays an important role so that all the products can be delivered and the services provided there can be fully utilized. Other convenience facilities around and on the way to the place also give a huge effect on the tourists' preferences in participation in agri-tourism.

iv. Promotion

The right way and channel to promote the products and services also play an important role to give awareness to the people. Sheth and Sisodia (2012) suggested that a powerful promotion is a promotion that gives informative knowledge about the products, reminds the public about the products, and acts as a persuasive agent to attract the interest of the people towards the products. The promotion also acts as the action or process of reinforcement of the product to the people.

3. Results

This study was conducted in Kuala Lumpur, Selangor, and Putrajaya. These locations were selected due to the higher potential of tourists who will go for agri-tourism. The survey

areas included were residential area, commercial area, and working area so that the data collected will not be biased. Kuala Lumpur is the capital city of Malaysia and surrounded by Selangor is world-renowned as one of the iconic cities in Southeast Asia. It is among the fastest growing metropolitan regions in South-East Asia, in both population and economic development. While Putrajaya is a planned city that has been Malaysia's third federal territory and becomes the federal administrative center of Malaysia replacing Kuala Lumpur in early 1999.

A convenience sampling method was chosen for this study. A convenience sample is a type of non-probability sampling method where the sample is taken from a group of people easy to contact or to reach. For example, standing at a mall or a grocery store and asking people to answer questions would be an example of a convenience sample. This type of sampling is also known as grab sampling or availability sampling. There are no other criteria for the sampling method except that people be available and willing to participate. Besides, this type of sampling method does not require that a simple random sample is generated since the only criterion is whether the participants agree to participate (Saunders *et al*., 2012). Using the Krejci and Morgan Table, 387 respondents were selected as sample population. Every member of the population has an equal chance to be selected and result in an unbiased representative sample. Kuala Lumpur, Selangor, and Putrajaya consist of multiracial background where its three major groups are Malay (Bumiputra), Chinese and Indian. Ethnics from Sabah and Sarawak were grouped in another sub-group which also represent the Non-Malay ethnics. All these races and ethnicities contribute to the growth of the population in this urban region. The population consists of a balanced number between males and females.

To get the information that is representative of the total population, this questionnaire has been divided into three (3) parts which are: 1) Part A: Respondents' profiles including their personal information and demographic backgrounds; 2) Part B: Respondents' preferences including their opinion about their needs and wants towards agri-tourism; and 3) Part C: Respondents' feeling and behavior including their scale towards certain factors in agri-tourism. The data analysis technique is important to ensure that the information that we get through the survey can be manipulated according to our objectives. Descriptive statistics were used to determine the frequency and percentage of overall data collected including respondents' background and their preferences. A Chi-squared test was used to determine whether there is a significant difference between demographic variables and their preferences towards agri-tourism based on the data collected.

4. Results and Discussions

4.1 Socio-Demographic Profiles of Respondents

The results of the socio-demographic profiles of the respondents such as gender, age, race, occupational sector and income status are presented in Table 3. From the study, out of 387 respondents, 51.4% of them were male, while the remaining 48.6% were female. This shows an unbiased respondent's selection as the percentages of the male and female were nearly the same. The majority of the respondents were between the age of 21 to 40 years old with 272 respondents (70.3%), followed by the age between 41 to 60 years old with 80 respondents (20.7%), the age above 61 years old with 21 respondents (5.4%) and the last were the age below 20 years old with 14 respondents (3.6%).

Table 3. Socio-demographic profiles of respondents

Profiles	**Parameter**	**Frequency (n)**	**Percentages (%)**
Gender	Male	199	51.4
	Female	188	48.6
Age	≤ 20 years	14	3.6
	21–40 years	272	70.3
	41–60 years	80	20.7
	≥ 61 years	21	5.4
Race	Malay	265	68.5
	Chinese	62	16.0
	Indian	44	11.4
	Others	16	4.1
Occupational Sector	Unemployed	44	11.4
	Self-employed	59	15.2
	Government	98	25.3
	Private	147	38.0
	Student	39	10.1
Income	≤ RM1,000	82	21.2
	RM 1,001–RM 4,000	230	59.4
	RM 4,001–RM 7,000	65	16.8
	RM 7,001–RM 10,000	8	2.1
	≥ RM 10,001	2	0.5

Study locations ethnically diverse population consists of three major ethnicities namely Malay, Chinese and Indian, as well as other ethnicities. Table 3 shows that the major ethnicity is Malay with 265 respondents (68.5%), followed by Chinese with 62 respondents

(16.0%), Indian with 44 respondents (11.4%), and other ethnicities with 16 respondents (4.1%). Since the selected areas of study is a developing urban area, the occupational sector of the population is vast especially in private sectors that contribute a lot to its development. The private sector has the highest number of respondents of 147 (38.0%), followed by the government sector which consists of 98 respondents (25.3%), self-employed with 59 respondents (15.2%), unemployed with 44 respondents (11.4%), and students with 39 respondents (10.1%). Table 3 portrays the demographic characteristics of the respondents. From the table, the income of the respondents also shows a corresponding relationship with the income distribution of the population released by the Department of Statistics. The income of the middle-class ranges from RM 1,001 to RM 4,000 shows the highest frequency with 230 respondents (59.4%), followed by the income below RM 1,000 with 82 respondents (21.2%), the income range between RM 4,001 to RM 7,000 with 65 respondents (16.8%), the income range between RM 7,001 to RM 10,000 with 8 respondents (2.1%) and lastly the income higher than RM 10,000 with 2 respondents (0.5%).

4.2 Respondents' Lifestyle Backgrounds

The study regarding respondents' lifestyle backgrounds is important in analyzing the preferences of the respondents towards the agri-tourism sector. Table 4 shows the expenses amount to be spending on tourism and activities at one time that the respondents are willing to pay for tourism and activities. 49.1% of the respondents are willing to pay between RM 11 to RM 30 per person, followed by less than RM 10 per person (23.0%), between RM 31 to RM 50 per person (22.7%), and lastly more than RM 51 per person (5.2%). This demonstrates that the price between RM 11 to RM 30 is an affordable price for most tourists. The percentage of the respondents' total income that they spend on tourism and recreational activities should also be identified so the agri-tourism service providers will be able to offer a price that does not exceed the tourists' expenditure limit. Table 4 also shows that most of the respondents (51.7%) spend below 10% of their income on tourism and recreational activities followed by the expenses between 11% to 20% of their incomes (46.2%) and the expenses between 21% to 30% of their incomes (2.1%). Due to less time and busy working and lifestyle, most city dwellers prefer day trips (76.0%) rather than an overnight trip (24.0%). Table 4 also reveals that city dwellers mostly prefer to travel between 2 to 4 hours (54.3%), followed by 0 to 2 hours travel period (41.6%) and the remaining 4.1% of the respondents consider traveling between 4 to 6 hours.

Table 4. Respondents' lifestyle backgrounds

Variables	Parameter	Frequency (n)	Percentages (%)
Expenses amount to be spending on tourism and activities at one time	≤ RM 10	89	23.0
	RM 11–RM 30	190	49.1
	RM 31–RM 50	88	22.7
	≥ RM 51	20	5.2
Percentages of income for tourism and recreational activities	≤ 10 %	200	51.7
	11%–20%	179	46.2
	21%–30%	8	2.1
	31%–40%	0	0
The travel period to experience tourism	0–2 hours	161	41.6
	2–4 hours	210	54.3
	4–6 hours	16	4.1
	≥ 6 hours	0	0
Type of trips	Day trip	294	76.0
	Overnight trip	93	24.0

Table 5 shows that the facilities needed in the tourism areas. Safety and comfortable road have the highest ranking with 375 respondents (96.9%), followed by rest and relax area with 269 respondents (95.3%), Wi-Fi and internet connectivity with 291 respondents (75.2%), restaurant availability with 250 respondents (64.6%), petrol station with 237 respondents (61.2%), mosque and *mussola* with 140 respondents (36.2%), hotel and motel with 133 respondents (34.4%) and mini mart with 63 respondents (16.3%). These top 5 facilities should be taken into consideration to provide a convenient and comfortable journey for the tourists. To deliver the information about agri-tourism to the urban dwellers, the medium of information delivery that they preferred to use was also asked. According to the result in Table 6, the internet as predicted was mostly picked as the medium of information transfer with the highest percentage of 89.7% followed by mass media (80.4%), exposition and event (57.9%), and lastly newspaper and magazine with only 34.6%.

Table 5. Facilities needed at tourism area

Rank	Facilities	Frequency	Percentages (%)
1	Safety and comfortable road	375	96.9
2	Rest and relax area (R&R)	369	95.3
3	Wi-Fi and internet connectivity	291	75.2
4	Restaurant	250	64.6
5	Petrol station	237	61.2
6	Mosque and *musolla*	140	36.2

7	Hotel and motel	133	34.4
8	Mini mart and convenience store	63	16.3

Table 6. Information sources in delivering information

Rank	Information Sources	Frequency	Percentages (%)
1	Internet: social media and search engine	347	89.7
2	Mass media: television and radio	311	80.4
3	Exposition and event	224	57.9
4	Newspaper and Magazine	134	34.6

4.3 Respondents' Tendency towards Agri-tourism

Table 7 shows the distribution frequency and percentages of respondents' tendency towards agri-tourism. The statements included were to show the level of knowledge and information of the respondents about agri-tourism and directly present their tendency towards agri-tourism. From the result, it is found that most of the respondents have heard or read about agri-tourism places and activities as this statement has the highest percentage (86.8%) of all. Table 8 shows the scope and concept of agri-tourism urban dwellers prefer. Based on the result, the most favorable scope and concepts of agri-tourism are recreational and event as it has the highest percentage of 78.8%, followed by the direct market (66.7%) and educational and experiences (56.3%).

Table 7. Tendency towards Agri-tourism

Statements	Frequency (n)	Percentages (%)
1. Involved directly or indirectly with agri-tourism	104	26.9
2. Have heard or read about agri-tourism place and activities	335	86.6
3. Understand about scope and concept of agri-tourism	98	25.3
4. Known about agri-tourism place and activities	215	55.6
5. Known about the advantages and benefits of agri-tourism	201	51.9
6. Interested in experiencing agri-tourism activities	213	55.0
7. Agri-tourism is a good choice for spending time with family	228	58.9

Table 8. Scope and concepts of agri-tourism

Rank	Scope and Concepts	Frequency (n)	Percentages (%)
1	Recreational and event	305	78.8
2	Direct market	258	66.7
3	Educational and experiences	218	56.3

4.4 Respondents' Perception towards Agri-tourism Preferences

Mean ranking analysis was used to rank the given 25 statements from the highest mean to the lowest mean divided into four (4) agri-tourism preferences which are pricing and payment (6 statements), placing and area (7 statements), promotion and advertisement (6 statements) and products and activities (6 statements). The statements were arranged according to the mean score from the highest to the lowest in each factor. The 25 statements that are related to the perception towards agri-tourism preferences were analyzed based on a 5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree.

4.4.1 Respondents' perception towards pricing and payment

Table 9 shows the respondents' perception of pricing and payment in agri-tourism. Most of the respondents agreed that payments for agri-tourism activities should be appropriate and satisfactory as the statement has the highest mean score (4.41). This means that the payments charged to the customers must be compatible with the satisfaction of agri-tourism products and services offered to them. The least respondents (mean = 4.15) believed that prices for activities and product should not be too different from the market outside.

Table 9. Respondents' Perception towards pricing and payment

Perception towards Pricing and Payment	**Scale***						
	1	**2**	**3**	**4**	**5**	**Mean**	***SD***
1. Payments for agri-tourism activities should be appropriate and satisfactory	0 (0)	0 (0)	14 (3.6)	202 (52.2)	171 (44.2)	4.41	0.56
2. Discounts and family packages are necessary to attract more tourist	0 (0)	0 (0)	27 (7.0)	201 (51.9)	159 (41.1)	4.34	0.60
3. Price and payment for experience agro-tourism should be reasonable	0 (0)	0 (0)	4 (1.0)	254 (65.7)	129 (33.3)	4.32	0.49
4. Payment for experience agri-tourism should be affordable to all range of ages	0 (0)	0 (0)	36 (9.3)	229 (59.2)	122 (31.5)	4.22	0.60
5. Entrance fee and payment for activities should be in one price to facilitate the tourist	0 (0)	0 (0)	45 (11.6)	212 (54.8)	130 (33.6)	4.22	0.64

Perception towards Pricing and Payment	Scale*						
	1	**2**	**3**	**4**	**5**	**Mean**	***SD***
6. Prices for activities and product should not be too different from the market outside	0 (0)	0 (0)	42 (10.9)	244 (53.0)	101 (26.1)	4.15	0.59
				Total Average Mean		**4.277**	

Note: Figures in parentheses indicate percentages (%)

*Scale: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

4.4.2 Respondents' perception towards placing and area

Table 10 shows respondents' perception towards placing and area of agri-tourism. Most of the respondents agreed that finding through a modern application like Google Maps and Waze should be easy as it has the highest mean score (4.54) on the statement. This is perhaps because the public is always connected to these applications as these applications make it easier for them to find any unfamiliar or new places anytime. Respondents also agreed with the other statements such as diversification of agri-tourism area, clean and comfortable as the mean score of every statement is above 4.3. Least respondents with the resulted mean of 4.22 were concerned about the safety of place and area of agri-tourism.

Table 10. Respondents' perception towards placing and area

Perception of Placing and Area	Scale*						
	1	**2**	**3**	**4**	**5**	**Mean**	***SD***
1. Finding through modern application (Google Maps and Waze) should be easy	0 (0)	0 (0)	0 (0)	177 (45.7)	210 (54.3)	4.54	0.50
2. Diversify area of agri-tourism was needed to attract more tourist	0 (0)	0 (0)	6 (1.6)	202 (52.1)	179 (46.3)	4.45	0.53
3. Agri-tourism area should be clean and comfortable for leisure	0 (0)	0 (0)	4 (1.0)	221 (57.1)	162 (41.9)	4.41	0.51
4. Facilities along the way to agri-tourism area should be comfortable to use	0 (0)	0 (0)	25 (6.5)	232 (59.9)	130 (33.6)	4.27	0.57
5. Place and area of agri-tourism should free from pollution to attract more tourist	0 (0)	0 (0)	29 (7.5)	229 (59.2)	129 (33.3)	4.26	0.59

Perception of Placing and Area	Scale*						
	1	2	3	4	5	Mean	*SD*
6. Journey to agri-tourism area should be easily to reached and found	0 (0)	0 (0)	9 (2.3)	274 (70.8)	104 (26.9)	4.25	0.48
7. Place and area of agri-tourism should be safe for tourism and leisure	0 (0)	0 (0)	27 (7.0)	249 (64.3)	111 (28.7)	4.22	0.56
				Total Average Mean		**4.343**	

Note: Figures in parentheses indicate percentages (%)

*Scale: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

4.4.3 Respondents' perception towards promotion and advertisement

Table 11 shows the respondents' perception towards promotion and advertisement in agri-tourism. Most of the respondents agreed that promotion and advertisement on agri-tourism must be attractive and effective as this statement shows the highest mean score of 4.47. Most respondents also agreed with the other statement as the mean score of every statement is above 4. Hence, proper management and best tactic of promotion and advertisement are vital to create a good impression to attract more tourists in the agri-tourism sector.

Table 11. Respondents' perception towards promotion and advertisement

Perception towards Promotion and Advertisement	Scale*						
	1	2	3	4	5	Mean	*SD*
1. Promotion and advertisement of agri-tourism must be effective and attractive	0 (0)	0 (0)	16 (4.1)	175 (45.3)	196 (50.6)	4.47	0.58
2. Promotion and advertisement of agri-tourism must be delivered through all channel	0 (0)	0 (0)	19 (4.9)	191 (49.4)	177 (45.7)	4.41	0.58
3. Promotion and advertisement must be increased to build awareness in agri-tourism	0 (0)	0 (0)	21 (5.4)	202 (52.2)	164 (42.4)	4.37	0.59
4. Promotion and advertisement of agri-tourism should be easily reached by the public	0 (0)	2 (0.5)	50 (12.9)	180 (46.5)	155 (40.1)	4.26	0.70
5. Promotion and advertisement must be focused around attraction area	0 (0)	0 (0)	45 (11.6)	231 (59.7)	111 (28.7)	4.17	0.61

Perception towards Promotion and Advertisement	Scale*						
	1	**2**	**3**	**4**	**5**	**Mean**	***SD***
6. Promotion and advertisement of agri-tourism need to be enough and adequate	0 (0)	2 (0.5)	44 (11.4)	248 (64.1)	93 (24.0)	4.12	0.60
				Total Average Mean		**4.300**	

Note: Figures in parentheses indicate percentages (%)

*Scale: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

4.4.4 Respondents' perception towards product and activities

Table 12 shows the respondents' perception towards products and activities in agri-tourism. Based on the result, most of the respondents agreed that agri-tourism products and activities should be appropriate for all range of ages, besides agreeing to another statement that activities and products of agri-tourism should expose them with new knowledge and experience as both of these statements have the highest mean of 4.51. This is true as the public believes that tourism is one of the ways to spend their valuable time to enjoy and gain new knowledge and experience with their loved ones that are consists of various range of age. Other than that. most of the respondents also agreed with the other statements as the mean score of every statement is above 4. Least respondents believed the role of agri-tourism product and activities in improving healthy lifestyle (Mean = 4.20).

Table 12. Respondents' perception towards product and activities

Perception towards Product and Activities	Scale*						
	1	**2**	**3**	**4**	**5**	**Mean**	***SD***
1. Agri-tourism product and activities should be appropriate for all ages	0 (0)	0 (0)	8 (2.1)	173 (44.7)	206 (53.2)	4.51	0.54
2. Activities and product should expose tourist with new knowledge and experience	0 (0)	0 (0)	8 (2.0)	174 (45.0)	205 (53.0)	4.51	0.54
3. Agri-tourism product and activities must be attractive and challenging	0 (0)	0 (0)	12 (3.1)	193 (49.9)	182 (47.0)	4.44	0.56
4. Agri-tourism product and activities should be safe to enjoy and participate	0 (0)	0 (0)	13 (3.4)	233 (60.2)	141 (36.4)	4.33	0.54

Perception towards Product and Activities	Scale*						
	1	**2**	**3**	**4**	**5**	**Mean**	***SD***
5. Agri-tourism product and activities should avoid any form of pollution	0 (0)	0 (0)	23 (5.9)	243 (62.8)	121 (31.3)	4.25	0.56
6. Agri-tourism product and activities should help to improve healthy lifestyle	0 (0)	0 (0)	47 (12.1)	217 (56.1)	123 (31.8)	4.20	0.63
				Total Average Mean		**4.373**	

Note: Figures in parentheses indicate percentages (%)

*Scale: 1 = strongly disagree; 2 = disagree; 3 = neutral; 4 = agree; 5 = strongly agree

4.5 Respondents' Perception towards Challenges and Potential in Agro-tourism

Table 13 shows respondents' perception towards the challenges and potential of the agri-tourism industry in Malaysia. About 58.7% of the respondents agreed that agri-tourism in Malaysia has good potential in the future, while the rest of the respondents did not agree with the statement because many problems and challenges still need to be improved in this industry. Based on the table, the major challenges in agri-tourism are the issues of lack of information about agri-tourism itself with 89.1% of the respondents agreed with the statement. This is true as sufficient information is crucial in building public awareness about this industry. Therefore, promotion, marketing, and advertisement must be done appropriately and actively to deliver the information to the public. Besides, almost 60% of the respondents stated that the challenges regarding agri-tourism are due to the activities provided that were boring and unattractive besides the areas of agri-tourism that were far to reach. This makes the tourists less interested to participate in agri-tourism.

Table 13. Respondents' perception towards challenges and potential in agri-tourism

Statement	Frequency (*n*)	Percentages (%)
Challenges		
1. Lack of information about agri-tourism in Malaysia	345	89.1
2. Agri-tourism activities were boring and unattractive	232	59.9
3. The agri-tourism area in Malaysia was far to reach	228	58.9
4. The price for experiencing agri-tourism was expensive and not worth it	188	48.6
5. Lack of agri-tourism destination in Malaysia	157	40.6

	Statement	Frequency (*n*)	Percentages (%)
Challenges			
Potential			
1.	Agri-tourism in Malaysia have good potential in the future	227	58.7

5. Conclusions and Recommendations

Tourism can be affected by a lot of factors and it requires a lot of planning and strategies to further improve this industry and expand it both in the domestic and international level. This study which focuses on agri-tourism preferences among urban dwellers shows that most are with average income of RM 1,000 to RM 4,000 a month. This will surely affect their dream vacation and location. Since these middle-income groups are among the group responding to the agri-tourism prospect in the Malaysian industry, they will be the target group the marketing and promotion should be focused on in the future. Those with high income (i.e., above RM 7,000) seems to be less interested in agri-tourism based on the number of respondents obtained. In terms of traveling period, most can drive up to 4 hours in a safe and comfortable road, and none would like to drive more than 6 hours, which indicates that most respondents prefer a short drive or traveling time. A one day get-away was most preferable by 75% of the respondents. They were informed about agri-tourism through social media and search engines and preferred recreational and event-oriented agri-tourism. By using the descriptive analysis and in the context of pricing and payment, the findings revealed that most of the respondents (Kuala Lumpur, Selangor and Putrajaya residences) agreed that payments for agri-tourism activities should be appropriate and satisfactory (Mean = 4.41), which means that the payments charged to the customers must be relevant and worth the services that the agri-tourism packages offered to them. The agri-tourism service provider must be active in offering discounts and family packages to increase the number of visitors at one time. In respect to the second preference factor, the place and area of the agri-tourism, most of the respondents agreed that the location of the agri-tourism area should be easily found through a modern application like Google Maps and Waze through their mobile gadgets as it has the highest mean score (4.54). Hence, they can reduce the traveling time and arrive at the destination safely and on time. Most of the respondents agreed that agri-tourism products and activities should be appropriate for all ages. Tourism is one of the ways for family and friends at different ages to get together during holidays and even prefers car-pooling to create the bond between individuals. The respondents mostly agreed that promotion and advertisement on agri-tourism must be attractive and effective as

this statement shows the highest mean score (4.47). Proper management and a good strategy of promotion and advertisement are a must as it is the primary key to create a good impression and attract more tourists to participate in agro-tourism activities. The major challenge in agro-tourism with 345 respondents (89.1%) agreed to the issues of lack of information on subject matter itself. Therefore, to deliver the information to the public, the promotion, marketing, and advertisement must be done actively and effectively by both government and private agencies. Besides, almost 60% of the respondents stated that the challenges regarding agro-tourism were their activities which were boring and unattractive, other than the place and area of agri-tourism itself which were far to reach. This makes the tourists even less interested to participate in any agri-tourism events. On the other side, about 58.7% of the respondents agreed that agri-tourism in Malaysia have good potential in the future, while the rest of the respondents did not agree due to the facts that there are still many problems and challenges that need to be taken care of to improve this agri-tourism industry from time to time.

Results from this study will serve as a guide for authorities in getting a road map on how to better promote agri-tourism based on the respondents' preference towards agro-tourism in Malaysia. The best strategies and action taken by Malaysia agri-tourism agencies will consequently improve the agri-tourism sectors which will indirectly contribute to the economy of Malaysia. This information can also be used by implementing agency in designing agri-tourism development programs in the future. This implementation of a program that is in accordance with the preferences of the urban dwellers may help to facilitate them to understand and subsequently explore the potential of agri-tourism in this country. In terms of policy implications, these findings will assist the government to have baseline information on how to evolve policies that will be beneficial to the Malaysian citizens especially the urban dwellers, and equally, help in promoting agri-tourism. These policies may help in boosting the agri-tourism productivity at the domestic level and it will go in the long term in increasing the visitors to participate in agri-tourism in Malaysia domestically and internationally.

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Original Research Article

Adoption of Social Media Marketing Among Agropreneurs in Peninsular Malaysia

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Abstract: Social media has become one of the main platforms for businesses across the globe to market products or services. However, some entrepreneurs remain doubtful over the efficacy of social media marketing relative to conventional marketing in attracting interests from their targeted audience of diverse backgrounds. Besides, social media is known primarily as the medium for people around the world to socialise with everyone, despite marketing their products or services, especially agro-based products. Inadequate knowledge on how to utilise the platform to market their products by using social media have refrained them from using social media marketing in their business because they require more time and assistance to learn how to employ social media marketing. Thus, the main objective of this study is to investigate the adoption of social media marketing among agropreneurs in Peninsular Malaysia. Primary data was collected using a structured questionnaire via an online survey. The questionnaires were distributed through social media platforms and via email to the targeted respondents using a purposive sampling method. A total of 113 respondents from 12 states in Peninsular Malaysia participated in this study. Data collected were analysed using descriptive, Chi-square and factor analysis. The results indicated that the adoption level of social media marketing among agropreneurs in Peninsular Malaysia is on the medium high level, and the highest and most adopted social media platform is Facebook. The results of Chi-square analysis showed that only types of agro-based business operated has an association with the adoption of social media marketing among agropreneurs. Factor analysis discovered four latent factors on the adoption of social media marketing among agropreneurs, namely perceived usefulness, social influence, perceived ease of use and facilitating conditions. Hence, entrepreneurs who are already adopted social media marketing should cooperate and create an association of online agropreneurs to encourage other entrepreneurs to start embracing social media marketing.

Keywords: adoption; agropreneurs; social media; Peninsular Malaysia; SMEs

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1. Introduction

The transformation of a country's agriculture depends on the availability and ease of access to the advanced technologies provided by the relevant stakeholders in the sector to develop human resources. Entrepreneurship is widely known to be the engine of economic growth for a country, while developing human resources. According to the Ministry of Entrepreneur and Co-operative Development (MECD), an entrepreneur is an individual who has the reputation of providing innovative products or services, which is also characterised by resilience and competitiveness in creating values. An entrepreneur is also able to embrace any risks or uncertainties and assumes full responsibility for the outcome. The conceptual and operational development of entrepreneurship has become increasingly important in Malaysia. Sahri (2007) defined entrepreneurs as people who are engaged in an enterprise or a business, whether in production, agriculture, service or livestock. Jarkko *et al.* (2006) coined the term *agropreneurs* that derive from *agro*, agriculture and *prenuer,* entrepreneur. It is a term used to define entrepreneurial farmers who aspire to excel in a farming business. As it is, agropreneurs should diversify their operations by setting up businesses that can boost their profits and allowing them to survive on the farm. Thus, an agropreneur is someone who uses agriculture to build his or her business. On the other hand, Richards and Bulkley (2007) defined agricultural entrepreneurs or agropreneurs as someone, who performs all activities that assist farmers in regulating a free market economy. In Malaysia, efforts have been made by the relevant stakeholders to increase the competitiveness of agropreneurs by encouraging the use of new technology such as digital marketing, specifically social media.

When digital marketing was introduced, communication has grown into more cybernetic than physical over time. In the era of global digitalisation and the introduction of new technologies, most of the activities are transformed from classical marketing to digital marketing due to the relatively lower cost of studying and the processing speed of big data has enhanced product promotion (Robul, 2020). For the past few years, social media has become a global phenomenon. The development of social media does not indicate any signs of ending or moving backward, and it is very vibrant (Gaber & Wright, 2014). According to Statista (2020), the record of global active internet users is totaled at 4.54 billion, with over 3.8 billion active users of social media. Social media has become the foundation of electronic communications that people use to share information, personal messages, ideas and other contents for online communities. Social media as defined by Safko and Brake (2009) refers to activities, practices and behaviours among communities of people who gather online to share information, knowledge and opinions using conversational media.

The widespread global adoption of social media has shaped social engagement among individuals, community and society. As of January 2015, there are 1.685 billion globally active mobile social accounts, which constitute 23% of the penetration. In 2020, there are an estimated 3.6 billion users of social media, and it is projected to increase further up to 4.41 billion in 2025 (Statista, 2020). According to the Department of Statistics Malaysia (2019), the population of Malaysia in 2019 is estimated at 32.6 million, which is an increase from

32.4 million in 2018 with the urbanisation rate is 76.6% of the total population. As of January 2020, Malaysia's active internet users accounted for 27.1 million with active social media users accounted for 81% of the total population (Statista, 2020). Malaysian users of social media spend on, an average of three hours and 27 minutes a day on any devices. In all the social networking platforms, Facebook has been the leading website with a remarkable rise over the last few years (Zolkepli & Kamarulzaman, 2014). The report by Bigdomain.my (2019) found that Facebook is a popular site among Internet users in Malaysia with 23 million Facebook users and it is expected to hit 24.2 million users in 2023, up from 23 million in 2018. Besides Facebook, the other top five social media platforms used by Malaysians are Youtube, Instagram, LinkedIn and TikTok. Besides, Hashim *et al.* (2016) revealed that most entrepreneurs believed social commerce is the future way of doing businesses and every entrepreneur needs to connect with social media not only to discuss products and services with customers, but also as a mean to facilitate entrepreneurs in making vital and critical business decisions. Interestingly, social media is also achieving popularity in the agriculture sector. The major platforms for the dissemination of agricultural information include Facebook, Twitter, YouTube and blogs. Ultimately, exploiting social media for enhanced communication is not a choice but a necessity because agriculture is one of the major sectors with great importance as part of the nation's engine growth. Thus, the objective of this study is to determine factors influencing the adoption of social media marketing among agro-based entrepreneurs or agropreneurs in Peninsular Malaysia.

2. Literature Review

Social media has been used widely by business organisations in conducting their marketing activities, whether they are selling products or services. Social media functions as an instrument for socialisation and communication based on the viewpoint of the individual, whereas from the business viewpoint, social media functions as a medium by which businesses connect with clientele as a whole (Boyd & Ellison, 2007; Mangold & Faulds, 2009; Hutton & Fosdick, 2011; Che Nawi *et al.,* 2019). Remarkably, social media needed only a few years to grab the attention and time of Internet users since its inception. The adoption of social media has since expanded (Zolkepli & Kamarulzaman, 2014; Ahmad *et al.,* 2019) and has changed the way of interaction between consumers and organisations (Akman & Mishra, 2017). Parveen *et al.* (2015) stated that the competency and performance of institutions such as development in information, approachability and enrichment on customer service and relations activities can be better by social media. Cox (2012) described that businesses are capable of networking with clienteles to attain an improved understanding of customer requirements and build connections by using social media. Chmielecki (2014) noted that marketers are able to get a way and a voice to converse with prospective customers and partners through social network media. The adoption of marketing strategies based on social media has tremendously improved the interaction of the firms with consumers; improve the marketing strategies based on consumer feedback as well as helping in gaining marketing information (Galati *et al.,* 2017). The adoption of social media for business

procedures that motivates consumer and business commitment levels is indeed a rising trend (Tuten & Angermeier, 2013).

Social media has been recognised as a viable marketing tactic by many organizations across the globe to reach their key audiences. Dahnil *et al*. (2014) characterised social media marketing as involving the marketing of products, brands, services, thoughts and information via the social media platform and can be recognised as an emerging business routine. According to Barefoot and Szabo (2010), social media marketing is characterised as utilizing the sites of social networking as channels to promote or advertise a company and selling products. Eagleman (2013) described social media as a unique form of marketing and communication strategy. Further, Gensler *et al*. (2013) stated that a brand's performance may be affected by online presence via social media in accomplishing marketing actions. Hence, social media marketing is indeed an emerging trend that is quickly evolving, and with the advancement of social media platforms, businesses are able to reach their targeted audiences faster.

Razak and Latip (2016) further proposed the use of social media as a collaborative platform. It allows companies to form a brand image and brand awareness, boost sales and captivate new customers, and secure present customers. In fact, Shahizan *et al*. (2012) affirmed that well-established companies in Malaysia have broadly embraced social media as a marketing tool. Hong *et al*. (2015), on the other hand, declare social media as a trend among the younger generation and business partners, as indicated by an overwhelming marketer (92%) based on Hubspot's 2014 figures, that social media marketing is the key to boosting business development. Thus, in ensuring their business can cover a wider market and customers, agropreneurs need to use social media marketing as one of the means in running the business.

3. Materials and Methods

Primary data was collected using a structured questionnaire via an online survey. The questionnaires were distributed through social media platforms and via email to the targeted respondents using a purposive sampling method. A total of 113 respondents from 12 states in Peninsular Malaysia participated in this study. Data collected were analysed using descriptive analysis, Chi-square analysis and factor analysis. Descriptive analysis was used to describe the fundamental features of the data in this study. It described the respondents' profiles and their adoption of social media marketing in business. Meanwhile, Chi-square analysis was carried out to identify the association between respondent's business profiles and the adoption of a social media marketing platform. Factor analysis, on the other hand, was utilised to determine the latent factors influencing the adoption of social media marketing platforms among agropreneurs in Peninsular Malaysia.

4. Results and Discussions

This section discussed the findings of the study, which were analysed using descriptive, Chi-square and factor analysis.

4.1 Descriptive Analysis

Descriptive analysis was used to describe the sample as well as the business profile of the respondents of this study. In terms of the types of agro-based business operated by the respondents, this study has classified the types into seven categories as outlined in Table 1. Most of the respondents were operating in the food processing business, which constituted 28% (32) of respondents. This is followed by animal rearing business with 20% (23) respondents and farming business with 19% (21) respondents. Approximately, 11% (12 respondents) of the total respondents were operating fisheries and aquaculture business. There were around 10% (11 respondents) and 4% (five respondents), respectively, of respondents involved in floriculture business and plantation businesses. .

In terms of monthly income earning from the operated business, it can be categorised into eight groups, as presented in Table 1. Most of the respondents belonged to the income levels of less than RM 1,500, which constitutes of 32% respondents. Respondents with a monthly income earning between RM 1,501 to RM 3,000 composed the second-highest percentage which is 26% 3 respondents, followed by the group of RM 3,001 to RM 4,500 which constitutes 17% respondents and 10% respondents of the respondents fall into RM 4,501 to RM 6,000 level. The income levels of RM 6,001 to RM 7,500 and more than RM 10,001 each constitutes 5% respondents of the total respondents.

Meanwhile, there were only 3% of respondents earning between RM 7,501 to RM 8,500 and 2% earning at RM 8,501 to RM 10,000 income level. The result outlined in Table 1 showed that most of the respondents have been involved in the business for less than two years, accounting for 39% (44 respondents) of the total respondents. This is followed by 34% with two to four years of involvement, 14% with five to seven years, 8% for more than 10 years and the least have been between eight to 10 years, accounting 5% from the total respondents.

Table 1. Respondent's business profiles.

Demographic Variables	Frequency (*n*)	Percentage (%)
Type of Business		
Farming	21	19
Animal Rearing	23	20
Fisheries and Aquaculture	12	11
Plantation	5	4
Food Processing	32	28
Non-Food Processing	9	8
Floriculture	11	10

Demographic Variables	Frequency (*n*)	Percentage (%)
Monthly Income		
< RM 1,500	35	32
RM 1,500–RM 3,000	30	27
RM 3,001–RM 4,500	19	17
RM 4,501–RM 6,000	12	11
RM 6,001–RM 7,500	5	4
RM 7,501–RM 8,500	4	3
RM 8,501–RM 10,000	2	2
>RM 10,000	5	4
Years Involved in the Business		
< 2 years	44	39
2–4 years	38	34
5–7 years	6	14
8–10 years	6	5
> 10 years	9	8

Respondents were asked to answer the questions regarding their current level adoption of social media marketing. In the question posed to them, the level of adoption was classified into five levels, notably low, medium-low, medium, medium-high and high. The respondents were required to choose one out of the multiple choices' answers given in the question and rate their own level of adoption, that is, which represents the best of their current adoption level of social media marketing. Table 2 shows the results from the respondents themselves and, it can be clearly seen that most of the respondents rated their adoption level as medium-high level, accounting for 50% of the total respondents. There were about 25% of respondents rated their adoption level of social media marketing as a high level. Meanwhile, a medium level of adoption of social media marketing accounts for 18% respondents. The lowest adoption level rated by the respondents is a medium low, which comprises 7% of the total respondents. There were none of the respondents rated their adoption level of social media marketing as a low level.

Table 2. The adoption level of social media marketing among the respondents.

Adoption level	Frequency (*n*)	Percentage (%)
Medium low	8	7
Medium	20	18
Medium high	57	50
High	28	25

Respondents were also asked which social media platforms they have adopted for their business, and they were allowed to choose more than one answer. As shown in Table 3, an overwhelming majority of the respondents adopted Facebook for their business which was by 97% of respondents. This is relevant because the finding in Global Web Index by US Census Bureau (2014) showed that Facebook usage is the highest accounted for 53% of the

total population in Malaysia. Meanwhile, Instagram is the second most adopted social media platform among the respondents, which comprises 41% of respondents, followed by BlogSpot with 24% respondents. There are 6% respondents of the respondents that adopted Twitter and 5% of respondents adopted Groupon for their business. Only 4% of the respondents adopted YouTube for their business activities. The use of social media marketing is really relevant at the moment because a report by the Department of Statistics Malaysia (2019) revealed that among five popular activities of internet usage among Malaysian, the highest is participating in social networks such as Facebook, Instagram, Twitter and others which accounted for 97.1%.

Table 3. The adoption of social media marketing platform by respondents.

Type of social media	Frequency (*n*)	Percentage (%)
Facebook	110	97
Instagram	46	41
Twitter	7	6
YouTube	5	4
Blogspot	27	24
Groupon	6	5

4.2 Chi-square Analysis

The Chi-square analysis was employed to analyse the association between the respondent's business profile and the adoption of social media marketing. There are three variables of respondent's business profile tested in this study, which include the types of agro-based business operated, monthly income and years involved in the business. The hypotheses that were developed and tested in this study are as follows:

H1: There is a significant association between respondent's types of agro-based business and the adoption of social media marketing.

H2: There is a significant association between respondent's monthly income and the adoption of social media marketing.

H3: There is a significant association between respondent's years involved in the business and the adoption of social media marketing.

Based on the result of Chi-square analysis placed in Table 4, there is only one variable that was significantly associated with the adoption of social media marketing, which is the type of agro-based business operated by the respondents at 5% significant level (α= 0.05). One of the possible reasons is because different types of agro-based business have its own business environment that can influence the decision to adopt social media marketing by the agropreneurs. Besides, the market of different types of agro-based businesses varies and that

affects the readiness of the market to accept social media marketing, which in turn affects the agropreneurs decision to adopt social media marketing.

Table 4. Association between respondent's business profiles and the adoption of social media marketing.

Variables	X^2	*df*	Significant	Decision
Types of agro-based business	13.138	6	0.041*	Reject H_0
Monthly income	6.877	7	0.442	Fail to reject H_0
Years involved in the business	3.626	4	0.459	Fail to reject H_0

4.3 Factor Analysis

The result of factor analysis is presented in Table 5. From the result, it can be seen that four factors were extracted from the factor solution which are perceived usefulness, social influence, perceived ease of use and facilitating conditions. The first factor is labeled as perceived usefulness and it consists of five sub-variables. This factor also appears to be the leading factor with the highest total of variance explained accounted for 24.253. The factor loadings of sub-variables in this factor are "using social media improves the performance of marketing activities of my business" (0.856), "using social media enhances the effectiveness of marketing my product" (0.846), "I find social media useful in doing marketing activities for my business" (0.791), "using social media enables me to accomplish marketing activities more quickly" (0.787) and "functions of social media are very useful for me to do marketing activities for my business" (0.708). The factor of perceived usefulness described in this study conforms with the previous study that was performed in other contexts and involving other technologies (Davis, 1989; Porter & Donthu, 2006). The study found that perceived usefulness is the most significant influencing factor in adoption.

The second factor from the factor analysis result is labeled as social influence. The total variance explained for social influence is 23.395, and it contains four sub-variables. The factor loadings of sub-variables in this factor are "my family think that I should use social media to market my product" (0.877), "my close friends think that I should use social media to market my product" (0.852), "people who influence my behaviour think that I should use social media to market my product" (0.845) and "people who are important to me think that I should use social media to market my product" (0.783). The result indicates that social influence the adoption of social media marketing among agro-based entrepreneurs in Peninsular Malaysia. According to Hong *et al*. (2015), social influence has proven to be the influencing factor in entrepreneurs' behavioural intention in adopting social media marketing.

Table 5. Factors influencing the adoption of social media among agro-based entrepreneurs.

Items	Factor Loadings			
	F1	**F2**	**F3**	**F4**
Perceived Usefulness				
Using social media improves the performance of marketing activities of my business.	0.856			
Using social media enhances the effectiveness of marketing my product.	0.846			
I find social media useful in doing marketing activities for my business.	0.791			
Using social media enables me to accomplish marketing activities more quickly.	0.787			
Functions of social media are very useful for me to do marketing activities for my business.	0.708			
Social Influence				
My family thinks that I should use social media to market my product.		0.877		
My close friends think that I should use social media to market my product.		0.852		
People who influence my behavior think that I should use social media to market my product.		0.845		
People who are important to me think that I should use social media to market my product.		0.783		
Perceived Ease of Use				
Learning how to use social media for my marketing activities is easy for me.			0.866	
Social media is easy to use in order to accomplish my marketing activities.			0.758	
Overall, I find social media is easy to use to market my product.			0.691	
I find it easy to be skillful in using social media to market my product.			0.691	
Facilitating Condition				
Social media is compatible with other technologies that I used.				0.827
I have the knowledge necessary to use social media to market my product.				0.769
Guidance is available for me to use social media to market my product effectively.				0.707

Items	Factor Loadings			
	F1	F2	F3	F4
A specific person (or group) is available for assistance with system difficulties.				0.642
% of Variance Explained	24.253	23.395	18.557	18.318
Total Variance Explained	24.253	47.648	66.205	84.523
Cronbach's Alpha	0.944	0.921	0.959	0.906

Perceived ease of use is the third recognised factor which also has four sub-variables with the total variance explained of 18.557. The factor loadings of the sub-variables in the third factor are "learning how to use social media for my marketing activities is easy for me" (0.866), "social media is easy to use in order to accomplish my marketing activities" (0.758), "overall, I find social media is easy to use to market my product" (0.691) and "I find it easy to be skillful in using social media to market my product" (0.691). This shows that perceived ease of use is one of the factors that influence the adoption of social media marketing among agro-based entrepreneurs in Peninsular Malaysia. Sago (2013) investigated the use of Facebook, Twitter, Pinterest, and Google among university students, and the study found that ease of use has a positive influence on social media adoption.

The final factor is named as facilitating conditions. The total variance explained of the factor is 18.318, and four sub-variables pertain to facilitating conditions. The factor loadings of all the sub-variables in this factor are "social media is compatible with other technologies that I used" (0.827), "I have the knowledge necessary to use social media for marketing my product" (0.769), "guidance is available for me to use social media for marketing my product effectively" (0.707), and "a specific person (or group) is available for assistance with system difficulties" (0.642). Facilitating conditions is one of the factors that influence the adoption of social media marketing among agropreneurs in Peninsular Malaysia. It has also been found that facilitating conditions have a strong positive effect on the adoption of social media marketing by entrepreneurs (Hong *et al.*, 2015). Finally, the results of Cronbach's Alpha scores for all four factors are 0.944, 0.921, 0.959 and 0.906 respectively, which is considered acceptable and reliable.

5. Conclusion

Generally, social media marketing has been adopted by agro-based entrepreneurs, also known as agropreneurs in Peninsular Malaysia to perform marketing activities for their businesses. In terms of agro-food based business, the food processor is the highest group of agropreneurs that adopted social media marketing for their business. However, most of the respondents have a low-income level which is less than RM 1500 and they have just started their business for less than two years. As for the adoption level of social media marketing among agropreneurs in Peninsular Malaysia, most of the respondents were at a medium high

level, which indicates that the adoption level is quite high. The highest social media platform adopted among agropreneurs is Facebook. Based on the results of chi-square analysis, there is an association between respondent's business profile, namely the types of agro-based business operated and the adoption of social media marketing among agro-based entrepreneurs. The results of factor analysis indicated four latent factors that can be associated with the adoption of social media marketing among agro-based entrepreneurs in Peninsular Malaysia. The factors are perceived usefulness, social influence, perceived ease of use and facilitating conditions. Hence, existing entrepreneurs that have adopted social media marketing should cooperate and create an association of online agropreneurs to encourage other fellow entrepreneurs to start embracing social media marketing. Apart from that, agriculture agencies should also organise more training on entrepreneurial skills to foster more efficient use of social media marketing.

Conflict of Interest: The authors declare that there is no conflict of interest in this work.

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Original Research Article

Household Preferences for Food Waste Management System

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Abstract: Improper waste management has received remarkable attention from the stakeholders due to its negative impacts. Due to the increase in population, the waste generated in Malaysia also is increasing. Currently, landfilling is the main method of disposal. Considering a few issues related to this approach such as the landfills have reached its capacity, environmental pollution, as well as the bad condition of the landfill; alternative measure to manage the waste, is crucial. Food waste can be utilized for other uses such as converting into fertilizer, electricity generation as well as the alternative for fuel. However, to implement such a program, innovative measures for appropriate management of the food waste collection are required. To encourage the participation of households in food waste management, determining the preferred attributes by the household is crucial. Therefore, this study attempts to determine the household preferences for food waste management system in Malaysia as well as their willingness to pay for the food waste management system. The discrete choice experiment was used to accomplish the objectives of the study. The findings from this study suggested that the frequency and time of food waste collection are among the preferred attributes for food waste management system. The result also suggested that the willingness to pay for food waste management significantly varies by income and age of the respondents. Thus, it is suggested that if the government decides to come out with food waste management program, frequency and pick up time of the food waste are among important attributes that need to be considered.

Keywords: food waste; discrete choice experiment; willingness to pay; waste management; household

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1. Introduction

According to the World Bank report (2018), 2.01 billion tons of solid waste was generated in 2016. It is estimated that this value will be increased to 3.40 billion tons in 2050 as the population is expected to rise to 9 billion (World Bank, 2018). The rapid growth in population, economic development, rapid urbanization, industrialization as well as changes in community lifestyle are among the factors that lead to the raising amount of solid waste generated (Zhang *et al*., 2015; Srivastava *et al*., 2014; Guerrero *et al.*, 2013; Manaf *et al*., 2009). Improper waste management has received remarkable attention from the stakeholders due to its negative impacts (Jereme *et al.*, 2016).

The management of waste is a critical issue for some developing countries especially in Asia (Subhan *et al.*, 2014). Malaysia is a developing country with significant economic development after its independence. However, due to the increase in population, the food waste generated in the country also is growing. Food waste heavily contributes towards municipal solid wastes in Malaysian. Malaysians generally generate 38,000 tons of waste per day and from this amount, 15,000 tons are food waste (SWCorp, 2018). The food waste produced by Malaysia is able to feed around 2.2 million people (Poverty Pollution Persecution, 2019).

According to the National Solid Waste Management Department (2013), food waste contributed the highest composition of waste with 44.5%, followed by plastics (13.2%), diapers (12.1%), papers (8.5%) and garden waste (5.8%). According to Nadzri (2013), food wastage makes up 50% of the overall municipal solid waste in Malaysia and 70% of them are being dumped at the landfills. As of 2018, Malaysia has 170 waste disposal sites and it was reported that only 14 had ‘sanitary landfill’ status (Poverty Pollution Persecution, 2019). The household was reported as the main contributor to food waste with 8,745 tons of food waste generated per day (Jereme *et al*., 2016).

Currently, landfilling is the main approach to dispose of waste in Malaysia (Abd Ghafar, 2017). The dependency on landfills as a waste disposal approach is expected to raise the production of greenhouse gas (GHG), which could lead to environmental pollution (Abd Ghafar, 2017). Furthermore, it was reported that the landfills in the country were also in bad condition and operated without appropriate protecting actions (Ismail & Manaf, 2013). The capacity of the landfills that have reached their size is another issue that has raised concern

(Moh & Manaf, 2014). Considering the problems mentioned above, an alternative measure is required to combat the rising trend of waste generation.

According to Nadzri (2013), proper management of food waste is considered limited and is still under-developed in Malaysia. Despite many kinds of efforts and initiatives taken by the government, the participation rate is still low (Moh & Manaf, 2014). There are limited studies done to determine the preferred food waste management attributes, as well as the household evaluation on food waste, attributes management system in Malaysia. The improvement in the food waste management system requires additional cost. However, there are limited information about the extent to the households value the environmental goods and services that can impact the environment in Malaysia. Policy makers generally require information about the value of benefits for the improvements and the extent to which new policies or programs are supported in communities (Benyam *et al.*, 2020). Thus, these, later on, can be compared to the costs of different food waste management system. The willingness to pay also reflects household awareness about the detrimental effects of improper waste management on the communities (Subhan *et al*., 2014). This valuation will provide useful information for future implementation of voluntary or mandatory food waste management system.

While knowing the right portion of food required is important to minimize the food waste, food waste recycling program also might be another measure to manage the waste. Food waste is possible to be converted into useful resources such as compost or fertilizer. Food waste also can be utilized for electricity generation as well as for alternative fuel (National Solid Waste Management Department, 2012). However, to implement such a program, innovative measures for appropriate management of the food waste collection are required. A clear food waste management system in Malaysia is still under develop. According to literature, the participation rate of the household in the proper food waste management system is still low (Moh & Manaf, 2014). The cooperation by the household as the main contributor to food waste generation is important to ensure the success of the food waste management system. Understanding community preferences are also an important element in the food waste management system to increase the participation rate of the household. This can be done by determining the attributes of the food waste collection program preferred by the households. This process is crucial before developing any kind of food waste management system or program. Therefore, this study attempted to provide a hypothetical scenario for food waste management system in Malaysia. The objective of this

study is to determine the household preferences for food waste management system in Malaysia as well as their willingness to pay for the food waste management system. The discrete choice experiment was used to accomplish the objectives of the study. A discrete choice experiment is a stated preference method in which the respondents are asked to select one of several options based on their preferences. This approach is often used to compare the costs and benefits of policy changes before the implementation of the program or policy (DEFRA 2007). This approach is suitable to value a good or service which does not have a pre-determined market price such as food waste collection (Ndau & Tilley, 2018).

2. Literature Review

Discrete choice experiments have been used in various settings to determine the respondents' preference for specific attributes of product or service. This approach also has been widely used for environmental valuation (Rakotonarivo *et al*., 2016). A discrete choice experiment is a stated preference method in which the respondents are asked to select one of several options based on their preferences. This technique offers a good valuation approach, especially for environmental goods. This approach also becomes widely used for non-market valuation (Adamowicz, 2004). It also has been widely used to evaluate the household preferences and willingness to pay for waste management and recycling (Akil *et al*., 2015; Boyer 2006; Rai *et al*., 2019; Yuan *et al*., 2015; Yuan & Yabe, 2015). This section, therefore, attempts to determine the relevant food waste management attributes that have been considered from previous studies. Most of the waste management studies considered food waste as part of solid waste (Ku *et al*., 2009; Ndau & Tilley, 2018; Akil *et al*., 2015). According to Benyam *et al*. (2020), solid waste management options are also relevant in explaining householders' interest to reduce food waste. There are limited numbers of studies that focus solely on food waste management attributes since most of them considering food waste as part of solid waste. Thus, the relevant attributes of waste management from previous studies have been reviewed to get some insight, in terms of possible attributes that the household is willing to pay for the improvement in the waste management system or service.

Several attributes have been used by previous studies to evaluate the willingness to pay off the households towards waste management service. Among them were frequency of collection and fee subscription (Boyer, 2006; Ku *et al*., 2009; Hazra *et al*., 2013; Ndau & Tilley, 2018; Rai *et al*., 2019; Akil *et al*., 2015). Boyer (2006) found that the households in Stillwater, Oklahoma were willing to pay more for a higher frequency of waste collection. A similar finding was found by Hazra *et al*. (2013) in which the household was willing to pay

for frequent collection of waste in India. Similarly, Akil *et al*. (2015) suggested that households were willing to pay a higher price for improvements in the collection frequency of waste in Malaysia.

Providing recycling containers is among the important factors that can encourage or motivate the households to sort out their waste (Rai *et al*., 2019; Keramitsoglou *et al*., 2018; Ting *et al*., 2016; Moh & Manaf, 2014; Suttibak *et al*., 2008). In terms of willingness to pay for the recycle bin, Hazra *et al*. (2013) found that the respondents were willing to pay more for the covered bin. In addition to the bin, Keramitsoglou *et al*. (2018) suggested that environmental messages must be printed on the bins to encourage the participation of the respondents in waste management. Providing recycling bins at appropriate places within the household areas also is a good approach to encourage waste separation at source (Moh & Manaf, 2014).

Considering the importance of the shortest distance between the container and the household, Yuan & Yabe (2015) conducted a study that focuses on placing bins for kitchen waste in front of individual apartment buildings. The choice experiment was used, and the selected attributes were collection frequency, collection time, incentives, and education. They found that households preferred the evening collection relative to morning selection. On the other hand, Yuan *et al*. (2015) has utilized the latent class model to determine the households' preferences for the attributes of household kitchen waste source separation service. They found that the young, highly educated and have more kitchen waste separation experiences households preferred the evening collection of waste.

Further studies have shown that socio-demographic factors can influence household willingness to pay for waste management. For instance, Boyer (2006) found the higher income households were more willing to pay for recycling services in Stillwater, Oklahoma. Similarly, Hazra *et al.* (2013) and Akil *et al*. (2015) found that high-income households were willing to pay more for waste management in India and Malaysia, respectively. In addition to income, age, gender, educational status, distance from the dumpsite, and satisfaction with the existing service for solid waste were among other factors that can influence willingness to pay for waste management (Mulat *et al.*, 2019). They also found that there was an inverse relationship between age and willingness to pay for waste management in which the younger people were willing to pay more for waste management than older people. In contrast, Akil *et al*. (2015) found that the elderly was more interested in waste management as compared

to younger people. Those households with higher education were willing to pay more for waste management (Song *et al,* 2016).

3. Methodology

3.1 Survey Design

A self-administered survey was conducted to the household in Klang Valley and 400 respondents have completed the survey. The survey was comprised of two sections. The first section consisted of the discrete choice experiment questions, in which respondents were requested to choose their preferred waste management system given different levels of service attributes and subscription fees. In the second section, the respondents were asked about their demographic and household information.

Table 1 presents the attributes and the attribute levels which were used to construct the survey options. Four attributes considered in this study were frequency of collection per week, the usage of a specific bin for storing food waste, the time of collection for food waste, and the price. Since there were three attributes varied at three levels and one attribute varied at two levels, there were 18 possible combinations ($3^3 \times 2^1$).

Table 1. Attributes and the attribute levels.

Attribute	Level	Description
Frequency of collection per week	Everyday	Pickup truck collects food waste twice a week from the household area
	Three times per week	Pickup truck collects food waste twice a week from the household area
	Two times per week	Pickup truck collects food waste twice a week from the household area
Specific bin for food waste	Yes	Each household has a specific bin allocated for food waste
	No	Each household does not have a specific bin allocated for food waste
Pickup time of the food waste	Morning	Pickup truck collects food waste in the morning
	Afternoon	Pickup truck collects food waste in the afternoon
	Evening	Pickup truck collects food waste in the evening

Price	RM 30	Subscription fee per month
	RM 20	Subscription fee per month
	RM 15	Subscription fee per month

The choice sets were created such that the respondents could choose between two waste management service options (A and B) and one option opting out of food waste management service, i.e., the "not willing to pay" option (Option C). The respondents were asked to compare the three alternatives (Option A, B, and C) simultaneously and choose one of them in which the one that they preferred the most. Table 2 provides an example of one of the randomly assigned choice sets.

Example 1: Below you will find three scenarios being considered for food waste management service. Please choose ONE option from choices A, B, or C.

Table 2. Example of choice set.

Option	**A**	**B**	**C**
Frequency of collection	Three times per week	Two times per week	Neither A nor B is preferred
Specific bin for food waste	No	Yes	
Pickup time of the food waste	Afternoon	Evening	
Price (RM/month)	RM 15	R M30	
I would choose…		X	

3.2 Model Development

Given a set of choices, each respondent faced 18 choice sets. The model assumed respondents are facing i=1, 2, N faced discrete choices between several alternatives. A random utility function may be defined by a deterministic V_{ji} and stochastic ε_{ji} component:

$$U_{ji}=V_{ji} + \varepsilon_{ji} \quad (1)$$

where U_{ji} is the j^{th} respondent's utility of selecting option i which are either option A, B or C V_{ji} is the systematic portion of the utility function which is determined by attributes of the

alternative *i* and the respondents-specific characteristics, and ε_{ji} is a stochastic element. The probability of a respondent chooses alternative *i* is given by

$$\text{Prob}\{V_{ji}+\varepsilon_{ji}\geq V_{jk}+\varepsilon_{jk};\text{for all } k\neq i\} \quad (2)$$

where *i* is the choice set for respondents *j*, i.e., I_j= {option A, option B, option C, etc.} If the ε_{ji} are independently and identically distributed across the I alternatives and N individuals with a type I extreme value distribution (e.g., $F(\varepsilon_{ji})=\exp(-\exp(-\varepsilon_{ji}))$), the probability of respondents *j* choosing alternative *i* is:

$$\text{Prob\{i is chosen\}}= \frac{e^{V_{ji}}}{\sum_{k=1}^{I} e^{V_{jk}}} \quad (3)$$

And the log-likelihood function is;

$$\log L= \sum_{j=j}^{N}\sum_{i=1}^{J} d_{ji} \log(\text{Prob }\{\text{i is chosen}\}) \quad (4)$$

where d_{ji} is a dummy variable that takes the value of 1 for a particular alternative that was chosen. The following utility function will be used to estimate the utility of the respondents

$$V_{ji}=\beta_0+\beta_1\text{Frequency}+\beta_2\text{Specific bin}+\beta_3\text{Pick up time}+\beta_4\text{price}+\varepsilon_{ji} \quad (5)$$

where Frequency refers to the frequency of pickup trucks pick up the food waste per week, Specific bin refers to each household has a specific bin allocated for food waste,*pick up time* refers to the time pick up truck collects food waste and *price* refers to the subscription fee per month. The β coefficients represent the parameters to be estimated, and β_0 is the alternative-specific constant, which captures the effect of a respondent's selection of option C on utility compared to options A and B in the sample. The conditional logit was performed to estimate the model. The coefficients obtained from equation (5) further will be used to calculate the willingness to pay using equation (6) below.

$$\text{WTP}= -\frac{B_k}{B4} \quad (6)$$

where *Bk* refers to coefficient of kth attribute and *B4 refers to* coefficient of price. Equation (5) refers to the basic model without interaction terms. The effects of other factors like demographics and other characteristics of the respondent can affect the willingness to pay for

waste management system. These characteristics can be included as interaction terms (Hanley *et al.*, 2001). Dummy variables have been generated for four age groups (Age2029 = 1 if a respondent is between 20 to 29, otherwise Age2029 = 0; Age3039 = 1 if a respondent is between 30 to 39, otherwise Age3039 = 0; Age4049 = 1 if a respondent is between 40 to 49, otherwise Age4049 = 0; Age over50 = 1 if a respondent is over 50, otherwise Age over50 = 0); three education groups (Edu_Low = 1 if a respondent has primary education, otherwise Edu_Low = 0; Edu_Med = 1 if a respondent has secondary education, otherwise Edu_Med = 0; Edu_High = 1 if a respondent has tertiary education, otherwise Edu_High = 0); gender (Gender_male = 1 if a respondent is male, otherwise Gender = 0). According to the Department of Statistics Malaysia (2019), the range of income for three income groups is as follows; B40 is less than RM 4849, M 40 is between RM 4850 to RM 10,959 and T20 is greater than RM 10,960. After considering the distribution of the data and these three classifications of income, the income has been categorized into three groups namely low, medium, and high income. Dummy variables have been generated for three income groups (Inc_Low = 1 if monthly respondent's income is less than RM 4000, otherwise Inc_Low = 0; Inc_Med = 1 if monthly respondent's income is in between RM 4001 and RM 9000, otherwise Inc_Med = 0; Inc_High = 1 if monthly respondent's income is more than RM 9000, otherwise Inc_ High = 0). Then, the interaction terms of these dummy variables with independent variables have been added to the original specification equation. The interaction model can be specified as follows:

$$V_{ij} = \beta_{ij}\mathbf{X} + \alpha(\mathbf{X_{ij}} \times \mathbf{Age}) + \alpha(\mathbf{X_{ij}} \times \mathbf{Education\ Level}) + \alpha(\mathbf{X_{ij}} \times \mathbf{Income}) + \alpha(\mathbf{X_{ij}} \times \mathbf{Gender}) \quad (7)$$

where **X** is a vector of variables specified in equation (5). β and α refer to the coefficient to be estimated. **Age** is a vector of age of the respondents which is separated into 4 categories that were coded as 1 if individual is in that age category group and 0 otherwise. The age category for 31–40 was used as a base. **Education level** is a vector of education level of the respondents which is separated into three variables that were coded as 1 if individual is in that income category group and 0 otherwise. The secondary education level category was used as a base. **Income** is a vector of households' income which is separated into three variables that were coded as 1 if individual is in that income category group and 0 otherwise. The low-income category was used as a base. **Gender** is dummy variable of gender and female was used as a base. A conditional logit model was used to estimate equations (5) and (7). The bootstrapping procedure followed by Krinsky and Robb (1986) was used in to calculate the standard error.

4. Results and Discussions

A total of 400 respondents completed the discrete-choice questions. Table 3 presents the socio-demographic profiles of these respondents. The majority of respondents were between 20–30 years old (47%), followed by 31–40 years old (29.5%), 41–50 years old (20%), and greater than 50 years old (3.5%). Of 400 respondents, 55% were female and 45% were male. As presented in Table 3 majority of the respondents were Malay (40%), followed by Chinese (36%), Indians (11%), Bumiputera from Sabah and Sarawak (28%), and other (6%). In terms of marital status, the majority of respondents were married (60%), followed by single (39%) and divorced (1%). 99% of the respondents had at least secondary education levels. In terms of employment status, 39% of them were from the government and private sector, followed by respondents with home duties (14%), unemployed or currently looking for a job (6%), and retirees (1%). The majority of respondents had a monthly income less than RM 4000 per month (70%), followed by RM 4001–9000 (25%) and greater than RM 9000 (5%).

Table 3. Socio-demographic profiles of the respondents.

Socio-Demographic profiles		**Frequency (*n*)**	**Percentage (%)**
Group of age (years old)	20–30	188	47
	31–40	118	29.5
	41–50	80	20
	>50	14	3.5
Gender	Male	179	45
	Female	221	55
Ethnic	Malay	160	40.0
	Chinese	144	36.0
	Indian	44	11.0
	Bumiputera Sabah dan Sarawak	28	7.0
	Others	24	6.0
Marital status	Single	157	39.25
	Married	239	59.75
	Divorced	4	1.0
Eucation	Primary Education	1	0.25
	Secondary Education	202	50.5
	Tertiary Education	197	49.25

Socio-Demographic profiles		Frequency (*n*)	Percentage (%)
Employment	Government sector	155	38.75
	Private sector	157	39.25
	Full time student	3	0.75
	Unemployed	23	5.75
	Home Duties	56	14.0
	Retiree	6	1.5
Income (RM/month)	<4000	281	70.25
	4001–9000	98	24.5
	>9001	21	5.25
Household number	1–3	186	46.5
	4–6	168	42.0
	7–9	39	9.75
	> 9	7	1.75
Total		**400**	**100**

The results from conditional logit model were reported in Table 4. For the basic model, frequency of collection, use of specific bin and pick up time of food waste were statistically significant at 5% level, while price was statistically significant at 1% level. All the coefficient showed the expected sign except for use of a specific bin which had a negative coefficient. A positive and significant coefficient indicated that the respondents were more likely to choose an alternative with that scenario. The negative sign for price coefficient indicated that the level of household utility decreases with the increase of the subscription fees for the waste management system. The alternative specific constant for the status quo was statistically significant and negative, indicating a specific preference against the status quo. This suggested that, on average, respondents for this study were significantly likely to choose any option (A or B) that proposed changes in the food waste management system. The highest coefficient was 1.3771 indicated that frequency of collection (everyday) was the most preferred food waste management attribute by the household followed by frequency of collection (thrice per week) (0.3453), pick up time (morning) (0.3304) and pick up time (evening) (0.11947). The positive sign for frequency of collection (thrice per week), frequency of collection (everyday), pick up time (morning), and pick up time (evening) implied that households had greater preferences to select the options that have those attributes. The conditional logit results indicated that the household's preference for the food waste to be collected frequently. It is proven by the positive sign of coefficient for frequency

of collection (everyday) and frequency of collection (thrice per week) suggesting that household preferred for the food waste to be collected every day and three times a week rather than 2 times in a week. This finding was consistent with previous studies in which they found that most households would prefer frequent collection of waste (Boyer, 2006; Hazra *et al*., 2013; Rai *et al.*, 2019). The result also suggested that the respondents preferred the food waste collection to be done in the morning and evening over the afternoon. In contrast, the negative sign for use a specific bin suggested that respondents did not prefer a specific bin solely for the use of storing food waste. The coefficients for the attributes and the price attributes were then used to calculate the willingness to pay.

Table 4. Conditional logit estimates for food waste management system.

Variable	Conditional logit estimates
Alternative Specific Constant	-4.4386*
	(0.9569)
Frequency of collection (Thrice per week)	0.3453**
	(0.04285)
Frequency of collection (Everyday)	1.3771**
	(0.0448)
Use of Specific Bin	-0.1802**
	(0.0365)
Pick up time (Morning)	0.3304**
	(0.0443)
Pick up time (Evening)	0.1947**
	(0.0459)
Price	-0.0926***
	(0.0029)
Log likelihood	-9314

Number of Observation = 21,600

Notes: Standard errors are in parentheses.

***Statistically significant at the 0.01 level

**Statistically significant at the 0.05 level

*Statistically significant at the 0.10 level

Table 5 below presents the willingness to pay for food waste management attributes. In discrete choice experiment, the willingness to pay is derived as the ratio of two random variables. The standard error obtained from Krinsky-Robb parametric bootstrap method was used to determine the confidence intervals of willingness to pay. The findings showed that

the respondents in this study were willing to pay RM 14.87 more for collection of food waste on a daily basis relative to collection of food waste twice per week. Besides that, the respondents were also willing to pay RM 3.73 more for collection of food waste thrice a week relative to collection of food waste twice per week. In contrast, the result indicated that the household was not willing to pay for a specific bin to store for food waste. This can be shown by negative sign of willingness to pay. This suggested that they were only willing to accept using a specific bin to store food waste, if they were being paid of RM 1.72.

A possible reason for this could be because respondents undergo social dilemmas where responding to the benefits of social conflicts with their own narrow self-interest. (Thøgersen, 2007). The author further explained that it is more convenient to dispose one's household waste in the same garbage bin rather than separate it at the source. The result also suggested that the respondents are willing to pay RM 3.56 and RM 2.10 more to have the food waste to be collected in the morning and evening respectively relative to the afternoon.

Table 5. Marginal willingness to pay for food waste management attributes.

	Marginal Willingness to Pay (RM/month)	**Standard Error[1]**
Frequency of collection (thrice)	3.73	0.4656
Frequency of collection (everyday)	14.87	0.6468
Usage of Specific bin for food waste storage	-1.95	0.3899
Pick up time (morning)	3.56	0.4773
Pick up time (evening)	2.10	0.4951

Note: [1]Corresponding standard errors are estimated following the Krinsky-Robb parametric bootstrap method with STATA 15 software.

In interactions model, the socio-demographic variables were interacted with the other attribute levels to estimate how marginal willingness to pay differs by social-demographic factors. Table 6 below presents the significant interaction variables in the interaction model. It was found that the household preferences varied by socio-demographic variables such as age and income. For example, compared to the household who were in between 31 to 40, the household who were in between 20 to 30 years old were more likely to choose options with frequent collection of food waste (everyday) and the pick-up time in the morning. In terms of income, similar finding was reported in which the results showed that the middle-income

household were more likely to choose options with frequent collection of food waste (everyday) and the pick-up time in the morning. In order to calculate the willingness to pay for the interaction model the following formula was used wtp=- ((βk+βx))/ βp where βk equals to coefficient of kth attribute, βx equals to coefficient of xth interacted category and βp is coefficient of price.

Table 6. Conditional logit estimates for interaction model.

Variable	Conditional logit estimates
Alternative Specific Constant	-3.4699*** (0.0920)
Frequency of collection (Thrice per week)	0.1963** (0.0889)
Frequency of collection (Everyday)	0.8522*** (0.0921)
Use of Specific Bin	0.0119 (0.0685)
Pick up time (Morning)	0.2169** (0.0928)
Pick up time (Evening)	0.0617 (0.0459)
Price	-0.0661*** (0.0027)
Frequency of collection (everyday)_Age2030	0.1838* (0.0963)
Pick up time (morning)_ Age2030	0.1723* (0.0972)
Frequency of collection (everyday)_Middle income	0.3821*** (0.1064)
Pick up time (morning)_Middle income	0.1915* (0.1079)
Log likelihood	-4777.04

Number of Observation = 21,600

Notes: Standard errors are in parentheses.

***Statistically significant at the 0.01 level

**Statistically significant at the 0.05 level

*Statistically significant at the 0.10 level

Table 7 below presents the marginal willingness to pay resulted from the interaction model. It was found that the marginal willingness to pay for waste management significantly varied by income and age of the respondents. For example, the results suggested that the households between 20–30 years old were willing to pay RM 15.67 more to have the food waste to be collected everyday relative to the household who were between 31 to 40 years old. This age group of respondents were willing to pay RM 5.89 more to have the food waste to be collected in the morning relative to the older respondents. The findings from this study suggested that young households were willing to pay more for the improvement in food waste management services relative to the older age group category. This finding is consistent with the previous studies in which they found that age has negatively influenced the willingness to pay for waste management (Mulat *et al.*, 2019; Padi *et al*., 2015). One possible reason could be because awareness of food waste and sustainability is becoming higher in younger generations than in older generations. The younger generation tends to be more concerned about environmental quality than the older generation. This is also aided by current means of technology like social media as tools to spread awareness and message.

In terms of income, the results showed that middle-income consumers were willing to pay RM 18.67 more if food waste is collected every day relative to the lower-income group household. The results also suggesting that the middle-income consumers were willing to pay RM 6.18 more if the food waste is collected in the morning relative to consumers who were in the lower-income group. These findings were supported by the previous studies in which the higher income households were willing to pay more for waste management relative to lower-income group households (Boyer, 2006; Hazra *et al*., 2013; Akil *et al*., 2015).

Table 7. Marginal willingness to pay for interaction model.

	Marginal Willingness to Pay (RM/month)
Frequency of collection (thrice)	2.95 (1.3508)[1]
Frequency of collection (everyday)	12.88 (1.4555)
Specific bin for food waste storage	0.17 (1.0366)
Pick up time (morning)	3.25 (1.4106)
Pick up time (evening)	0.89 (1.4106)

	Marginal Willingness to Pay (RM/month)
Frequency of collection (everyday)_Age2030	15.67 (0.4235)
Pick up time (morning)_ Age2030	5.89 (0.3586)
Frequency of collection (everyday)_Middle income	18.67 (0.3857)
Pick up time (morning)_Middle income	6.18 (0.3217)

Note: [1]Standard error in parentheses

5. Conclusion

The food waste management system in Malaysia is still under developed. The findings from this study suggest that the frequency and time of food waste collection are among the preferred attributes for food waste management system. The households preferred frequent collection of food waste. They are willing to pay about RM 14.87 more if the food waste is collected every day and they are willing to pay RM 3.56 more to have the food waste to be collected in the morning. The result also suggests that the willingness to pay for waste management significantly varied by income and age of the respondents. The findings from this study suggest that young households are willing to pay more for the improvement in food waste management services relative to the older age group category. Similarly, it is found that middle-income households are willing to pay more for waste management relative to the lower-income group household.

The government should consider to play a role in deciding and implementing food waste management system, pick up frequency and time to pick up the food waste . Since the marginal willingness to pay varied between age and income group, thus promoting the food waste management system can be focusing on these groups of households. The willingness to pay exhibited by most fellow respondents can be used to compare with the cost of implementing the food waste management system. Since the marginal willingness to pay for food waste management is not high, the alternative option might need to be considered. For example, instead of collecting the food waste from one household to another household, the government or municipal might provide a central drop-off or booth to collect food waste close to the area of residency. It would be a better way for household members to drop off their food waste at which time is convenient to them, meanwhile allowing the municipalities to collect them without time-constraint or high concern on no waste collections during public

holidays. Considering the households' preferences for food waste management is important to encourage participation by the households. The findings from this study could be used as the basis to provide some insight about the preferred attributes of the household and how much they are willing to pay if those attributes exist in the food waste management program.

Conflicts of Interest: The authors declare no conflict of interest.

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Original Research Article

Generation Z's Awareness of Eating at *Halal* Certified Restaurants

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Abstract: *Halal* food indeed remains the main concern among consumers when they decide to eat outside. As there are many different approaches in choosing a restaurant among consumers especially the youngsters, the *halal* status of these restaurants usually raises some critical issues particularly on ingredients used, *halal* certification, and logo issuance. Hence, this study was carried out to investigate the level of awareness among Generation Z (Gen Z) towards eating at *halal* certified restaurants, to examine the association between socio-demographic profiles of Gen Z and level of awareness towards eating at *halal* certified restaurants and to determine factors that influence Gen Z towards eating at *halal* certified restaurants. Data was gathered via a self-administered questionnaire survey with 1,050 Gen Z respondents. Descriptive analysis, Chi-square analysis, and factor analysis were used to analyse the data. The results revealed that a low level of awareness was found among Gen Z towards eating at *halal* certified restaurants with an average mean score of 3.809. The results also showed a few socio-demographic profiles to have associations with the awareness level towards dining at *halal* certified restaurants. Five factors were revealed to influence Gen Z towards eating at *halal* certified restaurants namely, *halal* certification and logo, religious responsibility, lifestyle, social influence, and attitude. This study concludes that Gen Z should increase their level of awareness towards eating at *halal* certified restaurants and this could be feasible by engaging with relevant awareness programs and *halal* campaigns by social media and community engagement.

Keywords: Awareness, Eating, Generation Z, *Halal*, *Halal* Certified Restaurants

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1. Introduction

Based on the State of Global Islamic Report 2017/2018, the Islamic economy is recorded as the fastest growing market in the world with more than 1.7 billion Muslim populations around the world. In general, consumers spent around $2 trillion in 2016 on halal sectors, while it is expected to rise to $2.6 trillion in 2020. Malaysia is reported on the Top 10 list in *Halal* Food Indicator in the global market where the country has the best developed Islamic economy of halal food (Thomson Reuters, 2018). According to the Companies Commission of Malaysia (SSM), there are around seven million businesses registered in Malaysia in 2018 and it is estimated over 200,000 food and beverage (F&B) businesses operating in Malaysia, since 2015. As there are opportunities to expand, *halal* food industries also have developed rapidly in Malaysia. Due to the *halal* food industry growth, small and medium enterprises (SMEs) are also attracted to involve in the processing and production of halal food (Mujar & Hassan, 2014). It also creates job opportunities for Malaysians and contributes to the increase in the Gross Domestic Product (GDP) of the country. Raising in the number of both the F&B businesses and the Muslim population, this had led to more food choices available to the consumers, served by various restaurants in the market, including Hipster style, Korean style, Japanese style as well as Western and Chinese cuisines. Nevertheless, not all food choices in the market are certified as *halal*. Although Muslim consumers are offered a variety of foods and restaurants, they need to be wise in selecting restaurants to dine in to ensure the foods they consume are *halal*, clean, healthy, and wholesome. Thus, it has directly influenced the demand for *halal* foods and *halal* restaurants across the countries in the world.

According to the Department of Statistics Malaysia (2020), the population of Malaysia in 2019 is estimated at 32.6 million, increased from 32.4 million in 2018 and most of the citizens are Muslims. This has made *halal* food high in demand and becomes very important to Muslims in Malaysia. Malaysia, a country with an Islamic background has a minority of Muslim *halal* producers, where 80% of *halal* products are manufactured by non-Muslims. In 2015, the Halal Industry Development Corporation (HDC), currently known as Halal Development Corporation Berhad, in its report indicated that non-Muslim producers are the dominator of the *halal* market in Malaysia. Berjaya Food Bhd. and Farm's Best Food Industries Sdn. Bhd. are two examples of a non-Muslim producer of halal food. Therefore, it has become a huge challenge for Muslim society to contribute more to halal foods in the local economy as well as the international markets.

For Muslims, to choose *halal* food and *halal* restaurant is an obligation to show their responsibility towards the Islamic religion. However, issues are arising at certain restaurants in Malaysia that they operate without halal certification from Malaysia's authorized body, which is the Department of Islamic Development Malaysia (JAKIM). Besides, the choice of foods and eateries to eat may have the same consensus as it has been influenced by social media and community engagement. The spread of many types of restaurants offers a different type of cuisines from different countries like Japan, Korea, western countries, and Thailand has provided a wide choice of places for consumers. The food providers need to ensure that the served food is *halal* and its food preparation and their premise's operation have adhered to the Islamic rules and regulations. Malaysian Muslim Generation Z (Gen Z) are among the regular consumers of these restaurants and this generation is tech-savvy and has advanced knowledge and awareness in social media and other influences of food and restaurant trends. Gen Z are those who were born from 1995 until 2012 (Wiedmer, 2015), and the oldest year for them to join college were in 2013 (Seemiller & Grace, 2017). However, studies indicated that Malaysian Muslim Gen Z are lack of knowledge, awareness, and understanding of the *halal* concept that has led to the declining values of *halal* itself among this generation as well as lack of awareness in eating at *halal* restaurants (Abdul Khalek, 2014; Krishnan *et al.*, 2017; Mat Salleh *et al.*, 2017). Hence, this limits Gen Z on *halal* related issues.

Gen Z are supposed to be more aware, knowledgeable, and have a better understanding of the *halalan toyyiban* concept which could assist them in choosing *halal* restaurants. Nevertheless, Gen Z in Malaysia have easily exposed to many types of restaurants that the *halal* status is still doubtful. With a complete *halal* directory by the Department of Islamic Development Malaysia (JAKIM), it would be a proper guide to assist Gen Z to choose *halal* certified restaurants. Not only do the *halal* food producers and operators need to serve *halal* food, but they also need to have high *halal* awareness in meeting the high demand of consumers for *halalan toyyiban* food. Thus, every player in the food sector should have the knowledge and a good understanding of the *halal* concept so that the issues of *halal* food can be addressed accordingly. Thus, this study aims to investigate the level of awareness among Generation Z (Gen Z) towards eating at *halal* certified restaurants, to examine the association between socio-demographic profiles of Gen Z and level of awareness towards eating at *halal* certified restaurants, and to determine factors that influence Gen Z towards eating at *halal* certified restaurants.

2. Literature Review

2.1 Halal Awareness

According to Merikle (1984), awareness is the ability to perceive, to feel, and to be conscious of events and objects. Awareness, in general, is also described as the ability to do better than a chance level and whether the decision made has been affected by the identity or the presence of the third person (Merikle, 1984). *Halal* awareness, on the other hand, is described as knowledge and thoughtful of *halal* issues and circumstances. It is a concept about implying the understanding and perception towards the events or subjects on *halal* (Abdul Aziz *et al.*, 2000).

2.2 Halal Certification and Logo

Halal certification and logo are very crucial indicators for Muslims especially in a multi-racial country and non-Muslim country. It represents product quality standards based on Islamic dietary standards (Muhamad *et al.*, 2017). In *halal* restaurant perspectives, *halal* certification is very prevalent among restaurant managers because it could help to promote the restaurant itself by knowing Muslims' dietary restrictions, sensitivity, and religious practices (Syed Marzuki *et al.*, 2012). Since *halal* certification is controlled by an authorized body, any restaurant that is certified as *halal* is considered trustworthy. However, with the emergence of international franchised restaurants in the local market, the *halal* status is questioned because not all *halal* certifications are equally perceived as trustworthy so do all the *halal* brands and products (Rios *et al.*, 2014).

2.3 Religious Responsibility

Religious responsibility is a source of awareness of consumers in choosing *halal* food. In Islam, responsibilities of a Muslim can be categorized in different ways as being addressed in the Islamic Holy book such as responsibility towards God; responsibility towards oneself; responsibility towards the community; responsibility towards other creations, nature, and environments; responsibility towards religion itself (Islamweb, 2004). To show a Muslim's responsibility towards his religion, he must obey all rules and regulations, however, secular Muslims as well as very pious Muslims can show the same degree of Islamic belief but may differ concerning other aspects of Muslim religiosity (El-Menouar, 2014). Autiero and Vinci (2016) described that religion could influence the growth of a person. Thus, by following

Islamic religious responsibility, consuming *halal* food and finding *halal* restaurants could develop a better Muslim in the future.

2.4 Lifestyle

Living in an environmentally friendly lifestyle is challenging for a growing and developing economy like Malaysia (Ong & Choon, 2018). Aligning with the development of *halal* industries in Malaysia, lifestyle is an important factor as a social pressure to perform certain behavior towards religious obligation. Lifestyles are influenced by people in the surrounding for example family, relatives, friends, and society. Lifestyle could affect awareness in choosing *halal* foods and restaurants. According to Krishnan *et al*. (2017), Gen Z have a lack of awareness in consuming halal food due to their lifestyle that are attached to the social media update where they tend to eat in the famous and viral restaurants and gain popularity when it is posted on the social media.

2.5 Social Influence

Fisher (2005) claimed that younger generation consumers in Malaysia are exposed to *halal* issues. Gen Z should be aware of halal issues, however, crucial external forces such as the internet, social media, and peer-influence would affect their awareness level in choosing *halal* restaurants. There are lots of factors that influenced *halal* industries, both internally and externally. Evolving technology had exposed Gen Z to constant social and technological changes (Roblek *et al.*, 2018). Further, the internet and social media have become a necessity in daily life in attaining and sharing information and knowledge, which indirectly could give positive and negative implications to a person.

2.6 Attitude

Attitude is a way of thinking or feeling about something. Abdul Khalek (2014) described that attitude and perceived behavioural control could influence behavioural intention of young consumers to choose *halal* food outlets. *Halal* food awareness is influenced by the attitude and understanding of the *halal* concept. Most of the young consumers understand that eating in a *halal* restaurant is important and a restaurant must display a *halal* logo or certificate at their premises.

3. Methodology

To measure the factors that influence awareness level towards eating at *halal* certified restaurants among Gen Z, 1,050 youngsters who were below 23 years old representing respondents of Malaysian Gen Z and living in Peninsular Malaysia were selected. The respondents were selected using a purposive sampling method. Using a self-administered questionnaire survey, the respondents' responses were gathered through various approaches such as email, social media, and phone calls. The questionnaires consisting of questions and statements on awareness of eating at *halal* certified restaurants were established using a 5-point Likert scale of '1-Strongly disagree', '2-Disagree', '3-Neutral', '4-Agree' and '5-Strongly agree'. Descriptive analysis, Chi-square analysis, and factor analysis were used to analyse the data. Descriptive analysis was carried out to determine the socio-demographic profiles of the respondents and the level of awareness among Gen Z. Chi-square analysis was performed to determine the association between socio-demographic profiles of Gen Z and awareness level, while factor analysis was conducted to extract factors influencing Gen Z's awareness towards eating at *halal* certified restaurants. The conceptual framework of this study is depicted in Figure 1 and the hypotheses of the study were established as follows: -

H_0 : There is no association between socio-demographic profiles and awareness level of Gen Z towards eating at *halal* certified restaurants.

H_1 : There is a significant association between socio-demographic profiles and awareness level of Gen Z towards eating at *halal* certified restaurants.

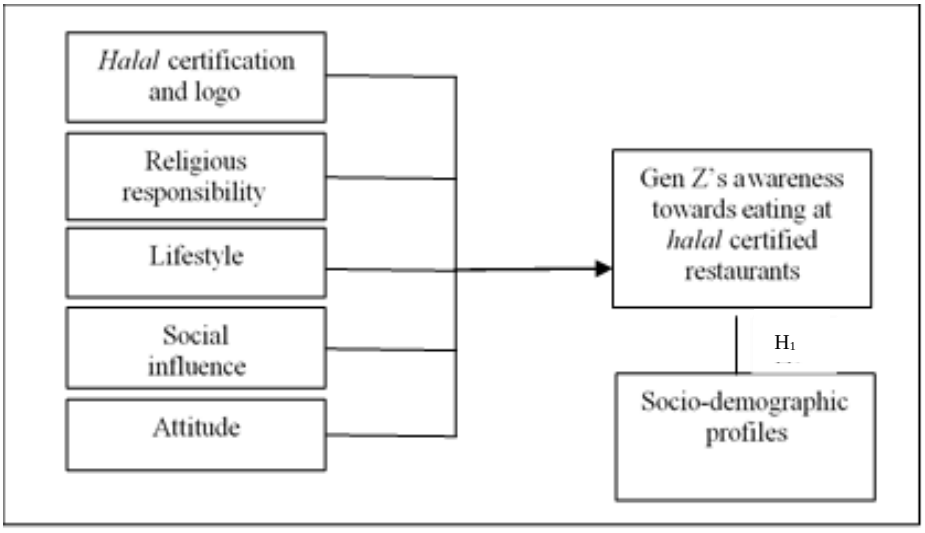

Figure 1. Conceptual framework.

4. Results and Discussions

4.1 Respondents' Socio-Demographic Profiles

The results of the socio-demographic profiles of 1,050 respondents who participated in the study are depicted in Table 1. Two-third of the respondents were female accounted for 67.4% (708), while the remaining 32.6% (342) were male. About 90% (1,002) of the respondents were aged between 19-23 years old and only 10% (48) of the respondents were aged between 14-18 years old. The respondents were dominated by Malays accounted for 92.9% (975) while Chinese, Indians, and other races accounted for 4.3% (45), 0.6% (6), and 2.3% (24), respectively. From a total of 1,050 respondents, 97.4% (1,023) of them were single and only 2.6% (27) respondents were married. Most of the respondents 73.3% (770) have less than three (3) people in their household and 83.1% (873) of the respondents obtained a bachelor's degree and they were mostly university students accounted for 88.9% (933). The remaining 11.1% (117) of the respondents were reported working with the government, private sector, self-employed, and others. The distribution of the respondents living in the rural and urban areas was slightly balanced in which 52% (546) respondents were from the rural residential area, while the remaining 48% (504) respondents were from the urban residential area. As more than 80% of the respondents were dominated by the students, most of them 88.9% (933) earned a monthly income of less than RM1,000, while the remaining 11.1% (117) respondents earned more than RM1,000 per month.

Table 1. Respondents' socio-demographic profiles.

Profile	**Frequency (*n*)**	**Percentage (%)**
Gender		
Male	342	32.6
Female	708	67.4
Age (years old)		
14-18	48	10
19-23	1,002	90
Race		
Malay	975	92.9
Chinese	45	4.3
Indian	6	0.6
Others	24	2.3
Marital Status		
Single	1,023	97.4
Married	27	2.6

Profile	Frequency (*n*)	Percentage (%)
Education		
Primary school	3	0.3
Secondary school	90	8.6
Diploma	84	8.0
Bachelor	873	83.1
No of Household (people)		
< 3	770	73.3
≥ 3	280	26.7
Occupation		
Government	15	1.4
Private Sector	75	7.1
Self-Employed	12	1.1
Student	933	88.9
Others	15	1.4
Residential Area		
Rural	546	52
Urban	504	48
Monthly Income (RM)		
<1000	933	88.9
≥1000	117	11.1

n = 1,050

4.2 Awareness Level of Gen Z towards Eating at Halal Certified Restaurants

Descriptive analysis was used to determine the mean score and to measure Gen Z awareness level towards eating at *halal* certified restaurants. Ten relevant statements on *halal* awareness were established based on 5-point Likert scales ranging from '1-Strongly disagree' to '5-Strongly agree'. The highest mean score for the established statement of "*I believe eating halal food shows that someone is obedient to religion*" was 4.59, while the lowest mean score for the established statement of "*Muslim consumers who visit a non-halal restaurant reassure me to visit the same restaurant*" was 2.89. The result of the average mean score was 3.809 in which an average mean score of above 4.00 indicated a high level of awareness, while an average mean score of below 4.00 indicated a low level of awareness (refer to Table 2). Thus, the average mean scores of 3.809 clearly showed that Gen Z have a low level of awareness towards eating at *halal* certified restaurants.

Table 2. Awareness level of Gen Z towards eating at *halal* certified restaurants.

No.	Statement	Mean	Std. Dev.
1.	I believe eating *halal* food shows that someone is obedient to religion.	4.59	0.645
2.	I believe Muslims should avoid eating doubtful *halal* food.	4.47	0.693
3.	*Halal* certificate and *halal* logo are the main references and sources before choosing a restaurant.	4.00	0.707
4.	I believe *halal* food help to boost someone's internal side.	4.12	0.645
5.	I believe eating *halal* food can improve health.	4.10	0.809
6.	I believe a restaurant that viral on social media is *halal.*	3.73	0.756
7.	I believe a restaurant that is certified *halal* only prepared *halal* dishes.	3.73	0.800
8.	The 'Pork-free' sign convinces me to try the food served by the restaurant.	3.35	0.875
9.	I search for the *halal* status of a restaurant to ensure its *halal*.	3.11	0.824
10.	Muslim consumers who visit a non-*halal* restaurant reassure me to visit the same restaurant.	2.89	0.609
Average mean		**3.809**	**0.7363**

4.3 Association between Gen Z's Socio-Demographic Profiles and Awareness Level towards Eating at Halal Certified Restaurants

Chi-square analysis was used to measure the association between socio-demographic profiles and awareness level of Gen Z towards eating at *halal* certified restaurants. There were nine (9) socio-demographic profiles tested to determine their association with the awareness level of Gen Z towards eating at *halal* certified restaurants. Only six (6) socio-demographic profiles namely gender, age, race, education level, occupation, and monthly income showed significant associations with the awareness level of Gen Z towards eating at *halal* certified restaurants, thus H_0 was rejected. As the results revealed gender has a significant association with the level of awareness, it indicated that female Gen Z were more concerned in choosing *halal* certified restaurants and this result was in line with studies by E. Gammie and B. Gammie (2009) and Sezer *et al.* (2015). Meanwhile, age and race also showed significant associations with the awareness level in choosing *halal* certified restaurants due to *halal* awareness level increased as the age of a person increased. As supported by Wilford and Wakunuma (2014) that awareness of youngsters towards *halal* issues was based on their experience and knowledge towards the issues. Since most of the respondents were above 18 years old, they all were assumed to have *halal* knowledge and

experience. Monthly income, education level, and occupation were also revealed to have significant associations with the awareness level of Gen Z towards eating at *halal* certified restaurants. This clearly showed that those Gen Z with a better income, they were more aware of choosing *halal* restaurants or places to eat, while education level and occupation gave positive influences in choosing *halal* certified restaurants. The education level represents Gen Z's knowledge in *halal*, while occupation represents Gen Z's social circle where it influenced the *halal* awareness. Table 3 shows the summary results of the association between socio-demographic profiles and awareness level among Gen Z towards eating at *halal* certified restaurants.

Table 3. Association between Gen Z's socio-demographic profiles and awareness level towards eating at *halal* certified restaurants.

Variable	Chi-Square	df	Significant	Decision
Gender	121.833	1	0.000*	Reject H_0
Age	666.179	1	0.000*	Reject H_0
Race	1437.877	3	0.000*	Reject H_0
No. of household	811.533	1	0.184	Fail to Reject H_0
Education level	241.757	3	0.000*	Reject H_0
Marital status	952.233	1	0.236	Fail to reject H_0
Occupation	582.601	4	0.000*	Reject H_0
Residential area	84.320	1	0.144	Fail to Reject H_0
Monthly income	124.110	1	0.000*	Reject H_0

Note: *significant at 1% level of significance

4.4 Factors that Influence Gen Z's Awareness towards Eating at Halal Certified Restaurants

The result of Kieser-Meyer-Olkin (KMO) obtained was 0.782, which was above 0.6 and the Barlett's Test showed the significant level was significant at 0.00, therefore factor analysis was appropriate for this study. Based on the factor analysis result, there were five (5) factors extracted that influenced Gen Z awareness of eating at *halal* certified restaurants namely '*halal* certification and logo', 'religious responsibility', 'lifestyle', 'social influence' and 'attitude'. The cumulative percentage of variance explained for *halal* certification and logo, religious responsibility, lifestyle, social influence, and attitude was 57.28%. Table 4 shows the five (5) factors extracted from factor analysis.

Table 4. Factors that influence Gen Z's awareness of eating at *halal* certified restaurants.

Statement	Factor Loading	Eigenvalue	% of Variance Explained	Cronbach's Alpha
Factor 1: *Halal* Certification and Logo				
a. I prefer taking *halal* food because *halal* food makes me good and have a smart mind.	0.781	4.304	15.50	0.808
b. *Halal* certification and logo are my priority in choosing *halal* food.	0.771			
c. *Halal* certification and logo should be placed in front of the premises.	0.734			
d. I believe a restaurant that certified *halal* by JAKIM serves *halal*, clean, and quality food.	0.774			
e. I should avoid eating at a restaurant that has no *halal* certification.	0.674			
f. A restaurant that has *halal* certification and logo will attract more consumers.	0.631			
g. I prefer to eat at a restaurant which is clean and has a *halal* logo.	0.614			
Factor 2: Religious Responsibility				
a. I should avoid entering a restaurant that has no *halal* certification.	0.795	3.395	28.65	0.804
b. Choosing a *halal* restaurant is my priority.	0.771			
c. I believe eating food that the *halal* status is doubtful is prohibited by religion.	0.742			
d. I believe eating *halal* food is an individual responsibility towards religion.	0.652			
Factor 3: Lifestyle				
a. If I work or study in an urban area, I tend to go to a restaurant that has no or doubtful *halal* status.	0.828	2.035	40.04	0.723
b. Lack of emphasis on *Halal* issues causes me to choose a restaurant that is not sure of its status.	0.785			
c. I tend to go to the restaurant that is not sure of its *Halal* status if there is no supervision from parents.	0.762			

Statement	Factor Loading	Eigenvalue	% of Variance Explained	Cronbach's Alpha
Factor 4: Social Influence				
a. Entering a restaurant that viral on social media has become a trend nowadays.	0.791			
b. Friends are a major influencer to visit a new restaurant.	0.757	1.251	49.45	0.660
c. Easy to access the internet could contribute to the spreading, not *Halal* food.	0.533			
Factor 5: Attitude				
a. I only care about appearance and taste when choosing a restaurant.	0.675			
b. I am not concern about the *halal* status of a restaurant because I believe in Malaysia all restaurants have followed rules and procedures before they start operating their business.	0.634	1.037	57.28	0.637
c. I believe most of the restaurants still do not display their *halal* certification and logo in front of their premises.	0.603			

4.4.1 Halal certification and logo

The first factor extracted from factor analysis was '*halal certification and logo*' with the percentage of variance explained was 15.5% and the eigenvalue was 4.304. *Halal* certification and logo display shows an important role in any restaurant business nature as it provides fast, short, and concise *halal* information to consumers. As consumers look for clean, healthy, safe, and wholesome food, *halal* food will be the perfect choice compared to non-*halal* food according to a common perspective among Muslims. Gen Z believed that eating *halal* food will make them good and have a smart mind. This generation also believed that the *halal* certificate and logo displayed at the restaurant will help them to speed up choosing *halal* restaurants. Furthermore, *halal* certificate and logo, which are displayed in front of the premise will indirectly convince consumers especially Gen Z to choose the restaurants. This group of consumers believed that a restaurant with a *halal* certificate and logo serves clean and quality foods. They also believed that the *halal* logo itself will attract them to revisit the restaurant. The Cronbach's alpha for eight (8) items extracted under *halal* certification and logo factor was 0.808.

4.4.1 Religious responsibility

The second factor extracted from factor analysis was '*religious responsibility*' with the percentage of variance explained was 13.15% and the eigenvalue was 3.395. As a Muslim, by doing permitted actions and avoiding prohibited actions by religion, it showed a person's responsibility as a believer towards the religion. Thus, as a Muslim Gen Z should be wise and smart in choosing *halal* food to show and signify their belief and responsibility towards Islam. Based on *Maqasid Shariah*, eating *halal* food and putting an effort into obtaining *halal* food is an individual responsibility towards religion. To show Muslim's responsibility, they should avoid entering the non-*halal* restaurant as the *halal* restaurant will be the top priority in choosing a place to eat. Muslims also are prohibited to eat food with non-confirm *halal* status or also called 's*yubhah*' and avoiding food that is '*syubhah*' also showed good religious responsibility. The Cronbach's alpha for four (4) items extracted under the religious responsibility factor was 0.804, the second highest in this analysis apart from *halal* certification and logo factor.

4.4.2 Lifestyle

The third factor extracted from factor analysis was '*lifestyle*' with the percentage of variance explained was 11.38% and the eigenvalue was 2.035. The lifestyle of Gen Z was different from one to another. The way Gen Z chooses and decides in choosing a place to eat could assist in expressing their monthly income, level of education, occupation, and much more. As mentioned previously, lifestyle also could be influenced by society. By working or studying in the urban area, there is a high tendency among Gen Z to walk-in into lots of fancy, hipster restaurants. This happens when a lack of emphasis on *halal* issues among this generation and far and lose supervision from parents could lead to the same causal. As this happened, Gen Z showed that they have less concern about *halal* restaurants when influenced by lifestyle factors. The Cronbach's alpha for three (3) items extracted under lifestyle was 0.723.

4.4.3 Social influence

The fourth factor extracted from factor analysis was '*social influence*' with the percentage of variance explained was 9.41% and the eigenvalue was 1.251. Almost the same to the lifestyle factor, social influence was another factor that influenced the awareness level among Gen Z. Nowadays, almost everyone owned social media accounts, where they can share what they are doing daily, what and where they eat regardless of the status of the actions or foods are permitted or not as long as they look great and fancy. Since many people are

updating about those restaurants through social media such as Twitter, Facebook, and Instagram, the information goes viral and directly influences Gen Z entering the restaurants regardless of their *halal* status. External influence such as peers also is one of the major influencers to these groups of youngsters to visit new restaurants without having enough consideration on the price and *halal* status. Accessibility to the internet network is also one of the important influences for these youngsters to keep on spreading non-confirm information about restaurants whose *halal* status is still doubtful. The Cronbach's alpha for three (3) items extracted under the social influence factor was 0.660.

4.4.4 Attitude

The fifth factor extracted from factor analysis was '*attitude*' with the percentage of variance explained was 7.82% and the eigenvalue was 1.037. Gen Z showed their attitude towards *halal* restaurants based on their style. Most Gen Z expressed their attitude towards *halal* restaurants by concerning on restaurant's appearance and taste, however, it creates apprehension when the restaurant's *halal* status is not a priority among this generation. Besides, this generation had less concern about the restaurant's *halal* status as they believed Malaysian restaurants need to follow specifics rules and guidelines before the restaurants could operate in Malaysia. They are also claimed that most of the restaurants in Malaysia did not display their *halal* certification and *halal* logo and this situation allowed them to simply walk-in into any restaurant in Malaysia as they believed the restaurants serve *halal* food and other Muslims also walk-in into the restaurants. However, Gen Z did not aware of the ingredients used by the restaurants, handling, logistics, and other related issues that might affect the *halal* status of the food served. Overall, Gen Z's attitude showed less favorable towards awareness of *halal* restaurants, where they should be more concerned about ingredients, handling, and certification compared to only concern on taste, appearance, minimal procedure, and common practices among restaurants in Malaysia. The Cronbach's alpha for three (3) items extracted under the attitude factor was 0.637.

5. Conclusion

Gen Z is a generation who are very responsive, technology-savvy, modern, and educated, however, this study found that the awareness level of this generation towards eating at *halal* certified restaurants is low. Gen Z socio-demographic profiles such as gender, age, race, education level, monthly income, and occupation had significant associations with the awareness level of Gen Z towards eating at *halal* certified restaurants. Five factors influenced Gen Z's awareness towards eating at *halal* certified restaurants namely *halal* certification and

logo, religious responsibility, lifestyle, social influence and attitude. The practical implications of this finding will be extended to food policy decision-makers and restaurant operators who might use *halal* related strategies in the growing *halal* food market segment among Gen Z's consumers in Malaysia. Understanding the why and how Gen Z perceive *halal* food can lead *halal* certified restaurant operators to increase their level of awareness and knowledge on *halal* principles and *halal* food handling and process. On top of that, Gen Z should increase their level of awareness towards eating at *halal* certified restaurants and this could be done through engaging with relevant awareness programs and *halal* campaigns by social media and community engagement. The only main *halal* authority, JAKIM should also play a significant role by implementing regular enforcement at certain restaurants in Malaysia that they operate without *halal* certification or those with existing *halal* certification but in suspicion for invalid or questionable certification and logo from Malaysia's authorized body.

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MALAYSIAN JOURNAL OF AGRICULTURAL ECONOMICS

Original Research Article

Assessment of Government Agriculture and Rural Development Expenditure Impact on the Malaysia's Agriculture Production

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Abstract: This study is focused on determination of the important factors that have affected the agriculture production in Malaysia. The data on interest rate (IR) and government agriculture expenditure (GE) were collected from Bank Negara Malaysia (BNM) monthly bulletin statistic. Besides that, the number of labor use in agriculture sector (LA) was collected from the World Development Indicator (WDI). All data collected were based on the time series (annually) from 1983 to 2016. In this study, the Augmented Dickey Fuller (ADF) and Philips Perron (PP) tests are used to determine the stationary of the time series data and the overall findings showed that the time series data are stationary at order one or I(1). In this study, the result of Engle Granger (EG) co-integration test was used and stated that all the factors were co-integrated with the agriculture productivity. However, the GE^2 and interest rate (IR) are the only factors that showed a negative relationship. In the long run, all the factors are significantly affecting agricultural productivity, while the interest rate is insignificant to determine the agriculture production. Furthermore, the Error Correction Mechanism (ECM) model showed that all the factors are significantly influencing the agricultural production in Malaysia except the interest rate. In the nutshell, this study suggests that the policy maker should take the precautions in the budget spending in agriculture sector, which should not exceed the threshold spending of RM3,057 million.

Keywords: Agriculture; government expenditure; agriculture production; innovation; nonlinear

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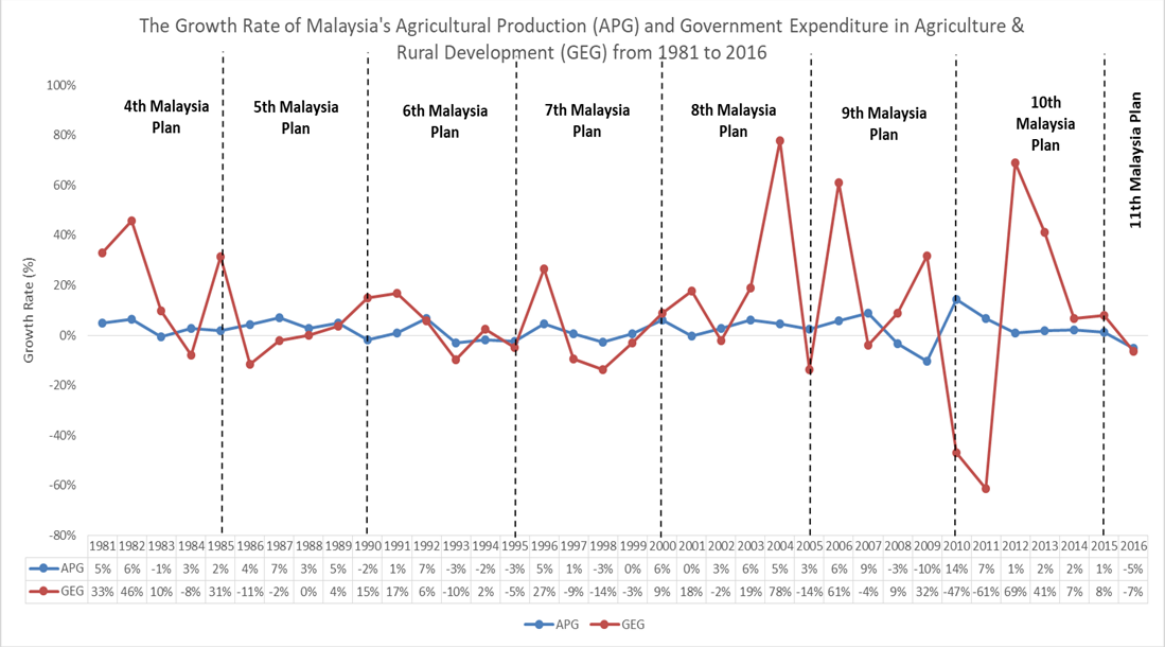
1. Introduction

Since Malaysia's independence in 1957, agricultural sector has played a role as engine of growth in developing economic sector and in meeting the sufficient and stable supply-demand in Malaysia. In order to reduce imported food from other countries for food consumption in Malaysia, the nation needs to increase agriculture productivity to overcome the increment of population in the country. As the result of the expenditure during this period, the visible trend shows significant relationship between government and rural development and agriculture GDP. Figure 1 shows that the growth rate for government expenditure in agriculture and rural development decreased significantly in 9th and 10th Malaysia Plan. However, the agriculture production increased gradually after 2009. Since 2010, Malaysia's government has reduced the budget support in this sector from RM 5,508 million to RM 2,920 million at year 2011 and further decreased to RM 1,128 million at year 2012 (BNM, 2017). In supply theory, the decrease of government budget support should reduce the production output. However, the budget support allocated for the Malaysia's agriculture sector significantly declined, but the agricultural GDP steadily increase until 2016 (refer to Table 1).



	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
APG	5%	6%	-1%	3%	2%	4%	7%	3%	5%	-2%	1%	7%	-3%	-2%	-3%	5%	1%	-3%	0%	6%	0%	3%	6%	5%	3%	6%	9%	-3%	-10%	14%	7%	1%	2%	2%	1%	-5%
GEG	33%	46%	10%	-8%	31%	-11%	-2%	0%	4%	15%	17%	6%	-10%	2%	-5%	27%	-9%	-14%	-3%	9%	18%	-2%	19%	78%	-14%	61%	-4%	9%	32%	-47%	-61%	69%	41%	7%	8%	-7%

Figure 1. The Growth Rate of Malaysia's Agricultural Production and Government Expenditure in Agriculture and Rural Development from 1981 to 2016.
Source: BNM, (2017)

Table 1. Malaysia's Agricultural Production and Government Expenditure in Agriculture and Rural Development from 1981 to 2016

Year	Agricultural Production (VA) (million)	Government Expenditure (GE) (million)	Growth Rate		Remarks
			VA (%)	**GE (%)**	
1981	43.53736	523	4.9%	33.1%	Fourth Malaysian Plan
1982	46.35319	763	6.5%	45.9%	
1983	46.05571	838	-0.6%	9.8%	
1984	47.36379	771	2.8%	-8.0%	
1985	48.30512	1013	2.0%	31.4%	
1986	50.31817	897	4.2%	-11.5%	Fifth Malaysian Plan
1987	53.85528	878	7.0%	-2.1%	
1988	55.31604	877	2.7%	-0.1%	
1989	57.94808	909	4.8%	3.6%	
1990	56.94651	1044	-1.7%	14.9%	
1991	57.5388	1219	1.0%	16.8%	Sixth Malaysian Plan
1992	61.48519	1291	6.9%	5.9%	
1993	59.55525	1166	-3.1%	-9.7%	
1994	58.42723	1194	-1.9%	2.4%	
1995	56.94651	1135	-2.5%	-4.9%	
1996	59.52863	1436	4.5%	26.5%	Seventh Malaysian Plan
1997	59.92793	1300	0.7%	-9.5%	
1998	58.27084	1121	-2.8%	-13.8%	
1999	58.55035	1088	0.5%	-2.9%	
2000	62.09745	1183	6.1%	8.7%	
2001	61.99006	1394	-0.2%	17.8%	Eight Malaysian Plan
2002	63.76705	1364	2.9%	-2.2%	
2003	67.61281	1620	6.0%	18.8%	
2004	70.7737	2881	4.7%	77.8%	
2005	72.60946	2482	2.6%	-13.8%	
2006	76.84684	3999	5.8%	61.1%	Ninth Malaysian Plan
2007	83.62995	3842	8.8%	-3.9%	
2008	80.74941	4184	-3.4%	8.9%	
2009	72.45175	5508	-10.3%	31.6%	
2010	82.882	2920	14.4%	-47.0%	
2011	88.555	1128	6.8%	-61.4%	
2012	89.406	1906	1.0%	69.0%	

2013	91.181	2692	2.0%	41.2%	Tenth Malaysia Plan
2014	93.048	2875	2.0%	6.8%	
2015	94.249	3105	1.3%	8.0%	
2016	89.465	2902	-5.1%	-6.5%	

Source: BNM (2017)

Yet, the increase of agriculture production in Malaysia shows that other positive factors may have contributed despite the negative impact of the decreasing government budget spending on agriculture sector. Hence, this study aims to examine the important factors which are affecting the Malaysia's agricultural production apart from government financial support.

2. Literature Review

The behavior of the agriculture production pattern has been investigated in many studies in the context of itself or its industry in the producing countries. However, most of these studies including Elias (1985), Mogues *et al*. (2015), Oyinbo *et al*. (2013), Iganiga and Unemhilin (2011), Ebere and Osundina (2014), Saungweme and Matandare (2014), El-Enababy *et al*. (2016), Selvaraj (1993) and Mohsen *et al*. (2016) have tested the effect of the government expenditure on agriculture sector especially on the agriculture output. These studies have proven that the government expenditure has significant positive impact toward the agriculture production. However, Martins (2014) found that there is a quadratic effect of government spending on the agriculture sector and Oyinbo *et al*. (2013) found that that budg*et al*location is positively related to agriculture GDP in the long-term, but not significant in - short-term.

In the past literatures, there are three main approaches to explain the relationship between government size and economic growth. The first approach is based on the traditional interpretation from Wagner's Law, the government size and economic growth is a positive relationship because the government expenditures can increase the market's efficiency, consequently, increase the national output (Grossman, 1988). Besides that, the Keynesian economic growth theory also has suggested that the implementation of expansionary fiscal policy has improved the economic growth. However, Chen and Lee (2005) explain that the increasing public spending has led to the budget deficits arise, increase of taxation becomes one of the options and further placing an additional burden on the production growth. This second approach further explained by Aydin (2016), the government spending could be negatively related to the production growth which was subjected to the law of diminishing

returns and grow out of the idea that the additional government spending gradually reduces economic growth based on the crowding-out effect on private investment.

The third approach that combine the explanation from the previous two approaches to interpret the nature of non-linear relationship between economic growth and government expenditures. This non-linear quadratic approach or Armey curve was proposed by Armey (1995). The Armey curve explained that the optimal government size and expenditures were questioned and associated with the level of economic growth. The Armey curve reflects that there was a positive relation between government expenditure and economic growth to a certain optimum point, after which the correlation becomes inversely related (Vedder and Gallaway, 1998). The negative correlation after the optimum government spending reflected that the influence of the law of diminishing returns leads to a situation in which increasing the share of government spending any further will reduce the economic growth (Altunc and Aydin, 2013).

The results from the Johensan Vector Error Correction Model used by Oyindo, Zakari and Rekwot (2013), has shown that the interest rate is also one of the significant factors that has affected the agriculture production. The interest rate is found negatively related to the dependent variable which is the agriculture output and this variable only significant in long-run, but insignificant in short-run. Selvaraj (1993) had conducted a research to analyze the impact of government expenditure on agriculture and performance of agricultural sector in India. The analysis was conducted using Ordinary Least Square (OLS) which has included factor of labor used in agriculture sector for analysis. The result has shown the labor used in agriculture sector is positively related to the agriculture production. This result also supported by the research done by Badar *et al*. (2007). This study fills the gap in the literature by investigating the relationship between the government expenditure on agriculture sector and the agriculture production in Malaysia based on the Armey curve theory. The finding of this study is expected to provide some valuable suggestion for policy makers in planning the new policy in order to increase the agriculture production.

3. Materials and Method

This study utilised a secondary data, which covers from the year 1983 to 2016. The data of Malaysia's agriculture production (VA) was derived from the variables including the government expenditure in agriculture and rural development (GE) and the interest of lending (IR) were collected from the Bank Negara Monthly Statistical Bulletin (BNM, 2017). Besides

that, the number of labor use in agriculture sector was obtained from the World Development Indicator (WDI, 2017).

The unit root test was used to examine the stationary of each variable. According to Hamilton and Susmel (1994), the null hypothesis for the ADF test would be that the variable has a unit root, which indicated that the variable was unstable. Meanwhile, the alternative hypothesis was the series did not have a unit root and the variable was stable. The true model of the ADF test would be tested by using Equation 1:

$$\boldsymbol{y_t = \alpha + \rho y_{t-1} + \sum_{i=1}^{k} \beta_i \Delta y_{t-i} + u_t} \quad (1)$$

Where ρ is the coefficient for lagged one endogenous (y_{t-1}) and the β_i denotes as the coefficient for the difference term and u_t is assumed to be zero-mean error term. According to Dickey and Fuller (1979), if the ρ is fall in the between 0 and -1, it indicated that the series were stationary. Besides that, the Phillips-Perron (PP) also generally used to check stationary of the entire variable.

Co-integration test is the next step which is a basic approach as a confirmation for the estimated time series regression does not produce a spurious regression. The Engle-Granger co-integration test (hereafter the EG test) is a single equation residual-based co-integration test. Engle and Granger (1987) noted that a linear combination of two or more order one series may be stationary, or I (0) in which case we concluded that the series were co-integrated.

The beginning of the step was to test the co-integration in EG test with the purpose to estimate the long-run Equation 2 with the ordinary least square (OLS) method, such as:

$$\boldsymbol{Y_t = c + \beta_1 X_t + \varepsilon_t} \quad (2)$$

Where Y_t denotes as the endogenous variable and the X_t denotes as the exogenous variable(s). In this study, the Equation 2 is re-written as Equation 3:

$$\boldsymbol{InVA_t = C + \beta_1 ln\, GE + \beta_2 ln\, GE^2 + \beta_3 lnLA + \beta_4 lnIR + \varepsilon_t} \quad (3)$$

Where β_1, β_2, β_3 and β_4 are the long-run co-efficients, namely: government expenditure on agriculture and rural development (GE), number of labours in agriculture sector (LA) and the interest rate of lending (IR), respectively, whereby VA is equivalent to

the Malaysia's agriculture production (VA), The *ln* denotes that all variables were transformed into a logarithm form.

After doing the regression analysis, the residual series was gained, and a k lag augmented regression of the form can be postulated as in Equation 4:

$$\Delta\hat{\boldsymbol{\varepsilon}}_{\boldsymbol{t}} = (\boldsymbol{\rho} - \mathbf{1})\hat{\boldsymbol{\varepsilon}}_{\boldsymbol{t-1}} + \sum_{\boldsymbol{j=1}}^{\boldsymbol{k}} \boldsymbol{\delta}_{\boldsymbol{j}}\Delta\hat{\boldsymbol{\varepsilon}}_{\boldsymbol{t-j}} + \boldsymbol{u}_{\boldsymbol{t}} \quad (4)$$

Where the $\Delta\hat{\varepsilon}_t$ indicates the first different of the estimated error term which was obtained from the equation 3 represented by ε_t.

After the co-integration test, the analysis was extended into the ECM estimation in order to confirm the short-run equilibrium among the estimated variables. In the ECM, the error term (ε_t) implies as the long-run equilibrium error or the disequilibrium magnitude in the Equation 5. Thus, the error term can be used to relate the short-run behavior of Malaysia's agriculture production (VA) to its long-run value. In general, the ECM can be expressed as in Equation 5:

$$\Delta\boldsymbol{y}_{\boldsymbol{t}} = \Omega_{\mathbf{0}} + \boldsymbol{\alpha}\hat{\boldsymbol{\varepsilon}}_{\boldsymbol{t-1}} + \sum_{\boldsymbol{i=1}}^{\boldsymbol{k}} \emptyset_{\boldsymbol{i}}\Delta\boldsymbol{y}_{\boldsymbol{t-i}} + \sum_{\boldsymbol{h=0}}^{\boldsymbol{r}} \boldsymbol{\theta}_{\boldsymbol{h}}\,\Delta\boldsymbol{x}_{\boldsymbol{jt-h}} + \boldsymbol{u}_{\boldsymbol{t}} \quad (5)$$

where the u_t is the stochastic term, while $\hat{\varepsilon}_{t-1}$is the lagged value of the error term in the Equation 4. Additionally, the y_t represents the VA_t and the $x_j$represents the exogenous variables including GE, GE^2, LA and IR, respectively, in the Equation 3. The *k* and *r* are the optimum lag length selected based on the general to specific approach and in order to avoid the auto-serial correlation on u_t. Nevertheless, α is the long-run speed of adjustment or call it as an error correction coefficient plus $\emptyset_i$and θ_h illustrate the short-run elastricity.

In the study, the ECM Equation 6 can be proposed as:

$$\begin{aligned}\Delta\ln\boldsymbol{VA}_{\boldsymbol{t}} = \Omega_{\mathbf{0}} + \boldsymbol{\alpha ECT}_{\boldsymbol{t-1}} + \sum_{\boldsymbol{i=1}}^{\boldsymbol{k}} \emptyset_{\boldsymbol{i}}\Delta\,\boldsymbol{lnVA}_{\boldsymbol{t-i}} + \sum_{\boldsymbol{h=0}}^{\boldsymbol{r}} \boldsymbol{\theta}_{\boldsymbol{h}}\Delta\boldsymbol{lnGE}_{\boldsymbol{t-h}} + \\ \sum_{\boldsymbol{h1=0}}^{\boldsymbol{p}} \boldsymbol{\theta}_{\boldsymbol{h1}}\Delta\boldsymbol{lnGE\hat{}2}_{\boldsymbol{t-h1}} + \sum_{\boldsymbol{h2=0}}^{\boldsymbol{q}} \boldsymbol{\theta}_{\boldsymbol{h2}}\Delta\boldsymbol{lnLA}_{\boldsymbol{t-h2}} + \\ \sum_{\boldsymbol{h3=0}}^{\boldsymbol{S}} \boldsymbol{\theta}_{\boldsymbol{h3}}\Delta\boldsymbol{lnIR}_{\boldsymbol{t-h3}} + \boldsymbol{u}_{\boldsymbol{t}}\end{aligned} \quad (6)$$

4. Result and Discussion

Stationary test was used to test the stationary level of the data in this study. Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) tests were used to test either the data are stationary at order I (0) or at order one I (1). The results of ADF test shows that all data retrieved were not stationary at all levels, however, after all data were transformed into

first difference, all data showed stationary at 1% significance level. Moreover, this result was supported by PP test, when PP test shows the same result as ADF test. In short, all series are stationary at order one or I (1) variables (refer to Table 2).

Table 2. Stationary Test Result (ADF and PP test).

Variable	**ADF Test**		**PP Test**	
	Level	**First Diff**	**Level**	**First Diff**
VA	-1.162	-5.955***	-1.175	-5.790***
	(0)	(1)	(4)	(6)
GE	-2.102	-5.639***	-2.120	-5.814***
	(0)	(0)	(1)	(5)
GE^2	-1.968	--5.619***	-1.996	-5.777***
	(0)	(0)	(1)	(5)
LA	-1.113	-8.562***	-2.538	-10.558***
	(1)	(0)	(18)	(13)
IR	-1.937	-5.328***	-1.705	-7.920***
	(0)	(2)	(8)	(34)

Note: All variables are converted into the form of logarithm, ***, ** and * represents as significant at 1%, 5% and 10% significance level, respectively. The number in the parenthesis (…) represents the optimum lag selected for the test.

The co-integration regression was estimated on the four independent variables that determine the Malaysian agricultural production. Table 3 shows that the residual from the long-run regression was statistically significant at 10% significance level in EG test. This indicates that the exogenous variables were weakly co-integrated with the agricultural productivity.

Table 3. Summary of Engle-Granger Co-integration test.

Engle-Granger Co-integration Test: -4.158*			
Critical Values	**1%**	**5%**	**10%**
	-5.017	-4.324	-3.979

Note: * represents as significant at 10% significant level. The number in the parenthesis (…) represents standard error value.

All independent variables are statistically significant at 1% significance level, except the IR is not significant (refer to Table 4). The trend variable was estimated in magnitude 0.015 and this indicated that the technology increase leads to increase in the VA. Besides that, the elasticities of LA werre about 0.535 which indicated that 1% increase in the mean of number of labor, leads to the increase in average agriculture productivity by 0.535%,

holding other constant. The GE and GE^2 represents that the government expenditure has a nonlinear effect on the agriculture productivity. The positive elasticities in GE and negative elasticities in GE^2 represents that there were a quadratic impact (∩ shape) of government expenditure to the agriculture productivity. Increasing government expenditure (GE) at the beginning stage shall resulted to increase in the productivity of agriculture (VA) in Malaysia. However, the productivity will decline drastically if the government over-spending on the agriculture sector. The threshold value is computed based on the partial equation which $\frac{\partial VA}{\partial GE} = 0$. After first different the long-run regression, we obtained that $\frac{\partial lnVA}{\partial lnGE} = 1.054 + 2\,(-0.154)lnGE$ and further transformed into exponential function which is exp(3.42) * 100. Finally, the threshold magnitude for government expenditure was estimated to RM 3,057 million. This indicates that the productivity of agriculture will decrease if government increases their expenditure beyond this value. This finding was supported by the Armey Curve theory propounded by Armey (1995) and similar findings from Altunc and Aydin (2013) which found that "inverted U" relationship between government optimal size and economic growth.

Table 4. Summary of long-run regression.

VA	C	Trend	GE	Ge^2	LA	IR
	∂	T	β_1	β_2	β_3	β_4
	8.083***	0.015***	1.054***	-0.154***	0.535***	-0.015
	(0.656)	(0.002)	(0.334)	(0.050)	(0.124)	(0.060)

Note: All variables are converted into the form of logarithm, ***, **, * represents as significant at 1%, 5%, and 10% significant level, respectively. The number in the parenthesis (…) represents standard error value.

Error-Correction Mechanism or ECM is a time series econometric model that was used to determine the long-term and short-term time series between two variables (Gujarati, 2003). The results of the short-run analysis by using the ECM model are reported in the summary Table 5. The negative coefficient for ECT lagged one was estimated in value of -0.56 and it was significant at 1% significance level, this indicated that the market self-adjustment was playing a significant impact to auto-converge the short-run disequilibrium back to the equilibrium point. Moreover, the magnitude speed of adjustment (-0.56) showed that the market itself have a moderate speed to converge in the short-run.

Table 5. Summary of error-correction mechanism analysis.

Variable	Coefficient	Std. Error	P-Value
C	0.009***	0.004	0.006
ECT(-1)	-0.560**	0.208	0.012
Δ(GE)	1.096**	0.435	0.018
Δ(GE^2)	-0.165**	0.065	0.0182
Δ(LA)	0.292**	0.117	0.0194
Δ(IR)	-0.019	0.055	0.7211

Note: All variables are converted into the form of logarithm, ***, **, * represents as significant at 1%, 5%, and 10% significant level.

The short-run elasticity for government expenditure (ΔGE) is estimated in magnitude of 1.096, which is the highest short-run elasticity than other factors on determine the changes of Malaysia's agriculture production in short-run. The R-squared in this ECM model is 0.486, which means that around 48.6% of the variation of ΔVA was explained by theΔGE, $\Delta GE\text{^}2$, ΔLA and ΔIR, and the remaining value of 51.4% was not explained in the estimated regression.

5. Conclusions

Based on the findings of this study, it is relevant that the government expenditure is one of the important factors and having a quadratic effect on the Malaysia's agriculture production. Hence, the policy makers should be careful of the budget spending in agriculture sector, which must not exceed the threshold spending RM 3,057 million. Based on this "inverted U" relationship, if the government spending is more than the threshold value, it will cause the decline in agriculture productivity, such as over relying on the government support and limit the innovation development in this sector. According to Armey (1995), the "inverted U" relationship between government spending and economic growth is mainly due to the law of diminishing returns. Furthermore, the findings also show the importance of innovation and technology to increase the agriculture productivity. Therefore, the agriculture sector should invest more on the technology and reduce the dependency on the usage. For example, there is a vital need to integrate the farming system into the digital system, mechanical system or high-tech system in order to reduce the cost of production and labour usage. Moreover, the number of labours involve in agriculture sector is also important to

influence the agriculture production in Malaysia. Policy makers have to design and implement a good policy in order to increase the number of labours in this industry to overcome the labour shortage problem.

Conflict of Interest: The authors declare that there is no conflict of interest in this work.

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Original Research Article

Marketing Channel Selection by Pineapple Smallholder Growers in Samarahan, Sarawak

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Abstract: The surging demand for pineapple creates opportunities for smallholder growers in maximising their income. However, the pineapple is a type of fruit that is easily perishable, thus it requires immediate sale to consumers and shorter shelf-life for them to get the best quality of the fruit. Moreover, its commodity price also depends on its quality on the shelves. In this respect, it is important for the smallholders to decide on the best marketing channel to distribute their farm produce to generate maximum profit. This study was conducted to investigate the most preferred pineapple marketing channel among smallholder pineapple growers in Samarahan, Sarawak. Questionnaires were distributed to 123 respondents and the data was analysed using descriptive analysis. The findings showed that the most popular marketing channel selected by pineapple smallholder farmers was the farmer's market and the least selected marketing channel was restaurant and online selling. With the introduction of the Fourth Industrial Revolution (IR4.0) by the government, it is essential to provide online marketing education via an online platform to farmers so that it creates marketing opportunities for selling their products and thus contribute to the overall economy.

Keywords: Smallholders, pineapple, marketing channels, farmers market

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1. Introduction

Pineapple is a very nutritional fruit as it contains lots of nutrients such as vitamin A, B, and C, minerals, and also bromelain enzyme (Martínez *et al.*, 2012). The fruit is available in most tropical countries, but the major producing countries are Brazil, India, China, Nigeria, Mexico, and Colombia (Esiobu *et al.*, 2014). In Malaysia, Sarawak (1,342 hectares) is the

second largest pineapple producing state after Johor (8,429 hectares). According to the Malaysian Pineapple Industry Board (MPIB) the total pineapple production in Sarawak is about 38,025 tons valued at RM 48.22 million (MPIB, 2019). Due to the increasing demand, Malaysia has started positioning itself among pineapple producing countries with several types of pineapple breeds planted in the country such as *Moris*, *N36, Sarawak*, *Moris Gajah*, *Gandul*, *Yankee*, *Josapine*, *Masapine*, and *MD2* (Amar Ahmadi *et al*., 2015). However, all these types of pineapples are highly perishable in nature. Therefore, it requires shorter shelf-life and immediate sale to consumers in order to ensure the wholesalers, retailers and consumers to get best quality of fruits.

The marketability and commodity price are highly influenced by the quality of pineapples on the shelves. These factors have hindered the smallholder growers to directly market their pineapple, which made them turn to the middleman as the alternative for marketing their products. According to Nor Azlina and Abdul Rahman (2014), most farmers in Malaysia depend on wholesalers to market their yield. Most farmers are limited in terms of affordability, availability and flexibility mode of transport for distribution and delivery, access to proper facilities and access to the customers. Consequently, relying on middlemen has caused the farmers to lose their maximum profit and income due to marketing costs. The authors also argued that most independent farmers did not make any agreement with other parties to purchase their recently harvested fruits, and they fully own the cropped land, which allows them to sell their products to any buyers. The pineapple cultivation industry also significantly contributes to the country's socio-economic development in terms of improving the livelihoods of smallholder farmers through income generation either in terms of its quantity or marketing system (Jaji *et al.*, 2018). An increase in the pineapple production without efficient and good support from the marketing system might reduce the motivation of smallholder farmers to increase their cultivation or yield. So, the marketing system shows high influence on the preference of smallholder farmers on selecting marketing channels to increase their income and improve their well-being. Therefore, this present study addresses the market access and determines the preferred pineapple marketing channel among smallholders in Samarahan, Sarawak.

2. Literature Review

Marketing channel is also known as the distribution channel. According to Watson *et al.* (2015), the distribution channel is interdependent of an organisation that involves processing until the consumption of a product or service. In a simpler explanation, the marketing channel is the flow of the product from raw materials until it reaches the consumers end. It is important to explore and identify the distribution channel or marketing channel as it influences the marketing activity throughout the journey of the product. In the marketing of pineapple produce, there are several marketing channels commonly used such as direct selling and selling through the intermediaries. Smallholders who utilize a correct marketing channel to market their yield can help them generate more income. Through market selection,

smallholders can improve their decision in choosing the best marketing channel. Market selection is a process where several factors are determined, whereby the cash crop products such as pineapple are sold in different market outlets (Arinloye *et al.*, 2016). Many determinants may influence the market selection among farmers as per proposed by Jari and Fraser (2012). These identified determinants are lack of information, transportation, proper infrastructure, expertise in quality management and contractual agreement in marketing yield.

Farmer's market is one of the most important marketplaces for farmers to market their goods, produce and farm products. Moreover, prices at this kind of market are fairer and reasonable (McGuirt *et al.*, 2014). This has caused more consumers to shop at the farmer's market due to the reasonable price of products and the location of the market was incrementally closer to their residence. Also, the most common positive perceptions towards farmer's markets as mentioned by Freedman et al, (2016) are about the quality, freshness, healthfulness and taste of foods available at farmer's markets. Similarly, Misyak *et al.* (2014) argued that the quality of food, knowing who grows the food, and the safety of foods available as the top benefits to shopping at farmer's markets. Smallholder farmers also sell their produce to the neighboring areas. Direct marketing channel offers the opportunity to foster close relationships between consumers and farmers through regular communication between both parties (Alia *et al.*, 2014). This channel also provides the opportunity for consumers to support local farmers and contributing towards expanding the local economy (Misyak *et al.*, 2014).

Due to their small-scale cultivation, the farmers prefer to sell their produce at the roadside stalls. Roadside or street stall operator refers to an individual who offers goods for sale or services to the public without having a permanent built-up structure, but with a temporary static structure or a mobile stall (ILO, 2013). This seems to be one of the reasons why farmers prefer to sell at the roadside stalls as they can quickly move to another place, when they are asked to leave and can easily reopen their small businesses because of their mobility (Lei *et al.*, 2019). Another marketing channel commonly preferred by smallholder farmers is the middlemen. According to Abebe *et al.* (2015), older farmers tend to choose middlemen as their trading partners rather than selling directly to wholesalers as they are likely to be more embedded in social networks. Furthermore, the online platform is another avenue for marketing channels, and farmers are encouraged to make use of social media for them to sell their products and not depending entirely on wholesalers. Robina-Ramírez *et al.* (2020) stated that online tools are not only helping consumers to pay more attention to food intangible values such as health, nutritional content, environmentally friendly production, and animal welfare, but also product's intangible value can increase the options of online purchase because of the advantages of e-commerce (i.e. low cost, high efficiency and openness). Moreover, online trading not only protects the environment, but also promotes socio-economic development (Rong-Da Liang, 2014).

3. Methodology

This study was conducted in Samarahan, which is a district in Sarawak. Sarawak was chosen since it is the second largest pineapple producer state in Malaysia, while Samarahan is the largest pineapple producer in Sarawak. The population of smallholders who cultivate pineapple in Samarahan is about 190 farmers. Therefore, based on Krejcie and Morgan (1970), the sample size (n) was decided as 123 respondents. Questionnaires were used as the primary instrument to gather data for the current study which were randomly distributed to the respondents in Samarahan. The questionnaires contain two major sections of demographic and preferred marketing channels. The quantitative data were analysed using descriptive analysis.

4. Results and Discussions

4.1 Socio-Demographic Profiles of Respondents

Table 1 illustrates the socio-demographic profiles of the respondents. Most of the pineapple farmers were between 31 to 40 years old with a percentage of 50.4%, followed by 41 to 50 years old, and 20 to 30 years old with a percentage of 21.1% and 20.3%, respectively. The least group age of farmers was between 51 to 60 years old with a percentage of 8.2%.

Table 1. Socio-demographic profiles of respondents**.**

Profiles	Frequency (*n*)	Percentage (%)
Age (years old)		
20–30	25	20.3
31–40	62	50.4
41–50	26	21.1
51–60	10	8.2
Education		
Primary School	13	10.6
Secondary School	89	72.3
Tertiary Education	21	17.1
Gender		
Male	64	52.0
Female	59	48.0
Monthly Income (RM)		
Less and equal to 500	62	50.4

Profiles	Frequency (*n*)	Percentage (%)
501–1,000	44	35.8
1,001–1,500	9	7.3
1,501–2,000	3	2.4
2,001–2,500	2	1.7
More than 2,500	3	2.4
Years of Experience		
0–2	19	15.5
3–5	87	70.8
6–8	17	13.7

Note: $n = 123$

In highlighting their education level, most of the pineapple farmers had only a secondary school qualification with a percentage of 72.3%. It is then followed by the tertiary education level in a university with a percentage of 17.1%. A small fraction of the farmers in this study had only a primary school education level (10.6%). Table 1 also shows that the smallholding pineapple sector in Samarahan was dominated by male farmers with a percentage of 52.0%. However, this number was only slightly higher than the female farmers with a percentage of 48.0%. The almost equal gender population in the pineapple cultivation sector indicates that both genders are highly participating in growing pineapple.

Considering the farmers' income status, most of the pineapple farmers earn below RM 500 with a percentage of 50.4%. It is then followed by a monthly income bracket of RM 501 to RM 1,000, and RM 1,001 to RM 1,500 with the percentage of 35.8% and 7.3%, respectively. Furthermore, the monthly income bracket of RM1501-RM2000 has a percentage of 2.4% which shared the same percentage with those who earned more than RM 2500.Interestingly, a small percentage of the smallholder farmers in the study earn about RM 2,001 to RM 2,500 monthly, with a percentage of 1.7%. Another item in the demographic section prompts the farmers' experience in the sector. Most of the pineapple farmers have three to five years of experience with a percentage of 70.8%. It is then followed by zero to two years of experience with the percentage of 15. 5%. Only 13.7% of the farmers have six to eight years of farming experience.

4.2 Preferred Marketing Channel

Based on the finding from the previous study, the pineapple growers in Samarahan have been using some of the marketing channels available. Therefore, this study has successfully discovered what would be their preferred marketing channel to trade if they can choose any of them. Table 2 shows the marketing channels that were preferred by the pineapple growers in Samarahan, Sarawak. From the analysis performed, it showed that most

of the respondents preferred to market their pineapple products in the farmer's market. It is constituted of 48.0% of the total respondents. Next, the roadside stall was preferred with a percentage of 19.5%, while selling through the middleman at 13.8% and 3.3% of them preferred selling it to their neighbours. Then, it is followed by 10.6% of the respondents who chose to sell their pineapple products to the Federal Agriculture Marketing Authority (FAMA). Only 2.4% of the respondents preferred selling their products to the restaurant owners and via online selling.

Table 2. Preferred marketing channel**.**

Marketing channel	**Frequency (*n*)**	**Percentage (%)**
Farmer's market	59	48.0
Roadside stall	24	19.5
Middleman	17	13.8
FAMA	13	10.6
Neighbourhood customer	4	3.3
Restaurant	3	2.4
Online selling	3	2.4

The most preferred marketing channel by the pineapple growers in this study was through direct selling (48.0%) by the farmers to the final consumers at the farmer's market. This might due to several reasons such as the ability of the farmers to communicate, negotiate, and promote the uniqueness of their products to their customers without any interference from others. This improves the chance for them to build the networking with the customers and the chance to negotiate for a better deal based on their produce and to meet the customers' requirements and quantity especially for those wholesalers, retailers and operators at the hypermarkets which require huge quantity purchasing. This is supported by Detre *et al.* (2011) who stated that farmers who used direct marketing strategies to promote their products were likely to have higher income in their growing sales. This is due to the ability of the farmers to reduce the cost they must bear when using the middleman in promoting their products. Besides, it can be said that farmers with more experience will choose a direct selling approach to sell their products as it provides the opportunity to have good communication and relationships with their end-users. According to Dries *et al*. (2012), the direct marketing interactions with the consumers allow the farmers to supply the relevant knowledge and information on their produce to them. Therefore, the consumers can value the produce by distinguishing between a good and a bad quality produce. The result in Table 1 also showed that 85.5% of the total respondents in the study have more than 2 years' worth

of experiences, which constituted around 85.5% of the total respondents, while 15.5% of the total respondents have less than 2 years of farming experience. So, it can be deduced that farmers with longer farming experience tend to sell or market their products at farmer's markets. However, this is contradicted with the finding by Muthini *et al.* (2017) who reported that the experience of the farmers did not significantly affect the choice of marketing channel.

Besides, the result also showed that market preferences among respondents might due to age factor. The result showed that 70.7% were age less than 40 years old and only 29.3% were more than 40 years old. It can be concluded that younger farmers at the age of less than 40 years old, in the context of this current study, were inclined to choose markets as their preferred location to sell their products. As mentioned by Barret *et al.* (2007), younger people participated more in the market because they are more receptive to new ideas and are less risk averse than older people. So, the markets which are the spot for the consumers to find and purchase their daily necessities will be the best location for the farmers to sell and promote their products. Nevertheless, selling goods at a market also can be a difficult task for some individuals, factors such as competition, networking, and others will affect their marketing activities. This is in line with the finding by Zegeye *et al.* (2001), who stated that the young farmers are willing to take risks as they might have long-term planning instead of short-term money making. Apart from direct selling of the produce, the farmers must also be more innovative in making home-made delicacies or products to be sold at the customers, such as pineapple-based such as fruit salad, jam, jelly, pudding, juice, fried-rice, cake, tartlets, health drinks or candies. This approach will create awareness on the usage of pineapple in our daily lives especially for the younger generations, who loves to try ready-food from the road stalls.

The second preferred marketing channel was roadside stalls which also involved the direct selling approach to reach the consumers. The small-scale farmers most probably choose the method as it is easier for them to reach the consumers who own their own vehicle or transport, while maintaining the low price of their products. Prospect passers-by of the road driving different type of vehicles will stop and buy the produce or products they sight from a distance, and they will become regular customers to get the supply of the produce direct to their business premises. Farmers who are not equipped with proper packaging and distributing knowledge, will find the location to sell at the shortest distance from their farm to reduce the chances of the pineapple to rot before purchasing date and time. This is due to the ability to sell the products directly to final consumers, while minimizing the risk related to their products such as the freshness and perishability of their produce. However, some of the respondents still used an indirect marketing approach to reach their consumers. Based on the data, the middleman (13.8%) and FAMA (10.6%) came in third and fourth place, respectively as the preferred marketing channel for the respondents. This was due to several factors such as the location, production, and knowledge that lead them to use the services of the middleman. As mentioned by Mmbando *et al.* (2016) some of the smallholder farmers had a problem with insufficient marketing price information, association or group, poor road

quality to the market, cooperation and communication with the buyer, bargaining power, access to credit, extension service and low education. These factors contribute to their tendency to use the service of the middleman even though they have to bear an extra cost based on the services. Moreover, the smallholders sometimes face a condition, where they need to sell the products as soon as possible after harvesting, which made them use the indirect marketing approach (Soe *et al.*, 2015). This is also supported by Ogunleye and Oladeji (2007) who argued that the distance to the market increases transportation costs and marketing costs which hinder the extent of market participation among smallholder farmers in direct marketing approach, especially those who reside and farm far away from the town.

Lastly, the results also found that selling their produce to the neighborhood customers, restaurants and online platforms were less favorable among the farmers as shown in Table 2. The lack of exposure, poor internet coverage, lack of knowledge and inadequate experience in digital marketing might be the reason for the lack of preferences to use online platforms as the mean for marketing purposes, especially in Malaysia. Based on the result, only 17.1% of the respondents have tertiary education level, whereas 82.9% were non-college graduates with education level at primary (10.6%) and secondary schools (72.3%). The lack of exposure, experience as well as knowledge on how to use the online platforms might be the reason for not using the platforms as their preferred marketing channel as digital marketing and strategies are taught deeper in tertiary level of education.

As mentioned by Boz and Ozcatalbas (2010), farmers' educational level and farm size have a significant effect on the usage of modern information to communicate. Furthermore, Yahaya (2002) also stated that there was a significant relationship between farmers' education level, gender, farm size, and frequency on the usage of traditional as well as conventional marketing among farmers. Several factors affected agricultural producers and agribusinesses to adopt computer and internet platforms for business purposes such as age and education, financial management skills, familiarity with computer interfaces, access to reliable Internet service, and lack of familiarity with the latest technology (Carpio & Kelly, 2015). A lot of advantages and benefits to both sellers and buyers can be obtained, if this medium is used efficiently for marketing purposes, such as the distribution rate of information among the sellers and the buyers in the future.

4. Conclusion

The results indicate that most smallholder pineapple growers in Samarahan chose to direct market their pineapple produce because it allows for better potential profit margins compared to selling with intermediaries. The benefits of cutting out the middleman and meeting the satisfaction level of the consumers by providing them with affordable prices can make these marketing channels worth it. Due to small quantities of farm production, they can manage to sell it directly to the customers. This enables the farmers to set the price, in which they have more control over the price and therefore, small farms can be profitable. Besides, farmers receive instant feedback from the customers on their products which allows them to

improve their business through this input and increase farm profitability. These days, smallholder farmers had to get courageous to survive in the stiff competition. They had to get involved in an online market that provides more opportunities to expand their market worldwide. Therefore, the time is right for pineapple farmers in Samarahan to make the shift and investment from traditional to digital marketing approaches and obtain their maximum sales available for the pineapple market. At this moment, a farm that is set up to sell directly to consumers is well-positioned to take advantage of the unprecedented demand. This online marketing can help farmers in promoting the right agricultural products to its rightful buyers by reaching out to the new people across diverse locations. Furthermore, with proper packaging, handling and distributing skills of the produce will further facilitate the smallholder's business that can penetrate not only domestically, but internationally, for a good start with the neighboring countries. Despite most of the pineapple farmers in Samarahan is still lagging behind in using online marketing, they can start selling their products through social media platforms such as Facebook, Twitter, Instagram, and many other social networks as these online platforms are growing stronger as the technology advances. Besides, they also can set up their own web store as most of the farmers are at young age and able to sell online via food delivery or domestic courier services such as Poslaju and J&T Express direct to the customers without having to pay the middleman for their services. Thus, the introduction of online platforms for agricultural products is very helpful from the point of view of farmers and governments. It is essential to provide online marketing education to farmers so that it creates a marketing opportunity for selling their products that can also contribute to the overall Malaysia's economic growth.

Conflicts of Interest: The authors declare no conflict of interest.

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Original Research Article

Factors that Influence Acceptance of GM Labels on Halal Food among Muslim Consumers

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Abstract: Genetically modified (GM) foods are produced from the development of modern biotechnology and gene combinations of the same or different species. GM foods have become an important issue among Muslim consumers in consuming *halalan toyyiban* GM foods. This in line with the decision of Muslim consumers in the selection of *halal* food that is closely related to faith, religion and culture in the Islamic society. Labelling on food packaging is an important indicator of every food product in the market by Muslim consumers to determine the halalness of food products. Therefore, this study aimed to determine factors that influence acceptance of GM labels on *halal* food among Muslim consumers. By using purposive sampling, 320 Muslim consumers were selected from the Klang Valley region in Malaysia. An interviewer-administered questionnaire was distributed to the targeted consumers to obtain consumers' responses. Several analyses were employed to analyse the data namely descriptive analysis, Chi-square analysis, Pearson correlation analysis, and factor analysis. This study revealed that the majority of Muslim consumers were not aware of GM labels on *halal* food. The association between Muslim consumers' awareness and their socio-demographic profiles such as age, education level, occupation, and household income were significant. There were also significant associations between Muslim consumers' acceptance of GM labels on *halal* food and socio-demographic factors such as age, education level, and household income. The relationship between awareness and acceptance showed a weak positive relationship. This study also revealed that labelling characteristics, religious belief, and health concern are the three factors that influenced Muslim consumers' acceptance of GM labelling on *halal* food. This study emphasizes that a continuous encouragement to food manufacturers in providing and displaying proper labelling on the food products would assist Muslim consumers to enhance their awareness and acceptance of GM labels and foods.

Keyword: genetically modified food; Muslim; consumers; acceptance; *halal*

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1. Introduction

In today's modern era, various technologies have been created to meet the increasing demands of the world's population. Therefore, genetically modified (GM) foods are introduced as a measure to meet the growing demands of the world's population and to increase the quantity and quality of food. The adoption of GM technology is influenced by global food demand, food security, and ethical beliefs. Nowadays, many foods have been produced using biotechnology methods as GM foods to improve their quantity and quality. Biotechnology cultivation areas have shown an increase of 3%, which is from 444 million acres in 2015 to 457 million acres in 2016 by 28 countries, among others are the United States, Brazil, Canada, China, Argentina, and India (Arujanan & Teng, 2018; James, 2015). Among the main crops involved are corn, soybean, cotton, and canola, which are often imported by Malaysia. According to Wahab (2017), 25% of imported soybeans from Canada are used for tempe production (soy through fermentation process) and soy beverages.

Genetically modified (GM) foods labelled as *halal* means that these foods have been certified *halal* by the Department of Islamic Development Malaysia (JAKIM) and displayed a label or logo of the 'genetically modified food' on the packaging of the food products. However, the issues that are mostly faced by Muslim consumers about GM foods are the use of enzymes, additives, emulsification, and hormones in vegetables or animals in the food products (Khattak *et al.*, 2011). Genetically modified (GM) food products made from or contained substances such as liquor, pork and dead animal blood, are prohibited for Muslim consumers' consumption (Isa & Man, 2014; Mukhtar & Butt, 2012). However, almost all the products produced through biotechnology are said to be safe for consumption and good for health. How far this proclaim is true, lays a question to all of us, especially for those who hold fast to religion. The labelling information displayed on the food packaging serves as a reference to Muslim consumers (Mohayidin & Kamarulzaman, 2014). Most of the food sold in the Malaysian market requires a proper label on the packaging to provide product information to consumers. Malaysia indeed had shown a high commitment to GM foods by issuing policies regarding GM foods labelling. Other countries like Japan, Korea, the European Union and Australia are very obliged to GM labelling, however, countries like the United States and Canada are voluntary labelling countries.

The Ministry of Health Malaysia (MOH) has established the guidelines on the labelling of foods and food ingredients obtained through modern biotechnology (Regulations 11(3A), 11(6) and 11(7), Food Regulations 1985) in 2014. This guidance is to consumers, food manufacturers, and authorized officers under the Food Act 1983. In Malaysia, labelling regulations are applicable to the food which contains, consists of, or is produced from GMO in a proportion of more than the 3% threshold level of the food ingredients. Also, it applies to some products, which contain Genetically Modified Organism (GMO) if the gene is derived from an animal or substance that may cause hypersensitivity. The examples of the ingredient that can cause hypersensitivity are nut products, fish products, milk products, and

egg products. However, no exemption of labelling for some foods such as highly refined foods (corn syrup), food additives (dextrin), acidic food (vinegar), salty foods (soy sauce) and food produced with GM enzyme (cheese). Yet, it is difficult to determine whether the food is produced by genetic modification or conventionally produced. This is because some constituents such as those found in plants will go through purification processes such as sucrose and vegetable oils. The Malaysian Agricultural Research and Development Institute (MARDI) also experimented with producing GM crops such as papayas, bananas, pineapples and rice to extend life expectancy, virus infection and delay maturation (Ismail *et al*., 2012).

The GM foods issues have been widely discussed by the Islamic countries because it is closely related to the status of food based on the guidelines in the al-Quran. Some Islamic researchers debated that GM foods containing pigs or animals that are not slaughtered are prohibited for Muslim consumers. Before selecting food, Islam has outlined the Muslims to choose foods that have *halal* and *halalan toyyiban* criteria. The word *toyyiban* means good, which includes the meaning that the food must be wholesome and pure from its sources. Islam is very concerned about cleanliness and purity because it will affect the health and growth of human beings. The need for GM labels on *halal* foods is important as *halal* label requirements, especially for Muslim consumers to guarantee the foods are originated from *halal* sources. In light of the above issues, this study was conducted to determine the factors that influence acceptance of GM labels on *halal* food among Muslim consumers.

2. Literature Review

Labelling on food products is a primary measure for consumers, especially Muslim consumers to make *halal*, clean, and quality food choices. Baltas (2001) stated that food labelling should display relevant information to prevent chronic diseases and unlawful substances. Moreover, the main goal of food labelling is to protect the welfare of consumers by displaying information about the food in a complete and easy-to-understand way, especially if it affects the health of consumers and to prevent fraud cases (Balasubramanian & Cole, 2002; Cheftel, 2005). Labelling a food item is providing information for consumers to make the right choice and is one of the ways to educate consumers so they can make informed decisions (Wagner & Walchli, 2002). Food product labelling is one of the sources of knowledge to consumers about the use of ingredients, benefits, and effects of food on consumers. Labels also play a role in helping consumers to make nutrient comparisons over the same type of food products according to consumers' requirements and help consumers choose healthier foods (Darkwa *et al*., 2014). Intentions of purchase, product perception, and risk are influenced by the way the label is written (Hellier *et al.*, 2012). Labelling as a direct communication channel to consumers has created awareness and enhancement of information from producers, regulators, public health bodies and third-party certifiers. Also, there is an increase in labelling types related to ethics and morals such as organic, eco-label, and carbon footprint labels (Sirieix *et al.*, 2013; Tonkin *et al.*, 2015).

Understanding about GM foods has not been widely spread among Muslim consumers. Among the problems affecting the knowledge and awareness of GM foods, especially to the public is the information about GM foods, which are difficult to access and obtain (Stenholm & Waggoner, 1992). Besides, Amin *et al.* (2007) identified that the issue of biotechnology is complicated as the public has limited knowledge of GM food products. There are many GM foods in the market, but consumers fail to track their presence due to the absence of labels on the packaging. Moreover, the better knowledge and understanding of the public towards GM foods will facilitate consumers to make selection or rejection of food produced using biotechnology methods (Frewer *et al.*, 2015). The resistance of the Asian countries towards GM foods is lower because the majority of consumers are still unaware of the food using biotechnology advancement (Bongoni, 2016).

The acceptance of GM foods is different across countries. Studies on global GM foods intake revealed that consumers in Western Europe are easily opposed to GM foods intake as compared to consumers in developing countries (Goyal & Gurtoo, 2011; van den Heuvel *et al*., 2011). The availability of GM foods' information is closely related to awareness and consumers' acceptance of the foods (Tanius & Seng, 2015). Consumers' acceptance of GM foods is also influenced by the benefits derived from food technology (Frewer *et al*., 2015). GM foods technology acceptance is strongly influenced by the overall climate change, security and ethical beliefs of the community (Vecchione *et al*., 2015). Hence, awareness of GM foods is different in various aspects, including the country and the nature of the community itself.

3. Methodology

Figure 1 shows the established conceptual framework of this study, which was adapted from the Attitude Model by Bredahl (2001). The Attitude Model is commonly adapted by studies related to attitude and acceptability towards GM foods (Amin *et al*., 2006; Amin *et al*., 2011; Chen, 2008; Christoph *et al*., 2008). Some of the key variables measured by these studies were related to the public attitude, including the impact of technology, knowledge, the effect of labelling, attachment to the religion, moral concern and socio-demographic factors. As further described by the Attitude Model that consumer attitudes are influenced by the perception of benefit and risk as well as awareness and general attitude towards GM foods (Badrie *et al*., 2006).

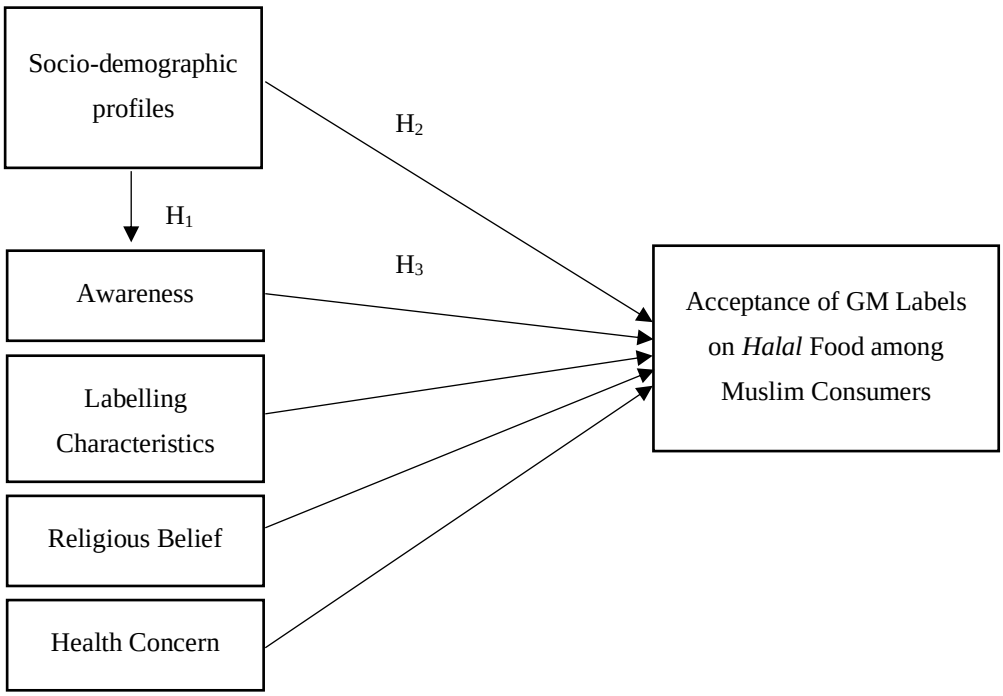

Figure 1. Conceptual framework of acceptance of GM labels on *halal* food among Muslim consumers.
Source: Adapted from Bredahl (2001); Christoph *et al*. (2008); Amin *et al*. (2011); Badrie *et al*. (2006); Chen (2008).

The conceptual framework in Figure 1 shows the independent variables were awareness, labelling characteristics, religious belief, health concern, and socio-demographic profiles, while the dependent variable was acceptance of GM labels on *halal* food among Muslim consumers. The awareness variable was used to measure the relationship with acceptance of GM labelling. The other independent variables such as labelling characteristics, religious belief, and health concern were used as the factors that influence the acceptance of GM labels on *halal* food among Muslim consumers. Besides, socio-demographic profiles such as age, gender, education level, household numbers, and household income were included in the conceptual framework to measure their associations with acceptance of Muslim consumers towards GM labels on *halal* food.

A quantitative survey was used to collect data from target respondents who were selected based on purposive sampling. A total of 320 Muslim consumers who live in Klang Valley, Malaysia were involved in the survey and their awareness and acceptance of GM labels on *halal* foods were measured. Klang Valley area was chosen as the targeted population because it is the center of economic and social development of Malaysia related to biotechnology (Amin *et al.*, 2011). The data for this study was collected via an interviewer-administered questionnaire to obtain responses from the target respondents. The

questionnaire consisted of questions and statements related to consumers' awareness and acceptance towards GM labelling and *halal* food and these questions were established using a 5-point Likert scale (ranging from 1 = strongly disagree to 5 = strongly agree). Data were analyzed using several analyses such as descriptive analysis, Chi-square analysis, and factor analysis. The descriptive analysis was carried out to summarize the socio-economic profiles of the respondents such as gender, age, marital status, household number, education level, occupation, and household income as well as awareness level towards GM foods labelling. Chi-square analysis was conducted to determine the association between socio-demographic profiles and awareness as well as acceptance towards genetically modified (GM) labels on *halal* food. Pearson correlation analysis was carried out to determine the relationship between two variables namely awareness and acceptance of Muslim consumers of GM labels on *halal* food. Factor analysis was conducted to extract factors that influence Muslim consumers' acceptance of GM labelling on *halal* food. The hypotheses established for this study were: -

H_1: There is an association between socio-demographic profiles and awareness of genetically modified (GM) labels on *halal* food among Muslim consumers.

H_2: There is an association between socio-demographic profiles and acceptance of genetically modified (GM) labels on *hala*l food among Muslim consumers.

H_3: There is a relationship between awareness and acceptance of genetically modified (GM) labels on *halal* food among Muslim consumers.

4. Results and Discussions

4.1 Socio-Demographic Profiles of Respondents

From the total of 320 respondents, the results in Table 1 showed that 62.5% of the respondents were female, while 37.5% were male. The respondents' age was around 18-27 years old accounted for 34.4%, followed by 28-37 years old accounted for 47.2% and 38-47 years old accounted for 18.4%, respectively. The marital status of the respondents involved in this study revealed that 54.7% of the respondents were single, 44.4% of them were married and 0.9% were divorced. Mostly, the Muslim respondents' household number consisted of 4-6 persons in every house accounted for 54.4%. The results indicated that on average respondents were well educated since more than half of the respondents have graduated from the university. In terms of occupation, most of the respondents were working in the private sector accounted for 34.9%, followed by students accounted for 30.0%, working in the government sector accounted for 28.8% and the self-employed accounted for 6.3%, respectively. The household income of the respondents indicated that 35.6% of the respondents have income less than RM 2,000 followed by 15.3% who have income RM 2,001 to RM 4,000 per month and 21.3% of the respondents indicated that they earned between RM 4,001 to RM 6,000 per month.

Table 1. Socio-demographic profiles of respondents.

Profiles	Frequency (*n*)	Percentage (%)
Gender		
Male	120	37.5
Female	200	62.5
Total	**320**	**100**
Age (years old)		
18–27	110	34.4
28–37	151	47.2
38–47	59	18.4
Total	**320**	**100**
Marital Status		
Single	175	54.7
Married	142	44.4
Divorced	3	0.9
Total	**320**	**100**
Household Number (people)	96	30.0
1–3	174	54.4
4–6	42	13.1
7–9	6	1.9
10–13	2	0.6
Total	**320**	**100**
Education Level		
SPM	58	18.1
Diploma	88	27.5
Degree	134	41.9
Master	40	12.5
Total	**320**	**100**
Occupation		
Government Sector	92	28.8
Private Sector	112	34.9
Self-employed	20	6.3
Student	96	30.0
Total	**320**	**100**
Household Income		
≤ RM 2,000	114	35.6
RM 2,001–RM 4,000	49	15.3
RM 4,001–RM 6,000	68	21.3

Profiles	Frequency (*n*)	Percentage (%)
RM 6,001–RM 8,000	35	10.9
RM 8,001–RM 10,000	21	6.6
RM 10,001–RM 12,000	18	5.6
RM 12,001–RM 14,000	15	4.7
Total	**320**	**100**

4.2 Awareness of Genetically Modified Labelling Regulation on Halal Food

Based on the results in Table 2, only 83 of the respondents (25.9%) were aware of GM labelling regulation, whereas the remaining 237 respondents (74.1%) were not aware of GM labelling regulation. This finding was similar to the findings of Tanius and Seng (2015) that the majority of consumers were unaware of GM food labelling.

Table 2. Awareness of GM labelling regulation on *halal* food.

Awareness	Frequency (n)	Percentage (%)
Yes	83	25.9
No	237	74.1
Total	**320**	**100**

4.3 Opinion of GM Labels on Halal Food

Based on the results in Table 3, 80.9% (259 respondents) of Muslim consumers responded that GM labels should be labelled on *halal* food packaging, while the remaining 19.1% (61 respondents) indicated that GM labels should not be labelled on *halal* food. As indicated by Tanius and Seng (2015), providing the labels on the products will increase Muslim consumers' awareness of GM foods. The labelling characteristic has two different ways which indicate the absence of GM (negative labelling) for example, 'GM Free', 'Non-GM', or 'All non-GM ingredients'. Meanwhile, labels that indicate the presence of GM (positive labelling), for example, 'Genetically Modified' or 'Genetically Modified: Gene derived from Cow' (Albert, 2009). In this study, Muslim consumers were more preferred positive labelling which showed the presence of GM in the foods. However, according to Runge and Jackson (2000), negative labelling is best suited to inform consumers about GM contents in food.

Table 4. Respondents' opinion of GM labels on *halal* food.

	Frequency (*n*)	Percentage (%)
1. GM *should be* labelled on *halal* food packaging. (positive labelling)	259	80.9
2. GM *should not be* labelled on *halal* food packaging. (negative labelling)	61	19.1
Total	**320**	**100**

4.4 Associations between Respondents' Socio-Demographic Profiles and Awareness of GM Labels on Halal Food

Chi-square analysis was used to determine the association between socio-demographic profiles and respondents' awareness of GM labels on *halal* food. Based on the results of Chi-square analysis in Table 3, four socio-demographic variables namely age (χ^2 = 9.580, p = 0.008), education level (χ^2 = 11.784, p = 0.067), occupation (χ^2 = 16.470, p = 0.011), and household income (χ^2 = 26.144, p = 0.004) were found to have significant associations with respondents' awareness. These variables were significant at 1% and 10% levels of significance, respectively. These findings were similar to the findings of Vecchione *et al.* (2015), who measured the relationship between demographic factors and consumers' knowledge and attitude on GM food products. Further, Tanius and Seng (2015) indicated in their study that consumers' awareness of GM foods was associated with their socio-demographic factors. Meanwhile, other variables such as gender, marital status, and household number were found not significant.

Table 3. Associations between socio-demographic profiles and respondents' awareness of GM labels on *halal* food.

Variable	χ^2	*df*	Significant	Decision
Gender	2.604	1	0.107	Fail to reject H_o
Age	9.580	2	0.008**	Reject H_o
Marital Status	8.783	2	0.132	Fail to reject H_o
Household Number	3.239	3	0.519	Fail to reject H_o
Education Level	11.784	4	0.067*	Reject H_o
Occupation	16.470	3	0.011*	Reject H_o
Household Income	26.144	6	0.000**	Reject H_o

Note: **, * Significant at 1% and 5% levels of significance

4.5 Associations between Socio-Demographic Profiles and Respondents' Acceptance of GM Labels on Halal Food

Chi-square analysis was used to determine the association between socio-demographic profiles and respondents' acceptance of GM labels on *halal* food. The results of Chi-square analysis in Table 4 revealed that out of seven socio-demographic profiles measured, three variables showed significant associations with respondents' acceptance of GM labels on halal food. The three variables were age (χ^2 = 1.592, p = 0.002), education level (χ^2 = 23.719, p = 0.012), and household income (χ^2 = 22.501, p = 0.014). These variables were significant at 5% and 10% levels of significance, respectively. These findings are in line with Font (2009) who revealed socio-economic and demographic profiles such as age, ethnicity, income level, and residence are closely related to GM's perception and acceptance of GM food worldwide. It is further supported by Smigic (2016) that education influenced the attitude towards labelling information on food packaging, while Ali and Kapoor (2009) described that income level makes a difference when consumers looking at information on

labels where low-income consumers are more concerned with product price information and high-income consumers give more emphasis to other information. Meanwhile, other variables such as gender, marital status, household number, and occupation were found not significant.

Table 4. Associations between socio-demographic profiles and respondents' acceptance of GM labels on *halal* food.

Variable	χ^2	df	Significant	Decision
Gender	1.592	1	0.451	Fail to reject H_o
Age	8.480	2	0.076*	Reject H_o
Marital Status	4.740	2	0.578	Fail to reject H_o
Household Number	6.797	3	0.559	Fail to reject H_o
Education Level	23.719	4	0.022**	Reject H_o
Occupation	12.239	3	0.427	Fail to reject H_o
Household Income	22.501	6	0.069*	Reject H_o

Note: **, * Significant at 5% and 10% levels of significance

4.5 Relationship between Respondents' Awareness and Acceptance of GM Labels on Halal Food

Table 5 shows the value of the Pearson coefficient, r = 0.252, indicating a weak positive relationship between awareness and acceptance, but statistically significant (p<0.01) at 1% level of significance. Based on the result, it showed that the relationship between the two variables that exist between the awareness and acceptance of GM labels on *halal* food among Muslim consumers was relatively weak. This finding was in line with a similar study by Hamdan *et al.* (2013) that a weak positive relationship between awareness and acceptance among consumers could be because of the level of education that the consumers possessed.

Table 5. Relationship between respondents' awareness and acceptance of GM labels on *halal* food.

	Correlation	
	Awareness	**Acceptance**
Awareness	1	0.252
Sig. (2-tailed)		0.000***
N	320	320

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

4.6 Factors that Influence Muslim Consumers' Acceptance of GM Labels on Halal Food

Factor analysis was used to measure the factors that influence Muslim consumers' acceptance of GM labels on *halal* food. The result of Kaiser-Meyer-Olkin (KMO) obtained was 0.782, which above 0.6 and the Barlett's Test showed the significant level was significant at 0.000. The three factors that influenced Muslim consumers' acceptance of GM labelling on *halal* food were extracted namely labelling characteristics, religious belief, and health concern (Table 6). The cumulative percentage (%) of the variance for the three factors explained by 60.553%, while Cronbach's alpha coefficients were ranged from 0.716 to 0.787 to indicate the internal reliability of the factors.

Table 6. Factors that influence Muslim consumers' acceptance of GM labels on *halal* food.

Items		**Factor Loading**		
		F1	F2	F3
Labelling Characteristics				
i.	I will buy *halal* GM foods if the label is easily understood in terms of the font type and size.	0.788		
ii.	I will buy *halal* GM foods if the label is easily seen and read.	0.824		
iii.	The label serves as an identification card for *halal* GM foods.	0.807		
iv.	The label 'Genetically Modified' is important for me to distinguish between foods based on biotechnology and natural food.	0.675		
Religious Belief				
i.	I am sure that the GM foods that have JAKIM *halal* logo are *halal* to eat even if it has the label 'Genetically Modified'.		0.781	
ii.	I believe food products that have the label 'Genetically Modified' is allowed in Islam.		0.859	
iii.	As a Muslim consumer, I believe that GM foods are *halal* to eat.		0.751	
iv.	The selection of food products that are lawful and good is important for Muslim consumers as outlined by Islam.		0.734	
Health Concern				
i.	I would buy *halal* GM foods if it is good for the health of my family.			0.750
ii.	I need a label 'Genetically Modified' to prevent allergies (allergic to nuts, seafood, milk, eggs).			0.723
iii.	The label 'Genetically Modified' is important for me to ensure it is from a source that is clean, healthy, and holy.			0.704
Eigenvalue		2.877	2.362	1.421
% of variance		26.155	21.477	12.921
Cumulative % of variance		26.155	47.632	60.553
Cronbach's alpha		0.787	0.752	0.716

The first factor extracted was labelling characteristics, which explained about 26.155% of the total variance. This factor consisted of four sub-variables namely "*I will buy halal GM foods if the label is easily understood in terms of the font type and size*" (0.788), "*I*

will buy halal GM foods if the label is easily seen and read" (0.824), "*The label serves as an identification card for halal GM foods*" (0.807), and "*The label 'Genetically Modified' is important for me to distinguish between foods based on biotechnology and natural food*" (0.675). The Cronbach's alpha for the factor was 0.787.

The second factor extracted was religious belief which explained 21.477% of the total variance. The four sub-variables under this factor were "*I am sure that the GM foods that have JAKIM halal logo are halal to eat even if it has the label 'Genetically Modified'"* (0.781), "*I believe food products that have the label 'Genetically Modified' is allowed in Islam*" (0.859), "*As a Muslim consumer, I believe that GM foods are halal to eat*" (0.751), and "*The selection of food products which are lawful and good is important for Muslim consumers as outlined by Islam*" (0.734). The Cronbach's alpha for the factor was 0.752.

The third factor extracted was health concern, which explained 12.921% of the total variance and consisted of three sub-variables. The sub-variables were "*I would buy halal GM foods if it is good for the health of my family*" (0.750), "*I need a label 'Genetically Modified' to prevent allergies (allergic to nuts, seafood, milk, eggs)*" (0.723), and "*The label 'Genetically Modified' is important for me to ensure it is from a source that is clean, healthy and holy*" (0.704). The Cronbach's alpha for the factor was 0.716.

5. Conclusion

Genetically modified (GM) foods have been developed extensively to accommodate world population growth and food supplies including Islamic countries. This has caused Muslim consumers to become more alert and aggressively obtaining information from each food product they consume. This study aimed to determine factors that influence Muslim consumers' awareness and acceptance of GM labels on *halal* food. The findings of this study showed that the majority of Muslim consumers are not aware of the existence of GM labels on *halal* food. The associations between socio-demographic profiles (age, education level, occupation, and household income) and awareness of GM labels on *halal* food showed significant associations. Furthermore, the results of the associations between socio-demographic profiles and acceptance of GM labels on *halal* food indicated that age, education level and household income indicated significant associations. There was a weak positive relationship, but statistically significant between awareness and acceptance of GM labels on *halal* food among Muslim consumers. This study also revealed labelling characteristics, religious belief and health concern are the three factors that influenced Muslim consumers' acceptance of GM labels on *halal* food. These factors are very crucial and could become early indicators for relevant authorities particularly the Ministry of Health Malaysia (MOH) to take necessary actions towards improving Muslim consumers' knowledge on GM labelling. This study emphasizes that a continuous encouragement to food manufacturers in providing and displaying proper labels on food products would assist Muslim consumers to enhance their awareness and thus, accept the GM labels. Furthermore, the information on GM labelling should be channeled through various platforms such as the

internet, television, or radio advertising. By disseminating the right information, it will create high awareness among Muslim consumers before making their purchasing decision on *halal* GM foods that are available in the market. The results of this study are described based on Muslim consumers in Klang Valley only, thus it is suggested that the target respondents should be extended not only among Muslim consumers, but also it could be carried out among non-Muslim consumers in all states in Malaysia.

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Original Research Article

Factors Influencing Consumers' Behaviour Towards Fraudulent Dietary Supplements

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Abstract: Dietary supplement fraud cases have become a major concern among consumers due to proven damage and effects on the health and lives of consumers. An increase in the risk of food safety might result from the high consumption of fraudulent dietary supplements. However, fraudulent activities are difficult to verify due to the lack of awareness of consumers on the safety and authenticity of active ingredients used in the dietary supplements' production. Thus, this study was carried out to achieve the following objectives: i) to determine consumers' behaviour towards fraudulent dietary supplements; ii) to determine factors that influence consumers' behaviour towards fraudulent dietary supplements. A purposive sampling method was used to select 400 respondents and a structured questionnaire was established to collect the data. Descriptive, Pearson correlation, Chi-square, factors and multiple regression analyses were employed to analyse the data. The results revealed that most of the respondents were aware of fraudulent dietary supplements. Socio-demographic profiles such as age, race, religion and education level had significant associations with consumers' behaviour towards fraudulent dietary supplements. There was a moderate positive relationship between knowledge and attitude of consumers towards fraudulent dietary supplements. Subjective norms, awareness, attitude and perceived behavioural control were the factors that influenced consumers' behaviour towards fraudulent dietary supplements. The study recommended that government and relevant agencies should continuously organize awareness campaigns and activities on the crime, existence and danger of food fraud especially for dietary supplements in Malaysia.

Keywords: dietary supplement; behavior; consumers; fraudulent; food fraud

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1. Introduction

Dietary supplements are proven to be able to meet the daily nutritional needs of consumers to stay fit, healthy and improve their quality of life (Chincholkar, 2016; Ghazali *et al*., 2006). Based on the National Institute of Health (1994), a dietary supplement is referred to as a product (other than tobacco) intended to supplement a diet that bears or contains one or more of the following dietary ingredients: (i) a vitamin; (ii) a mineral; (iii) an herbal or other botanical ingredient; (iv) an amino acid; (v) a dietary supplement used by individuals to supplement the diet by increasing total dietary intake; (vi) a concentrate, metabolite, constituent, extract or combination of any of the ingredients referred in to (i–vi). A dietary supplement is an item that is classified as a dietary supplement and is not intended for use as a conventional food or as a single meal or diet. A dietary supplement must be ingested orally by pill, capsule, tablet, and liquid form. The dietary supplement can be found in capsule, powder, gel cap, liquid and tablet. Examples of the dietary supplement brand available in the Malaysian market are Nutrilite, Elken, Cosway, Blackmores, and Herbalife (Bee & Wan, 2016).

Nowadays, consumers are becoming more concerned about their health and regularly consume dietary supplements to maintain their health. Various types of dietary supplements have been produced due to the growing interest in maintaining health and preventing disease among consumers (Bailey *et al*., 2013). In 2017, as reported by the Institute for Public Health, approximately 44.7% and 30.6% of Malaysian adolescents consumed vitamins, minerals, and food supplements, respectively (Institute for Public Health, 2017). These supplements are one of the ways used for disease prevention, correction of poor lifestyle behaviours and enhancement of physical performance (del Balzo *et al*., 2014). In Malaysia, the consumption of dietary supplements is growing among consumers because it was believed to increase the level of body's immunity (Sharma *et al*., 2014; Yusoff *et al*., 2016). Zheng and Navarro (2015) revealed that weight loss is the most important reason for taking these dietary supplements. Besides, aggressive advertisements in the mass media on dietary supplements have further gained interest in the use of dietary supplements among consumers (Goston & Correia, 2010). Due to the wide variety of supplements and the presence of established international brands such as Nutrilite, Live-well, Blackmores, and VitaHealth in the local market, Malaysian consumers are offered various choices of health dietary supplements. Besides, highly convincing marketing strategies of dietary supplements on social media platforms have triggered consumers to have regular purchasing and consumption of dietary supplements. According to Ahmad (2002), Malaysian consumers were reported to have spent an average of RM70 a month on health supplements such as traditional medicines and other health foods, such as herbs, foods and supplemented beverages. Further, the author indicated that consumers spending on these supplements are expected to increase for many years to come.

Health or dietary supplements are referred to as a diverse group of products commonly used to supplement the diet and improve health (Zahirudin & Zolkefli, 2019).

However, the Ministry of Health, Malaysia (MoH) considered food supplements to be a part of health supplement products described as "products intended to complement the diet taken by mouth in forms such as pills, capsules, tablets, liquids or powders. Not represented as a conventional food/single food item or a diet" (para 9.1 Guidance Notes for Health Supplement Products, Drug Registration Guidance Document, August 2010, issued by the National Pharmaceutical Control Bureau, Ministry of Health, Malaysia). In Malaysia, the dietary supplements are regulated according to the Control of Drugs and Cosmetics Regulations 1984 (CDCR), supported by the Sale of Drugs Act 1952, Medicines (Advertisement & Sale) Act 1956, and Drug Registration Guidance Document (DRGD). The DRGD is regulated by the Drug Control Authority (DCA) of National Pharmaceutical Control Bureau (NPCB). The DRGD acts as a reference guide for product classification, product registration, application process, quality control, Good Manufacturing Practice (GMP) licensing, labeling criteria, post-market surveillance, and pharmacovigilance activities (National Pharmaceutical Regulatory Agency, 2020).

With increasing consumption of dietary supplements, there are also increasing food safety related incidents due to the high availability of fraudulent dietary supplements in the market by producers whose purpose is to gain extra profit but neglecting the consumers' safety issue. According to Wheatley and Spink (2013), dietary supplement fraud is a form of product fraud or food fraud and is known as economically motivated adulteration (EMA). Dietary supplement fraud has the potential to be harmful to consumers. A very risky type of fraud for health supplements and weight loss products, in general, is the introduction of undeclared or unregulated prescription active substances (drugs that are not meant to be present) for efficacy-enhancing purposes. Dietary supplements are at a very high fraud risk as consumers nowadays are too obsessed to consume supplements that are claimed to have a quick effect or result. As indicated by Medsafe (2019), the dietary supplements are not subject to any specific regulatory pre-approval criteria or pre-market health tests. Thus, this has encouraged dishonest manufacturers and distributors to intentionally adulterate dietary supplements by adding pharmaceutical drugs or substance analogy to increase product effectiveness within a short time. Besides, the availability and accessibility to social network have greatly opened the path for dietary supplement advertising, which could attract a consumer to buy the products without getting relevant health consultation from a doctor or pharmacist on possible adverse effects or medication reactions. Hence, the consumer is unable to recognize the truth from fraud (Wheatley & Spink, 2013).

Food fraud is a criminal activity involving deception and misrepresentation, leading to negative effects on consumers' health (Molins, 2017). Through the years, many fraudulent dietary supplement cases in Malaysia have been reported and the cases are listed in Table 1.

Table 1. Fraudulent dietary supplement cases in Malaysia.

Year	Issue	Source
2019	The Penang Health Department has seized 16 tons of unregistered traditional Chinese medicines, unlabelled pills, and capsule products containing a scheduled poison that worth RM2.6 million. The case is being investigated under the Sale of Drugs Act 1952.	Othman (2019)
2019	The Ministry of Health Malaysia (MoH) confiscated eight (8) unregistered health products worth RM1.7 million containing hazardous substances such as Tadafil, Ibuprofen, Tetracycline HCL, Chloramphenicol, Dexamethasone, Cholorphenirame, Clarithromycin, and Lovastin. All the products are seized under the Poisons Act 1952 and the Sale of Drugs Act 1952.	Kannan (2019)
2019	The Kelantan Health Department has confiscated 1,353 bottles of unregistered products that worth RM67,650.	Zaimatuljuwita (2019)
2018	A beauty supplement company has been fined RM4,000 for having found guilty of selling five (5) unauthorized products.	Geraldine (2018)
2017	The Melaka Health Department has confiscated 562 unregistered health supplements, cosmetics, and traditional preparations worth approximately RM1.44 million.	Murali (2017)
2017	The Ministry of Health Malaysia (MoH) confirmed the withdrawal of two traditional Chinese products, Wan Ling Ren Sem Chin Kuo Pill and Chong Cao Dan, as they were found to contain Dexamethasone.	Noor (2017)
2017	The Kelantan Health Department seized 6,864 bottles of health products that are allegedly able to cure a diabetic disease.	Subaryati (2017)

Meanwhile, according to Jauze (2017), many cases of adulterated dietary supplements fraud have been reported and recorded in Malaysia. The descriptions of the cases are listed in Table 2.

Table 2. Adulterated dietary supplements fraud in Malaysia.

Product	Type of Supplement	Reason
Creative Herbs	Traditional supplements for health and strengthening body.	Not registered and contains undeclared dexamethasone and chlorpheniramine.
ABC Acai Berry Dietary Supplement	Weight loss supplement.	Undeclared sildenafil.
Bio Belut Putih	Traditional supplement for asthma, gout, and knee pain.	Undeclared dexamethasone.
D`Herbs Premium Diet	Weight loss supplement.	Undeclared caffeine.
Jamu Ajaib	Traditional supplement for nerve pain, waist pain, and knee pain.	Undeclared dexamethasone.

Source: Jauze (2017)

In 2019, the Ministry of Health, Malaysia (MoH) through the Pharmaceutical Enforcement Division has carried out 4,169 operations over the past three years on the registered pharmacy premises, private clinics, and other premises that have breached the laws and regulations regarding the dietary supplement fraud that worth RM 142 million. With strict enforcement actions by the MoH, 3,737 sanctions have been imposed on the websites and social media for undue health claims that advertise and sell prohibited health products online. Furthermore, many key factors contributed to the growth of dietary supplements in the market such as the increasing aging of the population, increasing lifestyle and increasing health care costs. These factors have provided a chance for irresponsible producers to gain more profit in a short time by involving in fraudulent dietary supplement activities. The MoH also discovered many products in the market that contain a wide variety of undeclared active pharmaceutical ingredients, most of which are labelled as a dietary supplement (Zulkifli, 2013). Since unscrupulous manufacturers and distributors intentionally leave active ingredients out of the labels to avoid regulatory complications, consumers remain unaware of what the products contain (Wheatley & Spink, 2013).

Consumers also lack knowledge regarding dietary supplements issues. This has led to high consumption of unsuitable dietary supplements, which provide many risks to their health. Consumers have a high tendency to consume dietary supplements without further consultation with their healthcare experts. This will indeed lead the consumers to get the wrong nutrients for their health. Dietary supplement fraud has been proven to have deteriorating effects on the health and lives of consumers. Thus, this study was carried out to achieve the following objectives: i) to determine consumers' behaviour towards fraudulent dietary supplements; and ii) to determine factors that influence consumers' behaviour towards fraudulent dietary supplements. Through this study, the government and other agencies will be able to utilise the data to know the level of awareness of consumers and their behaviour towards fraudulent dietary supplements. It is further increased the frequency and the medium to reach the consumers to spread more awareness on the past and recent cases and products proven to be fraudulent and how to identify fraudulent dietary supplements sold in the market.

2. Literature Review

In the study of human behaviour, the Theory of Planned Behaviour (TPB) is one of the most popular and influential ideas that have been developed, often commonly used for a variety of topics (Ajzen, 2002). The main factor in the Theory of Planned Behaviour (TPB) is the individual's intention to perform a given behaviour, which measures the motivational factor that influences behaviour as the intention characteristics (Ajzen, 1991). The author indicated how hard people are willing to try, of how much effort they planning to exert, just to perform a behaviour. The TPB measures how human action is guided and predicted the occurrence of behaviour, if behaviour is intentional. Human behaviour is influenced by three variables such as belief in the effects of behaviour (behavioural beliefs), belief in normative

expectations of other people (normative beliefs) and belief in the existence of factors that impede behavioural success (control beliefs). In the context of TPB, attitude towards behaviour is an antecedent of behavioural beliefs, which is measured and categorised based on favourable or unfavourable parameters (Ajzen, 1991). Normative beliefs create perceived social pressure, also called subjective norms. Control beliefs, in other words, are known as perceived behavioural control that can be referred to as ease or difficulty in performing the behaviour. Attitude towards behaviour was the first variable in TPB and it is referred to as the degree of favourable or unfavourable evaluation of the behaviour. Pelsmacker *et al*. (2006) described that people with a positive attitude towards a product tend to buy the product. The second variable, subjective norms is referred to as a perceived social pressure either to perform or not perform a behaviour. The third variable is perceived behavioural control (PCB), which is referred to as the ease or difficulty in performing behaviour reflects past experiences (Ajzen, 2002).

According to Conner (2001), attitude is the final behavioural assessment that is positive or negative for a person. Attitude is based on a belief in the likely outcome of behaviour (behavioural beliefs). Fishbein and Ajzen (1975) claimed that concepts such as desire, interest, feeling, valance, and utility all tend to indicate bipolar assessment and may, therefore, be subsumed under the attitude group. Conner (2001) further revealed that intentions are mostly predicted by attitude and consumers tend to show a high positive attitude towards consumption. Based on the TPB, the more resources and opportunities individuals believe they have, and the fewer barriers they anticipate, the greater their perceived control over behaviour should be (Ajzen, 1991). Perceived behavioural control (PBC) also has a direct influence on behaviour when perceptions of control precisely match the actual control (Armitage & Conner, 2001). However, PBC was not a major indicator of the use of products (Conner, 2001) but it is an indicator of a range of health behaviour (Godin & Kok, 1996).

Chireh (2011) explained that knowledge is the key to prevent human error, while education is the key to develop and gain knowledge. Consumers must have good knowledge of dietary and herbal supplements so that they can use it safely and effectively. Individuals of higher education and a high level of dietary supplement knowledge are expected to be more cautious in their use of dietary or herbal supplements than the general population (Axon *et al*., 2017). Zhu and Xie (2015) explained that knowledge significantly contributes to attitude formation towards products. Furthermore, Kemper (2003) described that health care professionals had insufficient knowledge of the adverse effects of dietary and herbal supplements and did not regularly consult with patients about dietary and herbal supplements. Kobayashi (2017) stated that knowledge on the dietary supplements is inadequate particularly on their effectiveness, product quality, and adverse effects. However, the author claimed that knowledge can affect consumers' attitudes. Frewer (2002) stated that negative attitudes may be caused by a lack of knowledge, which results in confusion as to the risks and benefits of

products and ultimately contributes to unfavourable perceptions of the technology and its implementations.

The awareness of consumers (either consciously or unconsciously) precedes control, modification, elimination, and change in human behaviour and decision making (Chartrand, 2005). According to Ishak and Zabil (2012), there is an important relationship between the awareness and effective behaviour of consumers. Nevertheless, the awareness of consumers differs considerably between locations where urban dwellers showed less awareness compared to those dwelling in sub-urban areas. While urban consumers were more aware than rural consumers of their rights to consumer protection (Gowd *et al.*, 2014). Arora *et al*. (2014) mentioned that consumer awareness plays an important role in decision-making, in which adolescents are not fully aware of quality assurance marks for different products. The authors further indicated that male adolescents are more aware of consumer rights than female adolescents. According to Chincholkar (2016), consumers are aware of health and nutritional supplements and believed that these products will benefit them in maintaining good health. Kulkarni and Mehta (2013) revealed that most consumers are aware of consumer rights, but never lodge claims against traffickers. Most consumers are unaware of adulteration (Ishwar *et al*., 2018) and its harmful effects on the body (Gautam & Singh, 2016). Consumers' awareness of rights and responsibilities is high, but low concerning food adulteration (Gupta & Panchal, 2009).

3. Methodology

Figure 1 shows the conceptual framework that was established for this study. The framework was adapted from the Theory of Planned Behaviour (TPB) (Ajzen, 1991). The TPB is one of the most established and most implemented theories of human behavioural research (Paul & Lin, 2002). The variables such as attitude, subjective norms, and perceived behavioural control were adapted from the TPB, while the other two variables namely awareness and knowledge were adapted from studies by Axon *et al*. (2017) and Chartrand (2005). The dependent variable of this study was consumers' behaviour towards fraudulent dietary supplements and the independent variables namely attitude, subjective norms, perceived behavioural control, and awareness were used to determine factors that influence consumers' behaviour towards fraudulent dietary supplements. Meanwhile, the independent variable, knowledge was described to have a relationship with consumers' attitude. Socio-demographic profiles were included and used to measure the association between consumers' behaviour towards fraudulent dietary supplements.

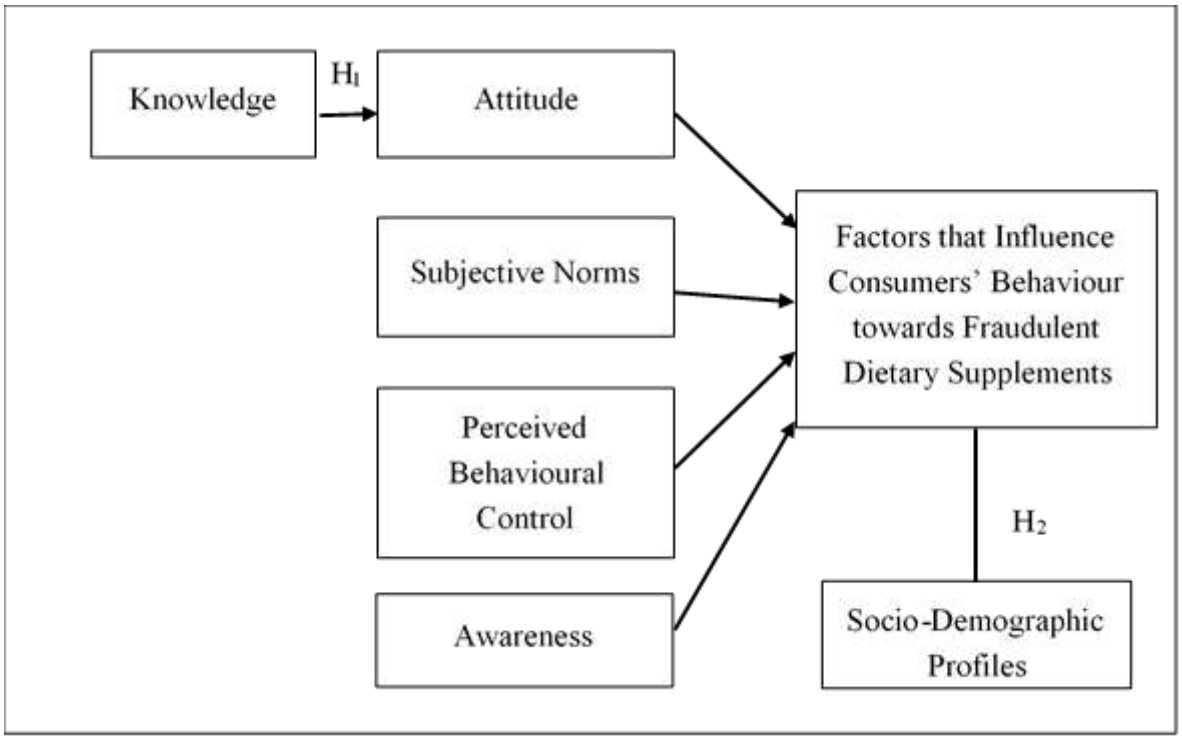

Figure 1. Conceptual framework of factor that influence consumers' behaviour towards fraudulent dietary supplements. Source: Adapted from Ajzen (1991); Chartrand (2005); Axon *et al*. (2017).

A total of 400 respondents resided in selected areas in Peninsular Malaysia such as Petaling Jaya, Ampang, Serdang, Shah Alam, Bangi and Putrajaya were selected using a purposive sampling method. Purposive sampling is a non-random approach that does not include underlying hypotheses or a fixed number of respondents (Etikan *et al*., 2016). Based on this sampling method, the researcher determines what needs to be known and decides people who can and are willing to give the information under knowledge or experience (Bernard, 2002). Thus, in this study, the target respondents were selected based on their experience in consuming dietary supplements. To collect the data from the target respondents, a structured questionnaire was developed, consisting of Part A — respondent's socio-demographic profiles; Part B — respondent's knowledge on fraudulent dietary supplements, and Part C — factors that influence consumers' behaviour towards fraudulent dietary supplements. All the statements in Part B and Part C were established based on a 5-point Likert scale. These statements were aimed to obtain responses on consumers' awareness and behaviour towards fraudulent dietary supplements.

The data collected were analysed using several statistical analyses such as descriptive, Chi-square, Pearson correlation, factor and multiple regression analyses. Descriptive analysis was used to explain the socio-demographic profiles of the respondents, and consumer awareness level. Chi-square analysis on the other hand was used to measure the associations between socio-demographic profiles and consumers' behaviour towards fraudulent dietary

supplements. Meanwhile, Pearson correlation analysis was used to identify the relationship between knowledge and consumers' attitude towards fraudulent dietary supplements. The following research hypotheses were developed for Chi-square analysis and Pearson correlation analysis (Table 3).

Table 3. Research hypotheses.

Analysis	Null Hypothesis (H_0)	Alternative Hypothesis (H_1)
Chi-Square	There is no association between socio-demographic profiles and consumers' behaviour towards fraudulent dietary supplements.	There is an association between socio-demographic profiles and consumers' behaviour towards fraudulent dietary supplements.
Pearson Correlation	There is no relationship between knowledge and consumers' attitude towards fraudulent dietary supplements.	There is a relationship between knowledge and consumers' attitude towards fraudulent dietary supplements.

Factor analysis was used to summarize the information contained in a large number of variables to a smaller number of variables by reducing the number of variables or group variables with similar characteristics. Before conducting the factor analysis, the reliability analysis was employed to measure the reliability of the variables or items that are used in the factor analysis. Based on the reliability analysis, Cronbach's alpha (α) was 0.899 which is above 0.7, indicating all the variables were valid and reliable for factor analysis. According to Nunnally and Bernstein (1978), Cronbach's alpha (α) of 0.7 and above was good reliability. Besides, Tenko and George (2008) indicated that Cronbach's alpha (α) equal to 0.5 level and less than 0.5 level were still acceptable in social science research and marketing research.

Multiple regression analysis was carried out to identify the factors that influenced consumers' behaviour towards fraudulent dietary supplements. The model that was established for this study as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \quad (1)$$

Where,

Y = dependent variable (consumers behaviour towards fraudulent dietary supplements)
A = constant
$\beta_1, \beta_2, \beta_3, \beta_4$ = coefficient of X_1, X_2, X_3, X_4
X_1 = subjective norms
X_2 = awareness
X_3 = attitude
X_4 = perceived behavioural control (PCB)
ϵ = error

4. Results and Discussions

4.1 Socio-Demographic Profiles of Respondents

Table 4 shows the results of the socio-demographic profiles of the respondents in this study.

Table 4: Respondents' socio-demographic profiles.

Variable		**Frequency (*n*)**	**Percentage (%)**
Gender	Male	107	27.0
	Female	293	73.0
Age (years old)	18–24	112	28.0
	25–34	194	48.5
	35–44	58	14.5
	45–54	29	7.25
	55–63	7	1.75
Race	Malay	346	86.0
	Chinese	19	5.0
	Indian	24	6.0
	Others	11	3.0
Religion	Islam	346	86.5
	Christian	30	7.5
	Hinduism	17	4.25
	Buddhism	7	1.75
Marital Status	Married	250	62.5
	Single	150	37.5
Monthly Income (RM)	≤ 1,000	191	47.8
	1,001–2,000	110	27.5
	2,001–3,000	73	18.2
	3,001–4,000	11	2.8
	4,001–5,000	6	1.5
	> 5,000	9	2.2
Educational Level	Primary School	3	0.75
	Secondary School	236	59.0
	Diploma	96	24.0
	Degree	57	14.25
	Master	5	1.25
	PhD	2	0.5
	Others	1	0.25
Occupation	Government Sector	50	12.5

Variable		Frequency (*n*)	Percentage (%)
	Private Sector	94	23.5
	Self-employed	102	25.5
	Housewife	64	16.0
	Unemployed	6	1.5
	Students	82	20.5
	Retired	2	0.5

Note: $n = 400$

Based on the results in Table 4, the highest number of respondents involved in this study were females (73%, 293) followed by males (27%, 107). The majority of the respondents were Malay, accounted for 86% (346), and aged between 25–34 years old (48.5%). Most of the respondents were Muslims, which accounted for 86.5% (346) and 62.5% (250) of the respondents were married. In terms of the monthly income, most of the respondents earned a monthly income of less than RM 1,000, accounted for 47.8% (191), and majority of them, 59% (236) were secondary school leavers. About 25.5% (102) of the respondents were self-employed.

4.2 Consumers' Awareness of Fraudulent Dietary Supplements

Table 5 shows that 395 (98.75%) of the consumers in this study were aware of fraudulent dietary supplements, while the remaining 5 (1.25%) consumers were not aware of it. Most of the consumers received fraudulent dietary supplements information from both mass media and social media.

Table 5. Consumers awareness.

	Frequency (*n*)	Percentage (%)
Aware	395	98.75
Not aware	5	1.25
Total	**400**	**100.00**

4.3 Associations between Socio-Demographic Profiles and Consumers' Behaviour towards Fraudulent Dietary Supplements

The results based on Chi-square analysis showed that age, race, religion and education level were significantly associated with consumers' behaviour towards fraudulent dietary supplements. Race ($p = 0.000$) and educational level ($p = 0.000$) were significant at 1% level of significance ($p < 0.01$), while age ($p = 0.035$) and religion ($p = 0.034$) were significant at 10% level of significance ($p < 0.10$), respectively. Other variables namely gender, marital status, occupation, and monthly income were not significantly associated

with consumers' behaviour towards fraudulent dietary supplements. Table 5 shows the results of the associations between socio-demographic profiles and consumers' behaviour towards fraudulent dietary supplements.

Table 6. Associations between socio-demographic profiles and consumers' behaviour towards fraudulent dietary supplements.

Variable	Chi-square	*dF*	Significant	Result
Gender	0.316	1	0.574	Fail to reject H_0
Age	10.329	4	0.035**	Reject H_0
Race	23.634	3	0.000***	Reject H_0
Religion	8.675	3	0.034**	Reject H_0
Marital Status	0.406	1	0.524	Fail to reject H_0
Monthly Income	6.665	5	0.247	Fail to reject H_0
Educational Level	32.904	6	0.000***	Reject H_0
Occupation	3.514	6	0.742	Fail to reject H_0

Note: n = 400, ***Significant at 1% level of significance, **Significant at 5% level of significance

4.4 Relationship Between Consumers' Knowledge and Attitude

Pearson correlation analysis was employed to examine the relationship between knowledge and attitude variables. The results in Table 7 show that $r = 0.104$ and $p < 0.038$, indicating a moderate positive relationship between consumers' knowledge and attitude. The relationship was significant at 5% level of significance. Based on Dancey and Reidy (2007), the *r*-value, which is less than 0.5 implies a moderate positive relationship.

Table 7. Results of relationship between consumers' knowledge and attitude.

		Knowledge	**Attitude**
Pearson Correlation (*r*)	Knowledge	1	0.104
	Attitude	0.104	1
Sig. (2-Tailed)	Knowledge		0.038**
	Attitude	0.038**	

Note: n = 400, **Significant at 5% level of significance

4.5 Factors that Influence Consumers' Behaviour towards Fraudulent Dietary Supplements

4.5.1 Factor analysis

Based on the factor analysis of this study, the results of Kaiser-Mayer-Olkin Measure of Sampling Adequacy (KMO) was 0.728, indicating the variance among the variables were estimable (Kaiser, 1974). Bartlett's Test of Sphericity was 1670.185, which exhibited 1% level of significance, indicating the correlation matrix in the factor model and the factor analysis with a given variable was appropriate (Tenko & George, 2008). Table 8 shows the summary of factor analysis results with four (4) factors extracted, and the cumulative

variance explained was 74.565%. The factors were named subjective norms, awareness, attitude and perceived behavioural control (PCB).

Table 8. Summary of factor analysis results.

Items	Factor loading
Factor 1: Subjective Norms	
a) I am confident to consume dietary supplements that were introduced by my friends.	0.854
b) I consumed dietary supplements because I was influenced by a good review of the product.	0.842
c) I consumed dietary supplements because I was influenced by the product's ambassador who provides good reviews of the product.	0.820
d) My family's opinion has influenced me to purchase dietary supplements that are available in the market.	0.768
Eigenvalues	2.940
% of variance explained	26.725
Cumulative % of variance explained	26.725
Cronbach's alpha	0.845
Factor 2: Awareness	
a) I am aware of fraudulent dietary supplements.	0.863
b) I am aware of the effects of consuming dietary supplement fraud.	0.859
c) I am aware of the existence of dietary supplement fraud in the market.	0.733
Eigenvalues	2.779
% of variance explained	25.268
Cumulative % of variance explained	51.993
Cronbach's alpha	0.784
Factor 3: Attitude	
a) I always check the ingredients of dietary supplements before purchasing them.	0.932
b) I always check the information on the packaging of dietary supplements before purchasing them.	0.914
Eigenvalues	1.433
% of variance explained	13.026
Cumulative % of variance explained	65.019
Cronbach's alpha	0.864

Items	Factor loading
Factor 4: Perceived Behavioural Control (PCB)	
a) I can find about fraudulent dietary supplements in the news.	0.856
b) I always ready to search for dietary supplements that are legally sold in the market.	0.801
Eigenvalues	1.050
% of variance explained	9.545
Cumulative % of variance explained	74.565
Cronbach's alpha	0.670

Note: n = 400

Based on Table 8, the first factor extracted was subjective norms with an eigenvalue of 2.940. The factor explained a total variance of 26.725% and consisted of four (4) sub-variables with factor loadings between 0.768–0.854. The first sub-variable was *"I am confident to consume dietary supplements that were introduced by my friends"* (0.854), followed by the second sub-variable was *"I consumed dietary supplements because I was influenced by a good review of the product"* (0.842), the third sub-variable was *"I consumed dietary supplements because I was influenced by the product's ambassador who provides good reviews of the product"* (0.820) and the fourth sub-variable was *"My family's opinion has influenced me to purchase dietary supplements that are available in the market"* (0.768). The internal reliability analysis, indicating Cronbach's alpha of the four (4) sub-variables was 0.845.

The second factor extracted was awareness with an eigenvalue of 2.779. The factor explained a total variance of 25.268% and consisted of three (3) sub-variables with factor loadings between 0.733 - 0.863. The first sub-variable was *"I am aware of fraudulent dietary supplements"* (0.863), followed by *"I am aware of the effects of consuming dietary supplement fraud"* (0.859) as the second sub-variable and the third sub-variable was *"I am aware of the existence of dietary supplement fraud in the market"* (0.733). The internal reliability analysis, indicating Cronbach's alpha of the three (3) sub-variables was 0.784.

The third factor extracted was attitude with an eigenvalue of 1.433. This factor consisted of two (2) sub-variables, which explained a total variance of 13.026%. The first sub-variable was *"I always check the ingredients of dietary supplements before purchasing them*" (0.932) and the second sub-variable was "*I always check the information on the packaging of dietary supplements before purchasing them*" (0.914). The internal reliability analysis, indicating Cronbach's alpha of the two (2) sub-variables was 0.864.

The fourth factor extracted was perceived behavioural control (PCB) with an eigenvalue of 1.050. The factor explained a total variance of 9.545% and consisted of two

(2) sub-variables. The first sub-variable was *"I can find about fraudulent dietary supplements in the news"* (0.856) and the second sub-variable was *"I always ready to search for dietary supplements that are legally sold in the market"* (0.801). The internal reliability analysis, indicating Cronbach's alpha of the two (2) sub-variables was 0.670.

4.5.2 Multiple regression analysis

Multiple regression analysis was used to identify the factors that most influence consumers' behaviour towards fraudulent dietary supplements. The independent variables included in the model were subjective norms, awareness, attitude, and perceived behavioural control (PCB). These variables were extracted from the factor analysis. Table 9 shows the result of multiple regression analysis.

Table 9. Multiple regression analysis result.

Variable	Unstandardized Coefficient		Standardized Coefficient	t-value	Sig.
	B	Standard Error	Beta		
(Constant)	3.814	0.017		220.151	0.000***
Subjective norms	0.091	0.017	0.192	5.242	0.001***
Awareness	0.250	0.017	0.529	14.413	0.002***
Attitude	0.073	0.017	0.154	4.197	0.004***
Perceived Behaviour Control (PCB)	0.169	0.017	0.358	9.749	0.003***
R^2	0.468				

Note: ***Significant at 1% level of significance

As shown in Table 9, R^2 of the model was 0.468, indicating that the combination of independent variables (subjective norms, awareness, attitude, perceived behavioural control) has explained 46.8% of the variation in the dependent variable (consumers' behaviour towards fraudulent dietary supplements). These four independent variables have a positive relative contribution to consumers' behaviour towards fraudulent dietary supplements. The first factor, awareness with β = 0.250 and p = 0.002 was significant at 1% level of significance. This finding signified that the greater is the consumers' awareness, the greater consumers' behaviour to avoid consuming dietary supplements fraud by 0.250. This finding was in line with Ishak and Zabil (2012) who argued the relationship between consumers' awareness and behaviour is very important and change in human behaviour and decision

making (Chartrand, 2005). The second factor perceived behavioural control (PCB) with β = 0.169 and p = 0.003 was significant at 1% level of significance. This indicated that when there is an increase in perceived behavioural control (PCB), consumers tend to have high behaviour in avoiding fraudulent dietary supplements by 0.169. As indicated by Armitage and Conner (2001), perceived behavioural control (PBC) has a direct influence on the behaviour. The third factor was subjective norms with β = 0.091 and p = 0.001 and significant at 1% significance level. Therefore, an increase in the influence of people from the surrounding such as family members, friends, and others, the more influence consumers' behaviour shall have towards fraudulent dietary supplements by 0.091. This finding further confirmed that subjective norms will influence social pressure either to perform or not to perform a behaviour (Ajzen, 2002). The attitude, the fourth factor was significant at 1% level of significance (β = 0.073, p = 0.004). Hence, an increase in a positive attitude has led to the improvement of consumers' behaviour towards fraudulent dietary supplements by 0.073. Pelsmacker *et al*. (2006) argued that people with a positive attitude towards a product tend to buy the product. Based on the results, the estimated multiple regression model can be represented by the following equation: -

$$\text{Behaviour} = \begin{array}{c} 3.814 + 0.091 \text{ x (subjective norms)} + 0.250 \text{ x (awareness)} + \\ 0.073 \text{ x (attitude)} + 0.169 \text{ x (perceived behavioural control)} + \epsilon \end{array} \quad (2)$$

5. Conclusion

The dietary supplements have become consumers' diet component because of its several functions and effectiveness. Consumers' awareness towards a better lifestyle has increased thus, they tend to be more concerned about their food consumption. This study revealed most consumers were aware of the fraudulent dietary supplements in the market. This is further confirmed by the significant correlation between knowledge and attitude, indicating that consumers who had adequate knowledge tend to have a favourable attitude towards fraudulent dietary supplements. Socio-demographic profiles such as age, race, religion and education level were significantly associated with consumers' behaviour towards fraudulent dietary supplements. Consumers' awareness was revealed as the factor that highly influenced consumers' behaviour towards dietary supplements. This study implies that the prevention for fraudulent activities are able to reduce the number of consumers who have been affected from adverse effects by consuming the fraudulent dietary supplements. The manufacturers of dietary supplements need to play a major part in the market by practicing high integrity in responding to the increasing demand from consumers by maintaining the quality, originality and effectiveness of the supplements with the warning of minor side or adverse effects. The government and relevant authorities also need to

continuously educate consumers on the effects of consuming fraud dietary supplements by organizing various programs or activities to spread the information regarding fraudulent dietary supplements in Malaysia and increase consumers' awareness towards fraudulent dietary supplements. Besides, the government's roles are important to eradicate fraudulent dietary supplements in the market and to continuously monitor the dietary supplements available and sold in the market to be properly labelled and fully certified by the Pharmaceutical Enforcement Division in the Ministry of Health, Malaysia. Apart from that, the consumers shall also have the opportunity to alert and notify the Ministry of Health or relevant authorities, if they discover any dietary supplement under the suspicion of fraudulent or victimised through dangerous side or adverse effects of any dietary supplement.

This study has revealed many interesting results, nevertheless, it has many limitations that must be considered. First, only a few numbers of fraudulent dietary supplement cases were reported, which unable to capture the real situation in Malaysia. Second, it is difficult to identify dietary supplement products in Malaysia because many producers tend to name their products with different terms like 'food supplements', 'health products', 'health supplements' 'traditional products', 'tonic drinks' and 'Chinese medicines'. Thus, this study suggests that proper guidelines and policies on dietary supplements should be improved by the relevant authorities, while these authorities should provide a complete database to be accessible via online application and from their mobile devices.

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Original Research Article

Youth's Intention to Venture into Agriculture Sector

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Abstract: This study aims to determine the factors influencing youth's intention to venture into the agriculture sector. Since Malaysia is a developing country, unemployment is one of the major issues, especially youth unemployment. Malaysia's government recognised that the agriculture sector is an important sector to contribute to the nation's GDP, followed by service and manufacture. The government implemented actions through programmes for attracting youth's intention. However, youth still lack the purpose and less motivated to venture into agriculture. A total of 245 respondents from 15 to 40 years old participated in the survey sampling. Data were analysed using several statistical analyses, such as descriptive, factor, Chi-square and multiple regression analysis. Based on the result, it can be concluded that youth's intention will be affected by knowledge, attitude, and acceptance as well as gender, age, marital status, and education field of youth. By setting agriculture as a compulsory subject and offering agricultural-oriented activities, it is recommended that the government, agriculture agencies, and universities take responsibility for attracting youth to venture into the agriculture sector.

Keywords: factors; youth; agriculture; intention; unemployment

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1. Introduction

Unemployment is one of the main issues being continuously discussed particularly in developing countries (Ogbeide *et al*., 2015). Several research have been discussing on the unemployment issues from various perspectives involving its effects on unemployed individuals and society (Krug & Eberl, 2018; Mousteri *et al*., 2018; Sileika & Bekeryte, 2013; Tang, 2009). The youth unemployment rate in Malaysia has been increasing annually. According to the Department of Statistics Malaysia (DOSM) 2017, the unemployment rate among youth has risen 2.4% from 9.9% in 2011 to a whopping 11% in 2016 and keep growing

to 11.26% in 2019 and 11.72% in 2020. This trend is worrying as unemployment has been found to cause negative impacts on the individual's psychological, society and country in general (Ahmad *et al*., 2017; Mousteri *et al.*, 2018; Tang, 2009). Thus, having an increasing trend of unemployment especially among the youth is a risk that needs to curb urgently.

Malaysian government has recognised that the agriculture sector offers a tremendous opportunity in terms of work and returns' benefits, even though it received a low participation from the youth as they perceive it as a 3D sector that is dirty, difficult, and dangerous (Abdullah & Sulaiman, 2013; D'Silva *et al*., 2009; Abdullah & Samah, 2013). In 2013, it is reported that 66% of people involved in the agriculture sector aged more than 50 years (Mohammad Nor *et al.*, 2015; Alam *et. al*., 2010). Thus, the involvement of youth in this sector is very critical. This low participation is the reason for aggressive and intensive collaboration between the government and agriculture-related agencies and universities in launching programmes that are able to attract youth interest to engage in this sector. Example of parties involves are the Malaysia Agricultural Research and Development Institute (MARDI), Ministry of Agriculture and Agro-based Industry Malaysia (MOA), Agrobank and Universiti Putra Malaysia (UPM). The purpose of the government's implementation is to grab the youth's attention to venture into the agriculture sector as entrepreneurs as well as becoming the workforce of that sector. Examples of such programmes are the Youth Agropreneur Programme, *Biztalk Pakej Perniagaan Agropreneur Muda* and *Tunas Usahawan Belia Bumiputera* (TUBE).

Besides initiating all kinds of programmes as mentioned earlier, the government has also allocated a significant budget for this sector over the years through investment and launching a variety of programmes to maintain the performance of the agriculture sector. The government has invested around RM28 billion for the past six years as of 2011 to 2016 (Annual Budget Malaysia, 2011–2017). Despite efforts in motion by the government and public universities to attract youth into participating in the agriculture sector, several reports and research have indicated that the number of youths venturing into the agriculture sector is still very minimal (Mohammad Nor *et al*., 2015; D'Silva *et al*., 2010a; Hayrol *et. al*., 2012). This trend eventually leads to a situation of shortage of employment in the agricultural sector in Malaysia. Thus, what could be the reasons for this low participation among youth. Therefore, this research aims to understand and identify the factors that influence the intention among youth towards venturing into the agriculture sector.

2. Materials and Methods

Youth is traditionally determined as a period of the transaction from childhood to adulthood (Idike & Eme, 2015). Nowadays, youth is defined as male or female who is young (the age between 15 to 24 years), energetic, and able to contribute to the development of a country (Mohammad Nor *et al*., 2015). Malaysia's National Youth Development Policy defined youth as an individual aged between 15 to 40 years. Youth is supposed to be the key player and backbone to the development of the country's economy and community (Bahaman

et al., 2010; D'Silva *et al*., 2010a), as they can promote their personal growth and provide the knowledge and skills for society (Checkoway, 2011). Youth is also the ideal catalyst for improvement, regarding new ideas, concepts, and techniques that are critical in changing the way agriculture is practiced and perceived (Ahaibwe *et al*., 2013).

The word agriculture derives from two Latin words in which are *Ager* and *Cultura. Ager* means a field or land, and *Cultura* means culture (Collins English Dictionary, 2012). Therefore, agriculture defines as the cultivation of land that applies to the science and art of producing crops and rearing animals for economic purposes (Kimaro *et al*., 2015). According to the World Bank (2017), agriculture is one of the tools to raise income more effectively compared to other sectors. Agriculture in Malaysia is acknowledged as the third engine of growth for the economy after the manufacturing and service sectors (Abdullah & Sulaiman, 2013). The agriculture sector does not only cover farming, animal and fisheries, it also covers the agro-based industry that includes food processing and non-food processing (Abdullah & Sulaiman, 2013). The following sections discuss the factors influencing youth's intention to venture into the agriculture sector.

2.1 Attitude

Attitude is defined as an evaluative disposition from cognitions, affect reactions and behavioural intentions (D'Silva *et al*., 2010b), that can be "shaped according to an individual's degree of like or dislike on something or whether it is a positive or negative perception towards a person, place, thing and event" (Bahaman *et al*., 2010). According to Ogbeide *et al*. (2015), the attitudes of youth towards work shape by their surroundings, where education, work, career, and nature are linked to social positioning and in other aspects of life. The youth believed that the agriculture sector is not a vibrant industry and can only generate an insufficient income (D'Silva, 2009; Nag *et al*., 2017), as the agriculture sector often associates with low social status, aside from being as dirty work (Ogbeide *et al*., 2015). Most of them are more interested in the glamorous jobs in the services and manufacturing sector (Abdullah & Sulaiman, 2013). In this study, attitude is regarded as the youth perception and evaluative disposition about the agriculture sector.

H_1: There is a relationship between youth's intention to venture into the agriculture sector and attitude.

2.2 Acceptance

Acceptance can be defined as the sum of all attitudes, an expression or implication by action, and as the intention to adopt an application, which is questioning the satisfaction of all the needs or requirements (Adell *et al.,* 2014; Bahaman *et al*., 2010; Ridha & Wahyu, 2017). In this study, acceptance is regarded as the perceived opportunities as well as the implication to join that youth has about ventured into the agriculture sector. D'Silva *et al*., 2010b) described that youth in Malaysia have negative acceptance towards agriculture. Also, D'Silva *et al*. (2009) found that there is a significant difference in youth's acceptance and

perception (age 15 to 40 years) and adults (age more than 40 years) to work in the agriculture sector. Youth is inclined to perceive the agriculture sector as a low level of work with harsh work conditions as compared to an adult who has embraced the rough work in the agriculture work setting. However, the authors further stated that positive acceptance among youth towards the agriculture sector could be foster through programmes related to agriculture.

H_1: There is a relationship between youth's intention to venture into the agriculture sector and acceptance.

2.3 Knowledge

Knowledge defines as organised or processed information may enhance someone's understandings of something (D'Silva *et al*., 2009). Increasing agriculture literacy knowledge enables people to form a more positive perception as knowledgeable, to expose what is known or what is not known. Youth have limited knowledge about agriculture activities comprising farming practices such as cultivation (Agboola *et al*., 2015), as some of them believed that milk comes from the grocery store rather than from a cow (Luckey *et al*., 2013). This lack of knowledge on agriculture information and technology and production techniques such as plant protection and crop rotation limit the youth's desire to involve in agriculture production (Jacobi *et al*., 2000; Uddin *et al*., 2008; Zaliza & Mohd, 2014).

H_1: There is a relationship between youth's intention to venture into the agriculture sector and knowledge.

2.4 Socio-Demographic

Many studies indicate that socio-demographic profiles such as age, gender, education, occupation, ethnicity and income also may influence youth to venture into the agriculture sector (Abdullah & Sulaiman, 2013; D'Silva *et al*., 2010a; Selvaraj *et al*., 2017). Age is a reference to an individual or group of age-appropriate for the agriculture sector (Abdullah & Sulaiman, 2013). The Department of Statistics Malaysia (DOSM) determines working age into five groups as follows: 1) between 15 and 24 years; 2) between 25 and 34 years; 3) between 35 and 44 years; 4) between 45 and 54 years; and 5) between 55 and 64 years. According to a study done by D'Silva *et al*. (2009) and Farah and Bahaman (2013), the average age of a farmer in Malaysia is above 40 years.

Gender is one of the indicators of socio-demographic that influences attitude (Abdullah & Sulaiman, 2013). Gender refers to a socially constructed feature of women and men according to the norms, roles, and relationships (World Health Organisation, 2018). Social norm of genders defines as a primary responsibility of female and male's work for the household task and childcare, has led to a finding that women in Malaysia faced many difficulties in involving in the agriculture sector and therefore their participation in this sector is lesser than men (D'Silva *et al*., 2009). Income is one of the items studied for socio-demographics. Hyttia and Kola (2006) found that income is one of the factors that influence

people's participation in agriculture, contrary to Stephenson and Lev (2004) whose find that income is not a significant determinant for creating positive acceptance to work in agriculture activities. However, Abdullah and Sulaiman (2013) found that most prefer to work in the sector that offers a higher salary, and only low-income people tend to choose agriculture activity as their primary money generating activity.

H_1: There is an association between youth's intention to venture into the agriculture sector and socio-demographic profiles.

3. Materials and Method

Figure 1 depicts the conceptual framework for this study. There were three independent variables (i.e., the factors: attitude, acceptance and knowledge) expected to have relationships with the independent variables (i.e. the youth intentions to venture into the agriculture sector). The socio-demographic profiles include gender, age, race, marital status, education background, education field, and income level, were examined in this study. The framework is adopted from Abdullah and Sulaiman (2013).

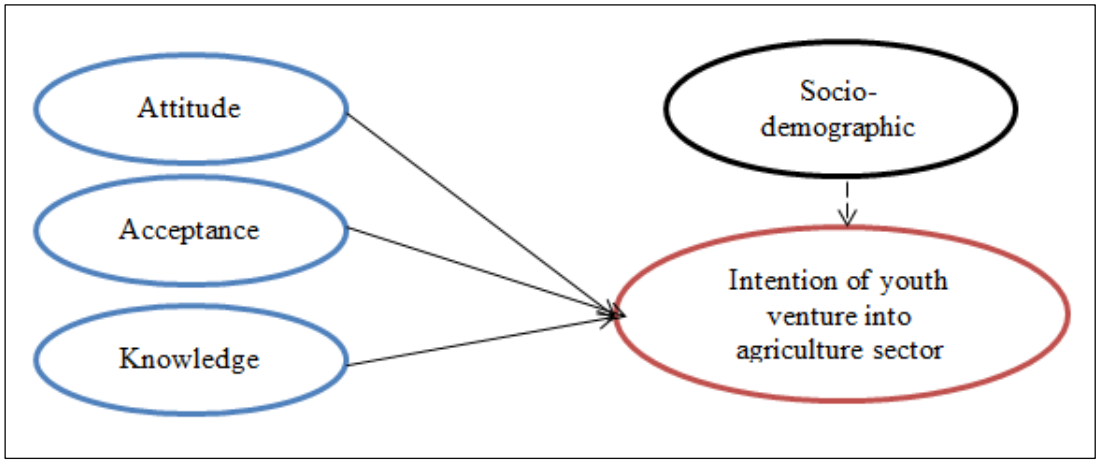

Figure 1. Conceptual framework. Source: Adopted from Abdullah and Sulaiman (2013).

This study used a quantitative approach in which is a questionnaire form was developed based on the research objectives. The target respondents were youth (15 to 40 years old). The chosen age range is aligned with the definition of youth according to Malaysia's National Youth Development. The targeted population included all youth in Malaysia resided from Johor, Malacca, Negeri Sembilan, Selangor, Perak, Penang, Kedah, Kelantan, Perlis, Pahang, Terengganu, Sabah, Sarawak, Kuala Lumpur, Putrajaya, and Labuan. The population in Malaysia is approximately 32 million (DOSM, 2018).

The questionnaire was distributed around Malaysia based on the simple random sampling method using the Google form platform. It was to ensure that the youth in all states of Malaysia were well represented. There was a question about the state of origin in ensuring

the distribution of the questionnaires. About 245 respondents participated and answered the questionnaire form.

The questionnaire was designed into three sections: section A; section B; section C. Section A was related to the respondent's socio-demographic profiles. The socio-demographic profiles were consisted of seven factors such as gender, age, race, marital status, education background, education field, income and state of origin. Section A is using a nominal scale to measure the data. Section B was related to the factors that influence youth intention to venture into the agriculture sector, which covers three variables that are attitude, acceptance and knowledge. Section C identified the youth's intention towards venturing into the agriculture sector. Both section B and section C were measured using the 5-point Likert-scale with a range from 1 (Strongly Disagree) to 5 (Strongly Agree) to ascertain the accuracy of data from the respondents. The questionnaire was developed in bi-language, namely Malay and English.

Descriptive, factor, Chi-square and multiple regression analysis were used as the method of investigation. The descriptive analysis was used to describe and visualise the socio-demographic profiles of the respondents. Section A was using the descriptive analysis to analyse the data as it provides simple summaries on the overview of youth socio-demographic profiles. Descriptive analysis uses mean, median or mode measures, which are the most common patterns of analysed data. Factor analysis was used as a factor extraction method to identify the items for factors that influence youth's intention to venture into the agriculture sector. Kaiser-Mayer-Olkin (KMO) and Bartlett's Test of Sphericity were applied to test the appropriateness of using factor analysis with both KMO and Bartlett's test of sphericity.

Chi-square analysis was utilised in this study to evaluate the test of independence when using cross-tabulation (bivariate table). Cross-tabulation is used to present the distributions of categorical variables with the intersections of the categories of the variables. Chi-square statistics calculate and compare against critical values from the Chi-square distribution. Multiple regression analysis is a statistical approach that uses several explanatory variables (independent variables) to predict the outcome of a response variable (dependent variable). This analysis was used to identify the relationship between factors and the youth's intention to venture into the agriculture sector. When a one-unit change in the independent variable, the dependent variable will be affected.

4. Results and Discussions

4.1 Descriptive Analysis

Table 1 shows the results of 245 respondents who participated in this study. There were 43.70% (107) of male respondents filled in the questionnaire and 56.30% (138) of female respondents. The figure also shows the slight disparity between male and female.

Table 1. Socio-demographic profiles of respondents.

Socio-demographic	Frequency (*n*)	Percentage (%)
Gender		
Male	107	43.70
Female	138	56.30
Total	245	100
Age		
15–19	34	13.90
20–24	74	30.20
25–29	69	28.20
30–34	40	16.30
35–40	28	11.40
Total	245	100
Race		
Malay	96	39.20
Chinese	101	41.20
Indian	47	19.20
Others	1	0.40
Total	245	100
Marital Status		
Single	165	67.30
Married	80	32.70
Total	245	100
Education Background		
Primary school	1	0.40
Secondary school	81	33.10
STPM / Matriculation / Foundation	58	23.70
Diploma / Bachelor	90	26.70
Master	11	4.50
PhD	4	1.60
Total	245	100
Education Field		
Agriculture	70	28.60
Business and Management	44	18.00
Engineering	30	12.20
Medical	7	2.90
Science	44	18.00
Others	50	20.40
Total	245	100
Income		
< RM 1,000	99	40.40
RM 1,001–RM 2,000	60	24.50
RM 2,001–RM 4,000	76	31.00
RM 4,001–RM 6,000	10	4.10
Total	245	100

The majority age is in the range of 20 to 24 years old were 74 respondents (30.2%), followed by 25 to 29 years old in which were 69 respondents (28.2%). While respondents who were 35 to 40 years old were the lowest in this research in which was 28 respondents (11.4%). Most of the respondents were Chinese accounted for 101 respondents (41.2%), followed by Malay were 96 respondents (39.2%), and Indian were 47 respondents (19.2%). About 165 respondents (67.3%) were single, while 80 respondents (32.7%) were married.

Concerning education background, the highest frequency was 36.7% from diploma/bachelor, followed by secondary school (33.1%) and STPM/matriculation/foundation (23.7%). The lowest was those having only primary school education accounted for 0.4% of the respondents. The majority of youth respondents were mostly educated in the agriculture field accounted for 28.6% (70 respondents). There were 18% (44 respondents) of total respondents in business and management field and science students. The minority of the respondents were from the medical field in which is 2.9% (7 respondents). In terms of income of respondents, there were 40.4% (99 respondents) who have income less than RM 1,000, followed by RM 2,001 to RM 4,000, RM 1,001 to RM 2,000 and RM 4,001 to RM 6,000 with the value of percentage are 31% (76 respondents), 24.5% (60 respondents) and 4.1% (10 respondents).

4.2 Reliability Test

The reliability test for all items is shown in Table 2. Based on the result, knowledge has the highest value of alpha of which was 0.964, and it is reliable for this study since the value of alpha is more than 0.80. Attitude, acceptance, and intention also have a high value of alpha at 0.915, 0.910 and 0.911, respectively. These two variables are reliable for this study since the value is greater than 0.80.

Table 2. Reliability test of independent variables.

Factors	No. of Items	Cronbach's Alpha
Knowledge	10	0.964
Attitude	6	0.915
Acceptance	4	0.910
Intention	5	0.911

4.3 Factor Analysis

The result of the Kaiser-Meyer-Olkin (KMO) test was 0.920, and as shown in Table 3. It indicates sampling adequacy of 92%, and for Bartlett's test of sphericity, the result showed that the correlation among the variables is significant at a 1% level of significance.

The small value (0.00) of Bartlett's test of sphericity shows that the variable meets the fundamental requirements for factor analysis.

Table 3. Kaiser-Meyer-Olkin and Bartlett's test.

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		**.920**
Bartlett's Test of Sphericity	**Approx. Chi-Square**	6012.197
	Df	253
	Sig.	.000

Based on Table 4, the total variance of knowledge was 34.20% can be explained by knowledge in the youth's intention. Knowledge factor includes 10 sub-variables.

Table 4. Total variance explained of independent variables.

Factors	**No. of Item**	**Total Variance Explained**
Knowledge	10	34.20
Attitude	6	21.027
Acceptance	4	17.687

Mohammad Nor *et al*. (2015) stated that knowledge is a vital factor that encourages youth to engage in the agriculture sector exclusively in entrepreneurship. Bahaman *et al*. (2010) and Mohammad Nor *et al*. (2015) supported that level of knowledge is positively significant for youth venturing into the agriculture sector and no significant difference between the youth locality.

Attitude consisted of six sub-variables and has a total variance of 21.027%. The result was supported by Bahaman *et al*. (2010) and Abdullah and Sulaiman (2013) that attitude is a significant variable towards the youth's intention to venture into the agriculture sector. The authors believed that the attitude of youth is one of the main factors to influence youth to take part in the agriculture sector, whether farming or entrepreneur.

There are four sub-variables of acceptance, and it has a total variance of 17.687%. Youth believe the agriculture sector can bring them a lot of work opportunities such as producer, processor, manufacturer and entrepreneur. Based on Kimaro *et al*. (2015), acceptance has a positive relationship with the agriculture sector, especially the youth who have an agriculture background. Thus, the most significant factor was knowledge, followed by attitude and acceptance.

4.4 Chi-square Analysis

Table 5. Cross tabulation between socio-demographic and youth's intention.

Variable	Chi-Square ($X^2_{0.05}$)	*df*	Significant	Decision
Gender	46.867[a]	1	0.001**	Reject H_0
Age	162.783[a]	4	0.010*	Reject H_0
Race	72.595[a]	3	0.647	Failed to reject H_0
Marital Status	27.630[a]	1	0.001**	Reject H_0
Education Background	107.208[a]	5	0.743	Failed to reject H_0
Education Field	183.916[a]	5	0.000***	Reject H_0
Income	83.802[a]	3	0.269	Failed to reject H_0

Note: ***, **, * Significant at 1%, 5% and 10% levels of significance, respectively.

Gender was a significant factor for youth intention towards the agriculture sector. Since $X^2 > X^2_{0.05}$, 18 = 46.867 and *p*-value = 0.001 < 0.05, there was enough evidence to reject H_0. Thus, there was a significant association between gender and youth intention towards the agriculture sector. Age of respondent is one of the factors, which influenced the intention of youth venture into the agriculture sector. Since $X^2 > X^2_{0.05}$, 72 = 162.783 and *p*-value = 0.010 < 0.05, there is enough evidence to reject H_0. Thus, there was a significant relationship between age and youth intention towards the agriculture sector. The following socio-demographic profile is the race of respondents. Since $X^2 > X^2_{0.05}$, 54 = 72.595 and *p*-value = 0.647 > 0.05, there is not enough evidence to reject H_0, thus there was no significant association between race and youth intention towards agriculture sector.

From Table 5, marital status was a significant factor for youth intention towards the agriculture sector. Since $X^2 > X^2_{0.05,\ 18}$ = 27.630 and *p*-value = 0.001 < 0.05, there is enough evidence to reject H_0. So, there is a significant association between marital status and youth intention towards the agriculture sector. Another variable is the educational background. Since $X^2 > X^2_{0.05,\ 90}$ = 107.208 and *p*-value = 0.743 > 0.05, there is not enough evidence to reject H_0. Thus, there was no association between education background and intention of youth to venture into the agriculture sector. For the income factor, it is one of the factors which influenced the youth's intention towards the agriculture sector. Since $X^2 > X^2_{0.05,\ 54}$ = 83.802 and *p*-value = 0.269 > 0.05, there is not enough evidence to reject H_0. Thus, there was no significant association between the income of respondents and youth's intention to venture into the agriculture sector. In conclusion, gender, age, marital status and education field influenced with the youth's intention to venture into the agriculture sector.

4.5 Multiple Regression

Based on Table 6, there are 80.40% explained the factors of attitude, acceptance and knowledge that influenced the youth's intention to venture into the agriculture sector. However, another 19.60% was not explained in the model.

Table 6. Multiple regression-model summary.

Model	*R*	*R* Square	Adjusted *R* Square	*Std.* Error of the Estimate
1	.897[a]	.804	.802	.43176

Note: a - Predictors: (Constant), Knowledge, Acceptance, Attitude

Based on Table 7, when the result of coefficients is between 0 and 1, it shows that the independent variables have enough evidence to explain the dependent variable. The effect of attitude (B = 0.675, p = 0.000) is significant, and its coefficient is positive, indicating that the higher or the positive the attitude towards youth's intention to venture into the agriculture sector. Since there is enough evidence to reject H_0 at a 5% significant level, the youth's attitude has a positive impact on the intention to venture into the agriculture sector. It means when the youth's attitude increasing by 1%, the youth's intention will increase by 0.675. Youth's attitude, hence is useful as a predictor of youth's intention. Shireesha & Sathyagopal (2016) stated that some of the youth already have a positive intention to venture into the agriculture sector and will be adopting the latest technologies in farming as well as production and marketing.

Table 7. Coefficients of youth's intention towards agriculture coefficients.

Model		Unstandardized Coefficients		Standardized Coefficients	*t*	Sig.
		B	*Std.* Error	Beta		
1	(Constant)	-.308	.137		-2.257	.025
	Attitude	.675	.053	.580	12.755	.000
	Acceptance	.125	.040	.113	3.138	.002
	Knowledge	.284	.034	.319	8.308	.000

Note: dependent variable - intention

Acceptance is another significant predictor of youth's intention. The result in Table 7 showed that acceptance is a positive coefficient (B = 0.125, p = 0.002) in which is directly proportional to the intention of youth. From the result, there is enough evidence to reject H_0 at a 5% significant level, and youth's acceptance is considered as a crucial factor to determine the youth's intention towards agriculture. The result also showed that when the youth's attitude increases by 1%, the youth's intention increases by 0.125. Based on Bahaman *et al*. (2010), rural communities are more accepting of the agriculture sector compared to the urban community due to the rapid transformation of the agriculture system.

Knowledge was one of the most significant predictors of youth's intention. Knowledge (B = 0.284, p = 0.000) has a positive value of coefficient. Since there is enough

evidence to reject H_0 at a 5% significant level, knowledge of youth is positive to the youth's intention to venture into the agriculture sector. It means that when the youth's attitude increases by 1%, the youth's intention increases by 0.284. The level of knowledge is vital in agriculture activities as well as entrepreneurship. Some institutions are trying to offer and expand the knowledge in agriculture by theoretical and practical to getting youth's intention towards the agriculture sector (Abdullah & Sulaiman, 2013).

5. Conclusion

This study aims to determine the factors influencing youth's intention to venture into the agriculture sector based on data collected from respondents across Malaysia. Generally, the agriculture sector is the third-largest sector followed by services and manufacturing. The finding of this study should be helpful to assist the government and agricultural organisations in solving the youth's unemployment issues. The result of multiple regression analysis showed that there were significant relationships between the dependent variable (youth's intention to venture into the agriculture sector) and independent variables (attitude, acceptance, and knowledge). It can be concluded that the greater the attitude, acceptance, and knowledge possessed by youth, the greater the youth's intention venturing into the agriculture sector.

Moreover, the results showed that attitude, acceptance, and knowledge have a significant relationship with the youth's intention to venture into the agriculture sector. The youth's intent to venture into the agriculture sector is based on their attitude, acceptance, and knowledge without any coercion from any parties as well as gender, age, marital status and educational background. Since the intention of youth can be influenced by attitude, acceptance and knowledge, the government can develop some actions to promote youth participation in the agriculture sector. The government can gain the youth's interest in agriculture through education. The government is encouraged to the promotion of agriculture as a compulsory subject in the education system. It is one of the mediums to promote the importance of the agriculture sector and to attract the youth's intention towards the agriculture sector. There is an example case in which UPM has been implementing this method by setting the subject of Agriculture and Man as a mandatory subject for all UPM students, whether engineering or medical student. This action is promoting UPM students to have basic knowledge about this sector and venturing in the future.

Another recommendation for the study is offering agriculture-based activities to youth. Although there are a lot of programmes were launched by the government and organizations such as Youth Agropreneur Programmes, youth still weak in their intention to these programmes. The government can promote the agriculture sector in the form of agriculture festivals like Malaysia Agriculture, Horticulture, and Agrotourism Show (MAHA) to encourage youth to participate in the agriculture sector. The youth can get more experience and knowledge about agriculture activities and influenced their perception. Besides, the youth's mindset for the agriculture sector generally relates it to the lower quality

sector compared to other sectors. The promotion can change the youth's outlook by giving them information about the agriculture sector.

Conflicts of Interest: The authors declare no conflict of interest.

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