



UNIVERSITI PUTRA MALAYSIA

***MALAYSIAN CONSUMERS' ACCEPTANCE OF NATURAL AND
SYNTHETIC FUNCTIONAL FOOD***

PHUAH KIT TENG

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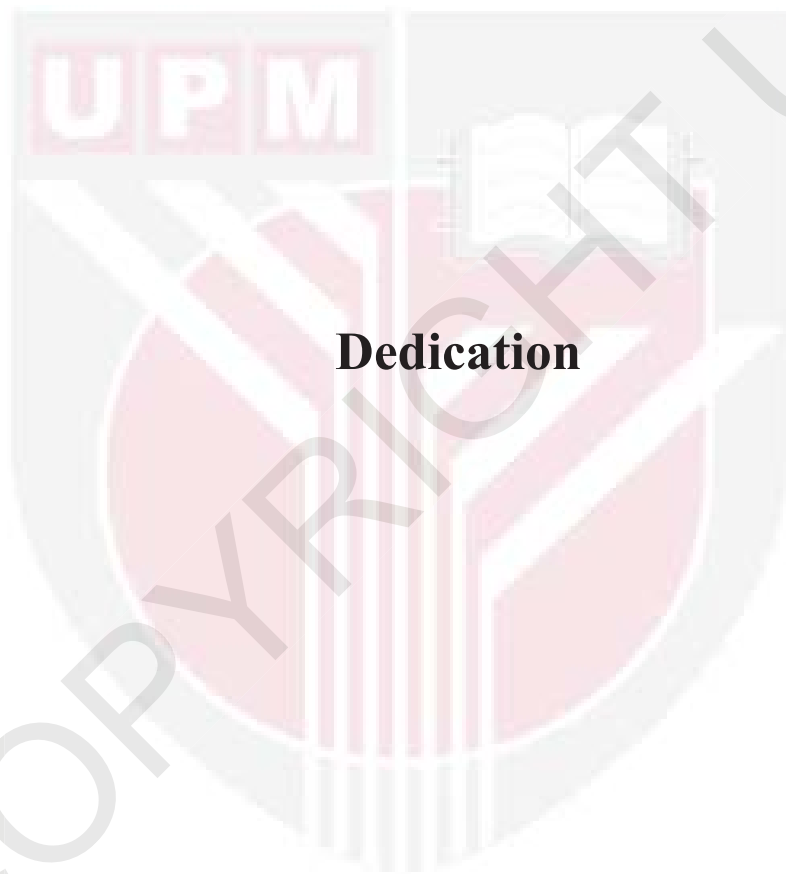
**Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia,
in Fulfillment of the Requirements for the Degree of Doctor of Philosophy**

November 2014

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Dedication

To My Parents

**Phuah Eng Hean and Fong Sau Yee, I
have always been proud to be your
daughter.**



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

**MALAYSIAN CONSUMERS' ACCEPTANCE OF NATURAL AND
SYNTHETIC FUNCTIONAL FOOD**

By

PHUAH KIT TENG

November 2014

Chair : Golnaz Rezai, PhD
Faculty : Agriculture

The concept of functional food is not new to the Malaysian people as traditional medicines have made tremendous contributions over the past centuries. However, with the advent of the pharmaceutical technology and industry some of the remedial formulas for alternative food and medicines have been forgotten, thus paving the way for the consumption of synthetic functional food. The growth of the economy together with the strong desire among the Malaysian consumers to maintain a healthy lifestyle and their growing awareness of functional ingredients are the driving force in the functional food and beverage market of the country. Although the consumption of natural and synthetic functional food is increasing in Malaysia, relatively little is known about how consumers perceive these products or about which factors are affecting their acceptance. Therefore, to gain success in the functional food market, all firms involved in the food industry need to explore the consumers' intention in accepting foods containing natural or synthetic compounds and the reasons behind including these products in their daily diet. Thus the objective of this study is to determine the Malaysian consumers' intention in accepting natural and synthetic functional food. A survey was conducted from 28 April 2013 until 15 October 2013 where 2004 Malaysian households were interviewed through structured questionnaires. The Theory of Planned Behavior and Health Belief Model are adopted and modified for this study. Descriptive statistics, exploratory factor analysis and structural equation modeling are used to analyze the collected data.

The results indicate that half of the respondents are not familiar and could not differentiate between natural and synthetic functional food since they are not well differentiated in Malaysia. A high proportion of the respondents believe that functional food is medical food, followed by it being a conventional food, a type of food for special dietary use, a modified food and a nutraceutical food. Only a quarter of the respondents expressed that they always buy functional foods because they want to stay healthy, to avoid medical conditions or to stay attractive. However, the result shows that the majority of the respondents prefer to consume natural functional

food than synthetic ones. Based on the exploratory factor analysis, five factors are identified that influence consumers' intention in accepting natural functional foods. These factors are perceived susceptibility, perceived barriers, consumer attitude, subjective norms and perceived benefits of natural functional food. However, seven factors are identified that can influence consumers' intention in accepting synthetic functional food such as perceived susceptibility, perceived barriers, consumer attitude, subjective norms, perceived benefits, perceived behavioral control and perceived severity. Furthermore, the result of structural equation modeling shows that the data set was normal, valid and reliable. The result for natural functional food shows that attitude has a partial mediating effect on perceived barriers, perceived susceptibility and perceived benefits which influence consumers' intention in accepting natural functional food. However, it is also found that attitude has no mediation effect on the subjective norms of the consumers to form the intention of accepting natural functional food. In other words, subjective norms have a direct influence on consumers' intention to accept natural functional food. On the other hand, the result for synthetic functional food shows that attitude has a fully mediating effect on subjective norms to form consumers' intention in accepting synthetic functional foods. However, attitude has an indirect effect on perceived barriers, perceived susceptibility and perceived behavioral control to form consumers' intention in accepting synthetic functional foods. Consumer attitude will also partially affect perceived benefits and there is no mediation effect on perceived severity of consumers' intention in accepting synthetic functional food. Moreover, the result of the structural equation modeling also shows that there is some form of moderating effect of gender, marital status, age, education level and income level on the overall model.

Functional food is becoming increasingly important for the food industry particularly in Malaysia. To succeed in the functional food markets domestically or internationally, manufacturers or marketers should understand and obtain more profound information on the consumers' behavior and demands. Marketing strategies for natural and synthetic functional food must take into consideration market segmentation as each product has its own niche market. The policy should clearly provide an opportunity for the producers and manufacturer of such products to communicate the evident medical and health benefits of consuming natural and synthetic functional foods with each other and the public in general. Therefore, an international definition for functional foods should be adopted by governments or related institutions so that the consumers can differentiate between functional food and other types of food products.

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

**PENGGUNA MALAYSIA PENERIMAAN TERHADAP MAKANAN
BERFUNGSI SEMULAJADI DAN SINTETIK**

Oleh

PHUAH KIT TENG

November 2014

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Makanan berfungsi bukanlah konsep baru kepada rakyat Malaysia. ubatan tradisional telah membuat sumbangan yang besar semenjak abad yang lalu. Walau bagaimanapun, sebahagian daripada fomulasi pemulihan untuk makanan alternatif dan perubatan telah lupa kerana kewujutan teknologi farmaseutikal dan industri. Oleh itu, pengguna mula mengambil makanan berfungsi sintetik. Pertumbuhan ekonomi dan keinginan yang kuat di kalangan pengguna Malaysia untuk mengekalkan gaya hidup yang sihat dan kesedaran yang semakin meningkat terhadap bahan-bahan berfungsi memacu makanan berfungsi dan pasaran minuman. Walaupun pengambilan makanan berfungsi semakin meningkat, hanya sedikit infomasi yang diketahui tentang bagaimana pengguna melihat produk-produk ini dan faktor-faktor mempengaruhi penerimaan mereka terhadap makanan berfungsi semulajadi dan sintetik di Malaysia. Oleh itu, untuk mencapai kejayaan dalam pemasaran makanan berfungsi, semua firma-firma yang terlibat dalam industri makanan perlu meneroka niat pengguna untuk menerima ke arah makanan berfungsi sama ada mengandungi bahan semula jadi atau bahan sintetik dan sebab mengapa pengguna memilih produk tersebut sebagai sebahagian daripada diet harian mereka. Objektif kajian ini adalah untuk menentukan hasrat pengguna Malaysia untuk menerima makanan berfungsi semulajadi dan sintetik. Kajian telah dijalankan di Malaysia di mana dua ribu empat (2004) isi rumah telah ditemuramah menggunakan kaedah soal selidik berstruktur. Teori rancangan perlakuan (TPB) dan Kepercayaan Kesihatan Model (HBM) digunakan dalam kajian tersebut. Data yang dikumpul akan ditafsir menggunakan statistik deskriptif , faktor analisis dan pemodelan persamaan struktur.

Keputusan menunjukkan bahawa satu perempat daripada responden tidak biasa dan tidak dapat membezakan antara makanan berfungsi semula jadi dengan sintetik. Kebanyakan responden percaya bahawa makanan berfungsi adalah makanan perubatan, diikuti dengan makanan konvensional, makanan untuk kegunaan diet khusus , makanan yang diubahsuai dan nutraseutikal. Hanya satu perempat daripada

responden selalu membeli makanan berfungsi kerana mereka mahu kekal sihat, untuk mengelakkan rawatan perubatan dan untuk kekal menarik. Walau bagaimanapun , keputusan menunjukkan bahawa majoriti responden lebih suka memakan makanan berfungsi semulajadi daripada makanan berfungsi sintetik .

Berdasarkan faktor analisis, lima faktor akan mempengaruhi niat pengguna untuk menerima makanan berfungsi semula jadi. Faktor-faktor ini adalah seperti berikut: kerentanan persepsi, halangan persepsi, sikap pengguna , norma subjektif dan manfaat makanan berfungsi semula jadi tersebut. Tetapi, tujuh faktor telah dikenal pasti boleh mempengaruhi niat pengguna untuk menerima makanan berfungsi sintetik seperti kerentanan persepsi, persepsi halangan ke arah makanan sintetik berfungsi, sikap pengguna , norma subjektif, manfaat tersebut , kawalan tingkahlaku yang dilihat dan tahap persepsi. Keputusan pemodelan persamaan struktur menunjukkan bahawa set data adalah normal, sah dan boleh dipercayai. Keputusan bagi makanan berfungsi semula jadi menunjukkan bahawa sikap mempunyai kesan perantara separa halangan persepsi, kecenderungan persepsi dan manfaat yang mempengaruhi niat pengguna untuk menerima makanan berfungsi semula jadi. Walau bagaimanapun, sikap tidak mempunyai kesan pengantaraan norma subjektif terhadap bentuk niat pengguna untuk menerima makanan berfungsi semula jadi. Dalam perkataan lain, norma subjektif mempunyai pengaruh langsung ke atas niat pengguna untuk menerima makanan berfungsi semula jadi. Selain itu, keputusan daripada makanan berfungsi sintetik menunjukkan bahawa sikap akan menjadi pengaruh sepenuhnya terhadap kesan norma subjektif untuk membentuk niat pengguna supaya menerima makanan berfungsi sintetik. Walau bagaimanapun , sikap mempunyai kesan tidak langsung kepada halangan persepsi, kecenderungan persepsi dan kawalan tingkahlaku persepsi untuk membentuk niat pengguna supaya menerima makanan berfungsi sintetik. Sikap pengguna juga akan mempengaruhi sebahagiannya manfaat persepsi dan tidak ada pengaruh di tahap persepsi niat pengguna untuk menerima makanan berfungsi sintetik. Selain itu , hasil pemodelan persamaan struktur juga menunjukkan bahawa terdapat kesan sederhana daripada jantina, status perkahwinan, umur , tahap pendidikan dan tahap pendapatan terhadap model keseluruhan.

Makanan berfungsi menjadi semakin penting bagi industri makanan terutama di Malaysia. Untuk berjaya dalam makanan pasaran berfungsi di dalam Negara atau di peringkat antarabangsa, pengeluar atau pemasar perlu memahami dan mendapatkan maklumat yang berkaitan dengan pengguna. Strategi pemasaran untuk makanan berfungsi semulajadi dan sintetik perlu mengambil kira segmentasi pasaran kerana setiap produk mempunyai pasaran tersendiri. Dasar hendaklah memberi peluang kepada pengeluar dan pengilang untuk memberi bukti tentang makanan berfungsi semulajadi dan sintetik adalah kebimbangan kepada kesihatan pengguna. Oleh itu, definisi antarabangsa untuk makanan berfungsi perlu diguna oleh kerajaan atau institusi supaya pengguna dapat membezakan yang makanan berfungsi dengan produk makanan yang lain.

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I certify that a Thesis Examination Committee has met on 19 November 2014 to conduct the final examination of Phuah Kit Teng on her thesis entitled "Malaysian Consumers' Acceptance of Natural and Synthetic Functional Food" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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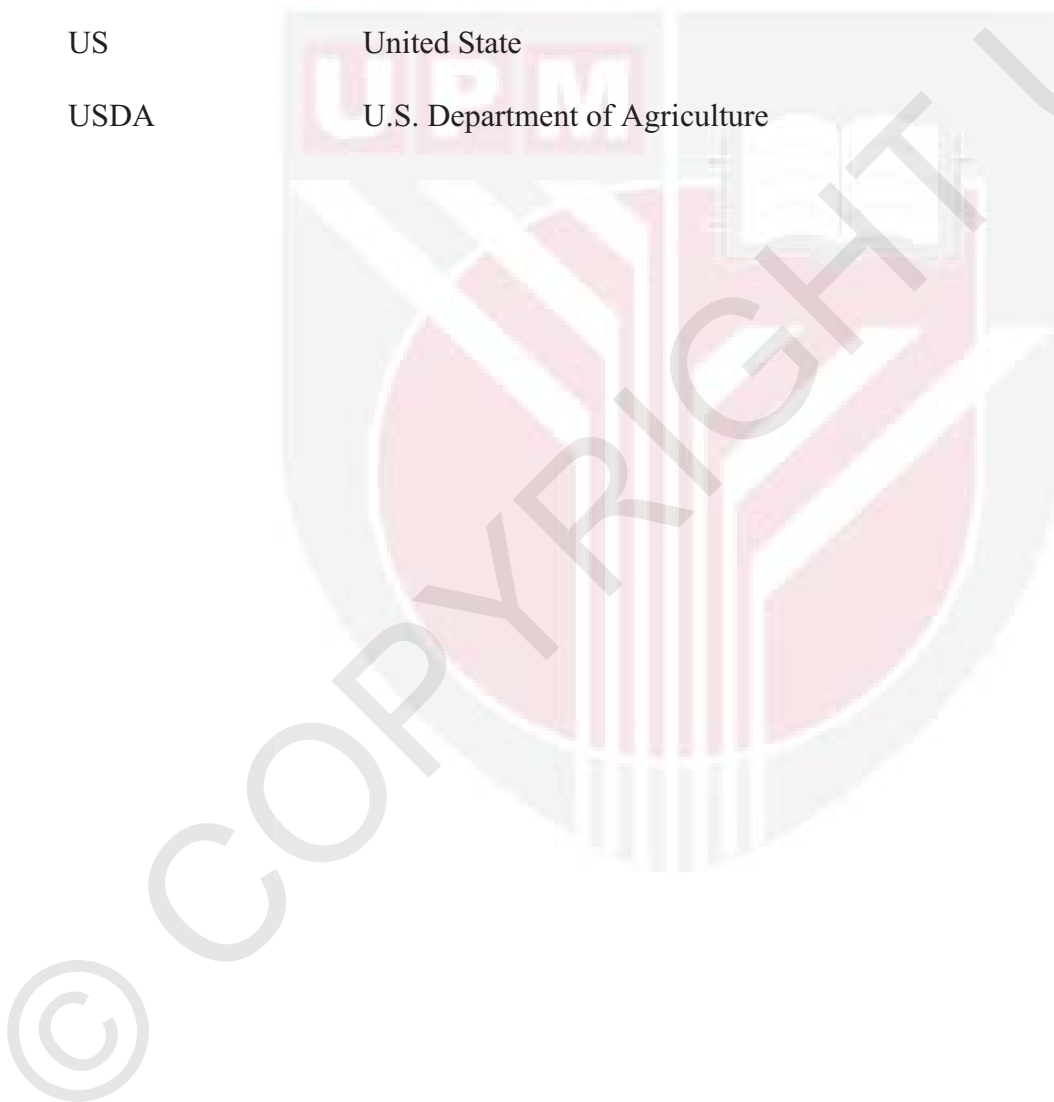
LIST OF ABBREVIATIONS

AAFC	Agriculture and Agri-Food Canada
ADA's	American Dietetic Association's
ASEAN	Association of Southeast Asian Nations
AMSA	Asian Medical Students' Association
ANOVA	Analysis of variance
AMOS	Analysis of Moment Structures
AVE	Average Variance Extracted
AGFI	Adjusted Goodness of fit indices
AIC	Akaike Information Correction
ATTN	Attitude towards Natural Functional Food
ATTS	Attitude towards Synthetic Functional Food
BDD	Blood Donation Drive
BMI	Body Mass Index
BSU	Basic Sampling Units
CPR	Cardiopulmonary Resuscitation
CFA	Confirmatory factor analysis
CFI	Comparative Fit Index
CR	Construct reliability
CMIN	Chi-Square
DSHEA	Dietary Supplement and Health Education Act
DF	Degree of Freedom
EU	European Union
EYS	Eu Yan Sang
EFA	Exploratory Factor Analysis

FOSHU	Food for Specified Health Uses
FAO	Food and Agricultural Organization
FSANZ	Food Standards Australia New Zealand
FDA	Food and Drug Administration
FFNHPP	Functional Food and Natural Health Products
F&N	Fraser & Neave
GAP	Good Agriculture Practice
GMP	Good Manufacturing Practice
GLS	Generalized Least Squares
GFI	Goodness of fit indices
HACCP	Hazard Analysis and Critical Control Points
HBM	Health Belief Model
IFIC	International Food Information Council
IFT	Institute of Food Technologists
ISO	International Organization for Standardization
IFI	Incremental Fit Index
IA	Intention to accept natural functional food
IAS	Intention to accept synthetic functional food
JAKIM	Department of Islamic Development Malaysia
MDD	Mamee Double Decker
MMU	Multimedia University
MBG	Money Back Guaranteed
MPMT	Modified Protection Motivation Theory
MANOVA	Multivariate Analysis of Variance or Multiple Analysis of Variance

MHW	Modern Health Worries
ML	Maximum Likelihood
NRTs	Norm Referenced Tests
NFI	Normed Fit Index
NGOs	Non-governmental Organization
NADI	National Diabetes Institute
NFK	National Kidney Foundation
NLEA	National Labelling Education Act
OCD	Office of the Campus Director
PCC	Primary Care Clinic
PMT	Protection Motivation Theory
PCA	Principal Component Analysis
PGFI	Parsimony Goodness-of-Fit Index
PNFI	Parsimony Normed Fit Index
PBENE	Perceived Benefits of Natural Functional food
PBAR	Perceived Barrier of Natural Functional food
PSUSCEP	Perceived Susceptibility
PBC	Perceived behavioral control
PSEVE	Perceived Severity
PBANS	Perceived Barrier of Synthetic Functional food
PBENES	Perceived Benefits of Synthetic Functional food
RMSEA	Root Means Square Error of Approximation
SCT	Social Cognitive Theory
SEM	Structural Equation Modeling
SRMR	Standardized Root Mean Square Residual

SNN	Subjective Norm of Natural Functional food
SNS	Subjective Norm of Synthetic Functional food
TLI	Tucker Lewis Index
TIB	Theory of Interpersonal Behavior
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behavior
TCM	Traditional Chinese Medicine
US	United State
USDA	U.S. Department of Agriculture



CHAPTER 1

INTRODUCTION

1.1 Functional Food Market in Malaysia

Malaysia has a sizeable functional food and drink market within its very large food and beverage market, which is now valued at more than RM 30 billion (Stanton et al., 2011). Currently, there are no dedicated tariff codes for functional food in Malaysia because it is still not officially defined (FAO, 2004).

According to the estimation done by Stanton et al., (2011), functional food in Malaysia now comprises of about 30% of the total processed and 40% of the retail packed food and drink market respectively and the segments with the greatest concentration of functional products involve energy drinks, infant and other milk formulas, dairy based drinks, sports drinks, fruit juices, breakfast cereals, energy bars, biscuits and baked products. Increasingly, consumers are looking at food beyond its nutritional purpose (Blaylock et al., 1999; Rozin et al., 1999; West et al., 2002) and considering a more broad set of attributes when making their food purchasing decisions (Blaylock et al., 1999; Labrecque et al., 2006). Table 1.1 shows the trade values for medicinal plants in Malaysia. The import of medicinal plants has increased by 32.2 percent from 1992 to 2007. The import of medicinal plants steadily increased from 1992 (RM 300,650,848) to 2007 (RM 931,550,000). This shows that they were getting popular among the Malaysian consumers.

Table 1.1. Trade Values for Medicinal Plants in Malaysia (1992-2007)

Year	Import (RM)	Export (RM)
1992	300650848	13328122
1993	325601893	24710644
1994	366984834	39675844
1995	409897294	46396189
1996	430561164	63393333
1997	383510070	52827946
1998	393577176	47774856
1999	626666188	83147090
2000	575302822	62455191
2001	652961393	72603422
2002	649725014	84154937
2003	621462941	92222895
2004	757224533	74295876
2005	785220857	87761434
2006	846488986	74635418
2007	931550000	-

(Source: Global Information Hub on Integrated Medicine, 2011)

According to Stanton et al., (2011), the estimates for the consumption of functional drinks range between 120 million and 130 million litres per annum and the majority are energy drinks and dairy-based products. The majority of functional drinks consumed are made in Malaysia or in the ASEAN countries with majority larger portion being imported from Thailand. Due to the high retail price, imports of functional drinks from other parts of the world are relatively small and can only be sold in the high-end supermarkets. Figure 1.1 shows the long term sales trends in functional drinks in Malaysia. Long term development trends in functional drink market have been positive, although the niche has been a challenge to develop in a price sensitive market in terms of the competitive activities of mainstream drinks such as carbonated drinks. However, Asian type drinks still maintain their strong place in the market such as fruit juices and dairy-based beverages.

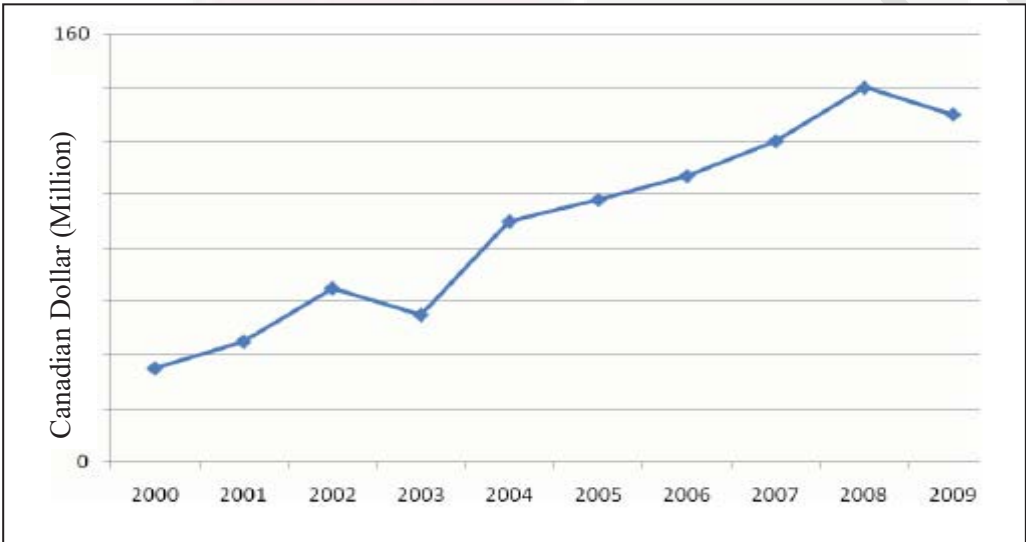


Figure 1.1. Long Term Sales Trend in Functional Drinks in Malaysia, 2000-2009
(Source: Stanton et al., 2011)

Table 1.2 shows Malaysia’s import of natural honey and yogurt from the year 2006 to 2011. The table shows that the import of natural honey steadily increased from 2006 to 2009 but started to drop from 2010 to 2011. The table also shows that the import of yogurt slightly dropped from 2006 to 2007 but from 2008 it steadily increased until 2011.

Table 1.2. Malaysia Import of Natural Honey and Yogurt, 2006-2011

Years	Natural Honey		Yogurt	
	Quantity (MT)	Value (Mill. US\$)	Quantity (MT)	Value (Mill. US\$)
2006	2482.83	4.25	481.36	0.95
2007	4926.53	6.70	64.50	0.21
2008	6749.45	8.01	125.97	0.48
2009	8232.91	9.33	351.92	0.81
2010	7913.57	9.49	385.57	0.93
2011	3159.66	13.64	1187.92	3.22

(Source: APEDA Agriexchange, 2006-2011)

Functional food is classified as food and must comply with the food regulations. According to the Ministry of Health (2010), if a product contains 80% or more of food ingredients, either singly or in combination, and with equal to or less than 20% biologically active ingredients of natural products with pharmacological and/or therapeutic properties, the product is regarded as a food product and for products containing specific ingredients which possess high potencies, even if they contain less than 20% of the active ingredients, they shall be classified as drugs and regulated under the Control of Drugs and Cosmetics Regulations.

1.1.1 The Distribution Channels for Functional Food in Malaysia

In Malaysia, functional food is mainly distributed through Malaysia's retail channels. Some "nutraceutical" ingredients such as Chinese-type herbs are being imported directly by those involved in making locally manufactured medicinal products (Stanton et al., 2011). Many of the functional food channels are dominated by the major supermarket operators such as Cold Storage, Aeon, Carrefour and Tesco. For example, functional drinks such as isotonic drinks, energy drinks, cultured yogurt and cultured milk drinks have very broad distribution channels from street side drink stalls to giant size hypermarkets or supermarkets. This can be a proof that in Malaysia, there is an increase in the variety of functional food stocked in larger retail businesses such as supermarkets, hypermarkets and department stores. Figure 1.2 shows the distribution channels of food and drinks in Malaysia.

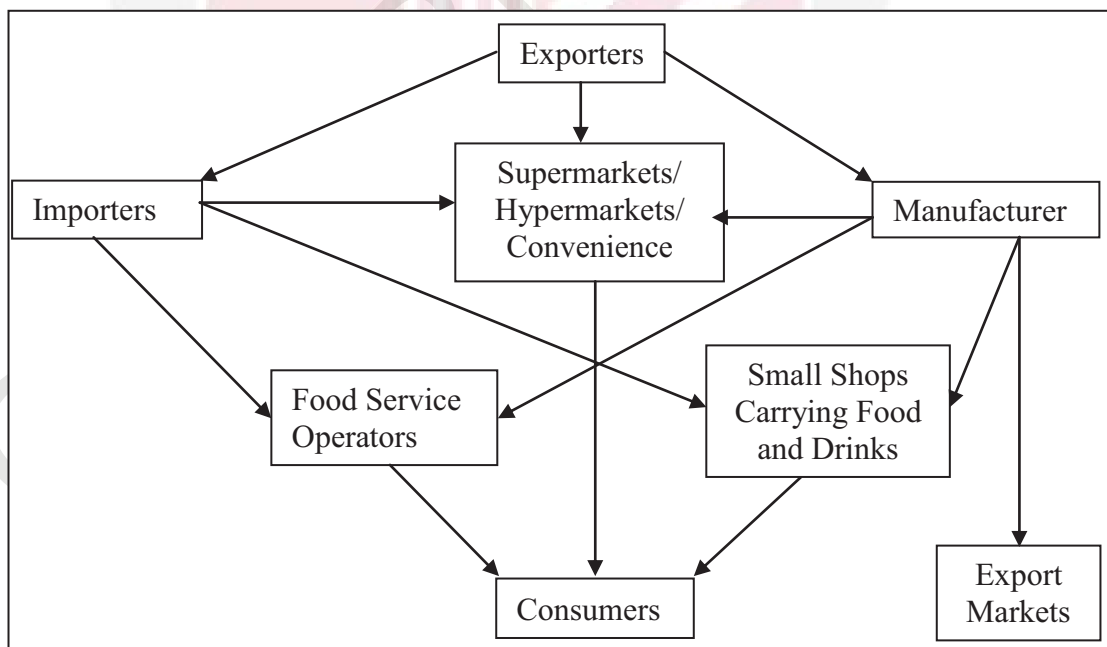


Figure 1.2. The Distribution Channel of Food and Drinks in Malaysia
(Source: Stanton et al., 2011)

Figure 1.2 shows that Malaysia's food and drink retail sector has been consolidating around larger business groups such as Tesco, Cold Storage, AEON and Giant over

the past 15 years. Modern trade has over 90% of imported food and drink products distributed in the country come from Western countries. At retail level, the bulk of imported retail packed food and drink products which include functional food is distributed through supermarkets and hypermarkets.

Small privately owned and operated functional and health food shops are generally single site operations, although some of them may have multiple outlets in different locations. There are an estimated 700 to 750 health food outlets operating all across Malaysia today (Stanton et al., 2011). Some of these outlets operate a small cafe or a food service area within their store in larger chains of health food shops, pharmacies, personal care shops and specialist nutraceutical retailers. Some of these retail stores are also involved in importing functional food and nutraceuticals.

However, functional food is not well differentiated in Malaysia's retail channels. It is generally displayed amongst the conventional food products such as sports drinks, frozen food, instant food, infant and other milk formulas and breakfast cereals. They are packaged in the same manner as non-functional food and drinks, they share the same top line brands as the non-functional food version. However, functional food is not labeled as "functional" so Malaysian consumers are usually not aware that they are purchasing "functional food". These products are not actively promoted as "functional food" but usually form part of the wider marketing, advertising and market segmentation activities of their suppliers (Stanton et al., 2011).

1.1.2 Functional Food Producers

In Malaysia, functional food and drink production has had quite a long history. In 1990s, there was a proliferation of functional food and drinks in the market. This occurred when major local and ASEAN regionally-based food manufacturers competed to introduce new product lines to create new market niches by capitalizing on the emerging health trends and to expand their market shares. There are a few Malaysia-based food manufacturing companies that are involved in the production of functional food.

Hai-O was the first traditional healthcare company listed on Bursa Malaysia Securities Berhad. They offer a wide range of complementary medicine, medicated tonic, wellness, beauty and healthcare products and clinical services. Hai-O is involved in both wholesale and retail, multi-level marketing, pharmaceutical manufacturing and Chinese medicinal clinics. Table 1.3 shows Hai-O products.

Table 1.3. Products of Hai-O

No.	Products Categories	Products	Sub-Products
1.	Herbs and Bird's Nest	Bird's Nest	i. Royal Bird's Nest Concentrate
			ii. Bird's Nest American Ginseng with White Fungus & Rock Sugar
			iii. Imperial Instant Bird's Nest
			iv. Bird's Nest with Ginseng, Aloe Vera & Rock Sugar
			v. Golden Instant Bird's Nest
Cordyceps		i. Cordyceps Capsule	
		ii. Cordyceps capsules gift packs	
		iii. Hai-O Cordyceps King	
Herbal soup		i. American Ginseng Soup	
		ii. Toddler Appetizing Soup	
		iii. Vision Enhancement Soup	
		iv. Vital Energy Soup	
		v. Lung Nourishment Soup	
2.	Tea	Green tea	Lung Ching
		Pu-Er Tea	Xinchun Diyi Bing
3.	Health Supplement	Man	i. Strengthon Capsule
			ii. Male Silkworm Chiew
			iii. Tze Pao San Pien Pills
	Children		i. Honbo Hanicare
			ii. Toddler Appetizing Soup
	General Health Supplement		i. Jiao Gu Lan Tea
			ii. Chicken essence with american ginseng and cordyceps
iii. Peking Liu Wei Wan			
Women		i. MingZhu Bai Feng Wan	
		ii. Ba Zhen Wan (concentrated pills)	
4.	Health food and drinks	Health drinks	i. Bamboo Salt Premier Drink
			ii. Bamboo Premier Cooking Powder
	Health food		i. Hashima
			ii. Digest Plus Meal

(Source: Hai-O, 2013)

Eu Yan Sang (EYS) is one of the global health care companies and the oldest company in Malaysia famous for Traditional Chinese Medicine (TCM) products. Eu Yan Sang manufactures and retails traditional Chinese medicine and herbs in Malaysia, Singapore, Hong Kong, Macau and China. Currently, the company has more than 80 retail outlets throughout Malaysia (Business Innovation Series, 2012).

Eu Yan Sang sources their herbs only from reliable and reputable suppliers which have Good Agriculture Practice (GAP) certification. To ensure the quality, efficacy and safety of their products, EYS has demonstrated full GMP accreditation for unmatched quality assurance from the harvesting to the manufacturing process. Eu Yan Sang has over 1,000 types of finest raw herbs and more than 900 products under the Eu Yan Sang (EYS) brand and sub-brands. In anticipation of the modern and hectic lifestyle, EYS has widened its product range to include health food, dietary supplements, beverages, packaged tonic soups and personal care items. Table 1.4 shows the TCM products that are manufactured and retailed by EYS.

Table 1.4. TCM Products Manufactured and Retailed by EYS

No.	Products Categories	Products	Sub-Products	Ingredient
1.	Health food	Honey series	Raw honey Clover honey Manuka honey	100% pure honey and free of any artificial flavouring, colouring and preservatives.
		Enzyme series	Men's Power Monroe enzyme Teens' WITS	Naturally fermented from health-enhancing ingredients
		Essence of chicken series	With Wild America Ginseng With wolfberry and red date With Danggui and Pearl With Gingko Bibola	Made from premium-grade chicken together with premium herb
		Herbal Jelly Series	Lingzhi herbal jelly Pearl herbal jelly Peppermint herbal jelly	Made from a combination of natural herbal ingredients
2.	Flagship products	Bak Foong pill	Available in capsule, pill and sachet	Ginseng, Deer's Antler, Cinnamon Inner Bark, Eucommia Bark and other groups of herbs
		Bo Ying compound		Traditional Chinese Medicine
No.	Products Categories	Products	Sub-Products	Ingredient
3.	TCM Herbs	American Ginseng Bird's Nest Chinese Angelica Cordyceps		Raw Herbs
4.	TCM Solution	Cough and cold series	Hou Ning Powder Cold cough Hou Zao Chen Pi Mo Hot Cough Hou Zao Chun Bei Mo Pure Pearl Powder Cough relief granules	Made from natural ingredients with no additives and contains animal part.
		Classical formulaes	Heat expulsion granules Sleep formula granules Fever relief granules Pak Poh powder	Made from Traditional Chinese medicine
		Modern Health Solutions	H4H Hair formula capsules Spot whitening capsules Menoease pill	Made from a combination of natural herbal ingredients
		Vitality and immunity	Extra Strength Lingzhi Cracked Spores Cordyceps Mycelia	Lingzhi spore powder) 100% Cordyceps Mycelia extract

(Source: Eu Yan Sang, 2013)

Himalaya Herbal Healthcare uses the tools of modern science to create pharmaceutical grade ayurvedic products. Their vision is to bring the traditional Indian science of Ayurveda to the people in a contemporary form. Pioneered research was done and they focused on converting the Ayurveda's herbal tradition into a range of proprietary formulations dedicated to healthy living and longevity. Himalaya shares a close relationship with nature after eight decades in the area of herbal research. Himalaya not only promotes good health but it is also trying to help and preserve the environment by protecting the biodiversity, collecting herbs in a sustainable way and promoting good agricultural practices.

Himalaya products are prescribed by 400,000 doctors worldwide and have found acceptance with medical fraternities and serve the health and personal care needs of consumers in 89 countries. Amongst 500 top pharmaceutical companies in India, Himalaya ranks thirty-first and their brand Liv.52, Cystone, Bonnisan and Septilin are leaders in their categories. Liv.52, is the only herbal medicine ranked amongst the top ten bestselling medicines in India. Table 1.5 shows the products that are provided by Himalaya.

Table 1.5. Products of Himalaya

Products Categories	Products	Ingredient	Functions
Pharmaceuticals	Koflet	Honey, Holy Basil, Licorice	The cough reliever
	Septilin	Tinospora Gulancha (<i>Guduchi</i>), Licorice (<i>Yashtimadhu</i>), Indian Bdellium (<i>Guggulu</i>)	Builds the body's own defense mechanism
	Reosto	Indian Country Bdellium (<i>Guggulu</i>), Mallow (<i>Bala</i>), Arjuna (<i>Terminalia arjuna</i>)	Manages osteoporosis, Anti-inflammatory
	Diabecon	Gymnema's (<i>Meshashringi</i>), Indian Kino Tree's (<i>Pitasara</i>), Shilajeet	Combats diabetes, Anti-hyperglycemic
	Diarex	Coneru (<i>Kutaja</i>), Bael (<i>Bilva</i>)	Antimicrobial and antidiarrheal, Ensures gastrointestinal (GI) health
Personal care	AyurSlim	Garcinia, Indian Bdellium, Gymnema, Chebulic Myrobalan, Fenugreek	Weight management
	DigesTea	Mint, Cardamom, Fennel, Ginger, Black Pepper	Helping digestion
	SleepTea	Indian Valerian, Intellect Tree, Gotu Kola	Sleep soundly
	StressTea	Tinospora Gulancha, Winter Cherry, Gotu-Kola, Holy Basil, Indian Gooseberry, Asparagus	calms your nerves

(Source: Himalaya Health Care, 2013)

Nature's Farm is the first local health food chain to regionalize business in South-east Asia and the first specialty health supplement retail chain in Singapore that offers a wide range of quality health supplements at affordable prices. Nature's Farm has operations in Singapore, Malaysia and Brunei. The vision of Nature's Farm is to deliver high quality nutritional and health food supplements at best values to their customers. They provide a comprehensive range of health products which include vitamins and minerals, diabetic and organic food, body building and sports supplements, beauty and slimming formulae to skin care and hair care products. Table 1.6 shows the list of supplements provide by Nature's Farm.

Table 1.6. Supplements List of Nature's Farm

Products Categories	Products	Functions
Wellness	Pycnogenol	Antioxidant, support health inflammatory response, skin health, heart and cardiovascular health
	Norwegian fish oil	<ul style="list-style-type: none"> • Ensures normal blood lipid profile • Provides essential nutrients for healthy skin, brain, eyes and nerves • Prevents flare-up of body defense system that causes swelling and affects joint mobility • Supports the normal production of serotonin – 'feel good' hormone
	KYO-DOPHILUS® 9	Boasts nine friendly human strains of bacteria to care for all areas of intestinal function
Beauty/ Weight Management	Collagen matrix	<ul style="list-style-type: none"> • Re-establish youthful skin suppleness and elasticity • Support a glowing, radiant complexion • Promote the skins cellular efficiency to effectively remove metabolic wastes and impurities • Improve hair, nails, teeth and connective tissue
Brain & Memory	IQ Memory	<ul style="list-style-type: none"> • Support optimal intellectual performance • Boost memory and alertness • Improved mood and calms the mind
Eye Health	Clear eye formula	<ul style="list-style-type: none"> • Provide relief for tired and dry eyes • Guard overall eye health
Heart Health	Kyolic Formula 109	<ul style="list-style-type: none"> • Support healthy blood pressure • Strengthen cardiovascular Health • Alleviates daily stress
Others	Manuka Honey	Treat burns, ulcers and sore throat
	Yummi Bears	Provide vitamins and minerals
	Multi Vitamin	

(Source: Nature's Farm, 2013)

Nestlé Malaysia which is the country's largest food and drink company supplies a wide range of functional and enriched food products which it claims as health and wellness products. All of these products are certified by JAKIM. The products by this company are either made locally or in another ASEAN region based factory. The lists of functional or enriched food products produced by Nestlé Malaysia are shown below:

- a) Ready-to-drink Milo, fortified with, PROTOMALT, ACTIGEN-E, a combination of 8 vitamins (B1, B2, B3, B5, B6, B8, B12 and C) and 4 minerals (Iron, Magnesium, Calcium and Phosphorus).
- b) Ready-to-drink NESTEA Ice Tea, fortified with Calcium.
- c) Breakfast cereals with iron, calcium, protein and vitamin C.
- d) Fat free yogurt drink, with Inulin (fibre) and live cultures (*Lactobacillus acidophilus*, *Bifidobacterium lactis* and *Streptococcus Thermophilus*) which are the good bacteria that maintain a good intestinal environment and improve digestion and absorption of vital nutrients from food.
- e) A range of health care products under the NUTREN brand, which claim to provide a complete meal replacement for convalescents.
- f) Energy bars fortified with 17 vitamins such as Ascorbic Acid, Retinyl Acetate, Thiamin Hydrochloride, Riboflavin and minerals such as Calcium Carbonate, Iron Oxide, Zinc Oxide.
- g) Adult milk products such as Nestlé Omega Plus milk which is high in calcium and contains ACTICOL with added plant sterols and the recommended amount of Omega 3 and Omega 6.
- h) Nesvita Calciplus milk drink which is high calcium milk with CALCILOCK. CALCILOCK and contains a combination of bone nutrients such as calcium, zinc, magnesium, phosphorus, vitamin C and vitamin D.

Fraser & Neave (F&N) is one of Malaysia's largest food and drink processors. It also produces a wide range of different functional and enriched food and drink products. Examples are:

- a) Farmhouse Omega Milk, which is claimed by this company to be Malaysia's first pasteurized low fat fresh milk that contains omega 3, folic acid, DHA, EPA calcium and vitamin E.
- b) Sunkist branded juices that are high in antioxidants, vitamin A, vitamin C, vitamin E and rich in fiber.
- c) Alive branded breakfast and energy bars contain omega 3 fatty acids, vitamin B2 and vitamin E.

Mamee Double Decker (MDD) group of companies produce cultured milk drinks in Malaysia. MDD has produced Nutrigen brand with added Choline. Choline is a precursor of the neurotransmitter acetylcholine or an important neurotransmitter which controls diverse neural functions such as memory and muscle function.

Malaysia Dairy Industries PTE LTD which is also one of the companies that produces cultured milk drinks have come out with Vitagen brand. Vitagen is claimed to be Malaysia's No 1 cultured milk brand. This cultured milk includes dietary fibre (Inulin and polydextrose), fructose, sucrose, milk solids, glucose, permitted stabilisers and probiotics (*Lactobacillus Culture*).

Yakult Malaysia provides high quality probiotics in the form of a cultured milk drink. Yakult contains the probiotic bacteria "*Lactobacillus casei* Shirota." The Shirota strain is scientifically proven to be among the 'strongest' strains of beneficial

bacteria, and has been shown to benefit human health. Yakult has the highest concentration of probiotics compared to other probiotic products on the market.

Kraft operates a major Asian regional biscuit and snack production facility in Malaysia. Under their Jacobs brand, they produce a wide range of enriched crackers and biscuits. Their products are high in fiber, low in salt, oatmeal infused and fortified. They contain the company's own *Enermaxx* branded enrichment formula which is a combination of nine vitamins such as vitamin A, B1, B2, B3, B5, B6, B12, D & E and six minerals (calcium, magnesium, iron, phosphorus, zinc and iodine). Kraft also has a range of Tiger branded children's biscuits that are enriched with calcium, inulin and probiotic fiber.

Permanis which is a Malaysia-based soft drinks company has included energy drinks, sports drinks and enriched fruit juices in its product portfolio. Its products include Gatorade and Revive which are enriched with vitamins B3, B6 and B12, Sting, an energy drink that is enriched with Panax Ginseng extract, and Tropicana Twister Orange which is enriched with vitamins A, C and E.

Yeo Hiap Seng is another large Malaysian food and drink company which produces an isotonic drink under the H-Two-O brand or Asian fruit drinks, such as Soursop (a tropical fruit) enriched with vitamins B and C, calcium iron and a high fiber coconut juice.

1.2 Health Issues in Malaysia

The concept of maintaining a healthy lifestyle and nutritious diet is well entrenched in the minds of the majority of the Malaysians. Malay, Indian and Chinese herbal medicine and wellness traditions are well established in the nation. Most Malaysians have some knowledge of the traditional herbs which is usually passed down through the generations. Malaysians also get information about the functions of synthetic functional food through media, advertisements, government and private sectors.

Dramatic changes in the urban lifestyles have created health and nutrition problems with a rapid increase in obesity, hypertension, diabetes and coronary heart disease rates. According to the Ministry of Health (2009), the main causes of death in Malaysia were heart disease (16 percent), septicemia (14 percent), cancer (11 percent) and pneumonia (11 percent). Approximately 8 percent of the adult population suffers from diabetes. This can be blamed on the changing lifestyles which include a high intake of sugar and a lack of physical exercise. Around 63 percent of the nation's obese adults are women, with the rate for men being significantly lower at 37 percent. Table 1.7 shows the distribution numbers of active diabetic patients from 2008 to 2010. It shows that the number of active diabetics has steadily increased from 574,983 Malaysians in 2008 to 659,938 in 2010.

Table 1.7 Distribution of Number of Active Diabetic Patients, 2008-2010

	2008	2009	2010
No of Active Diabetics	574983	629151	659938
No of Newly Registered	67271	70079	78784

(Source: Ministry of Health Malaysia Annual Report, 2008; 2009; 2010)

Table 1.8 to Table 1.10 shows the top five most common cancers among women and men in Malaysia. According to the Ministry of Health Malaysia (2010), they are breast cancer, colorectal cancer, lung cancer, nasopharynx cancer and leukaemia. In terms of genders, the top five most common cancers among male Malaysians are lung cancer, colorectal cancer, nasopharynx cancer, leukaemia and prostatic cancer. And the top five most common cancers among female Malaysian are breast cancer, colorectal cancer, cervix cancer, ovary cancer and lung cancer.

Table 1.8 Top Five Most Common Types of Cancer in Malaysia (Total of 2007-2010)

Cancer	Percentage (%)
Breast	18.5
Colorectal	12.8
Lung	10
Nasopharynx	5.7
Leukaemia	5.1

(Source: Ministry of Health Malaysia Annual Report, 2010)

Table 1.9 Top Five Most Common Types of Cancer for Men in Malaysia (Total of 2007-2010)

Cancer	Percentage (%)
Lung	15.9
Colorectal	15.5
Nasopharynx	9.8
Leukaemia	6.7
Prostatic	6.1

(Source: Ministry of Health Malaysia Annual Report, 2010)

Table 1.10 Top Five Most Common Cancer for Women in Malaysia (Total of 2007-2010)

Cancer	Percentage (%)
Breast	32.8
Cole rectum	10.3
Cervix	8.7
Ovary	6.1
Lung	5.4

(Source: Ministry of Health Malaysia Annual Report, 2010)

Table 1.11 shows the health risks detected during screening in health clinics from the year 2009 to 2010. It shows that health risks such as physical inactivity, being overweight and obesity are increasing among the Malaysian. This phenomenon has caused some of the consumers to use slimming or health products both natural and synthetic to maintain a good body shape and a healthy lifestyle.

Table 1.11 Health Risks Detected During Screening in Health Clinic, 2009-2010

Health Risks	2009 (%)	2010 (%)
Physical Inactivity	7.62	13.3
Being Overweight	8.38	11.1
Smokes	11.53	10.8
Raised Blood Pressure	9.1	8.1
Obesity	5.36	5.5
Raised Glucose Level	4.66	4.6
Unhealthy Dietary Habits	-	7.4

(Source: Ministry of Health Malaysia Annual Report, 2009; 2010)

Table 1.12 shows the incidence rate of food and water borne disease. It shows that incidence rate of cholera, food poisoning and hepatitis A increased from 2006 to 2011. Thus, consumers have become more aware of the kind of food they consume. The use of excessive chemicals and additives and synthetic ingredients in food production, manufacturing and pharmaceutical industry has caused side effects on the health of the consumers, thus forcing them to search for products that are said to be safe to consume. They are also looking for natural products that can be used as an alternative food or medicine to combat or prevent some ailments

Table 1.12 Incidence Rate of Food and Water Borne Diseases (per 100,000 populations), 2006-2011

Disease \ Year	Year					
	2006	2007	2008	2009	2010	2011
Cholera	0.89	0.49	0.34	0.98	1.56	2.02
Dysentery	0.39	0.54	0.33	0.54	0.37	0.15
Food Poisoning	26.04	53.19	62.47	36.17	44.18	56.25
Hepatitis A	0.24	0.35	0.13	0.14	0.14	1.71
Typhoid	0.77	1.20	0.72	1.07	0.74	0.84

(Source: Ministry of Health Malaysia Annual Report, 2006; 2007; 2008; 2009; 2010; 2011)

1.3 Self Medication in Malaysia

The rapid change in the socio-economic growth of the past three decades has brought about significant changes to the lives of the Malaysian population. First of all, due to the hectic lifestyle, there has been an increasing trend in self-medication with non-prescription drugs available in pharmacies and retail outlets (Abdul et al., 2012). According to Montastruc *et al.* (1997), self-medication can be defined as a person obtaining and consuming drugs without the advice from a physician either for

diagnosis, treatment or monitoring. The changes in consumer urban lifestyles along with the positive economic conditions have influenced consumers to choose health products such as health supplements and alternative medicine such as the traditional medicine for quick relief from minor ailments (Stanton et al, 2011). Consumer confidence in self-medicating has dramatically increased such as in reported cases of using herbal traditional medicine by the female students in Malaysia (Sohair et al., 2010) or using nutritional and energy supplements by those in a private university in Malaysia (Abdul et al., 2012). Table 1.13 shows the medicine storage among the female students in Malaysia. It shows that 10.8 percent of the female students stocked vitamins and minerals and 3.5 percent of them stocked herbal medicine. However, there were 22.9 percent of the female students who did not stock any medicine.

Table 1.13. Medicine Storage among the Female Student in Malaysia

Types of medicines stocked by female students for emergency purposes	Percentage
Analgesics & antipyretics	30.2
ENT Drug	10.8
Vitamins and minerals	10.8
GIT Drugs	8.5
Anti-infections	7.3
Herbal Medicine	3.5
Respiratory system drugs	3.1
Skin Products	2.3
Other medicines	0.6
No medicine stocks	22.9

(Source: Sohair et al., 2010)

Table 1.14 shows the reasons of self medication among the female students in Malaysia. The main reason behind female students' self-medication was their knowledge about the disease and functions of the medicine, followed by saving time to self-medicate and the medication given by a health provider such as a doctor and a physician not being effective.

Table 1.14. Self-medication among the Female Students in Malaysia

Reasons of self-medication practice	Percentage
Saves time	14.4
Knowledge about disease and treatment	58
Medication given by provider not effective	8.5

(Source: Sohair et al., 2010)

Table 1.15 shows the reasons for using herbal traditional medicine by the female students in Malaysia. A quarter of the female students chose to use herbal traditional medicine because they believed it was effective. Some of them believed in the functions of traditional herbal medicine and its safety and having fewer side effects than the other medicine. And 7 percent of them consumed herbal traditional medicine because they got advice from friends and relatives to do so. The majority of the

students who used herbal medicine spent between 1 to 10 percent of their money on purchasing different types of traditional herbal medicine. Therefore it is not surprising to see an extensive use of alternative medicine especially traditional herbal medicine in Malaysia because it is a common socio-cultural behavior among Malays, Chinese and Indians (Mohd, 2003).

Table 1.15. Reasons for using Herbal Traditional Medicine by Female Students in Malaysia

Reasons for the use of herbal medicine	Percentage
Effective	28.9
Safe and with fewer side effects	16.8
I believe in traditional-herbal medicine	11.2
Advice from friends and relatives	7
Easy to obtain (availability)	6.7
Cheaper	4.6
Unsure about the real reason	4

(Source: Sohair et al., 2010)

1.4 Adverse Drug Reaction in Malaysia

Due to the consumer demand, there is an increase in the production of natural and synthetic functional food. Thus, there is a risk that new functional food might mislead the consumers to switch from a diverse, healthy diet to a basically unhealthy diet with an increased reliance on functional additives or modifications. Table 1.16 shows the number of adverse drug reaction reports received in Malaysia from 1987 to 2010. The number of reports is steadily increasing from 1987 to 2010.

Table 1.16 Number of Adverse Drug Reaction Reports Received, 1987- 2010

Years	Number of Reports	Years	Number of Reports
1987	10	2000	792
1988	38	2001	787
1989	40	2002	1000
1991	150	2003	1063
1992	216	2004	1665
1993	263	2005	2363
1994	233	2006	2543
1995	400	2007	3068
1996	530	2008	4826
1998	603	2009	5850
1999	875	2010	7079

(Source: Ministry of Health, 2010)

Table 1.17 shows the number of adverse reports by product category from 2008 to 2010. It is divided into six categories which are poisonous, non-poisonous, unregistered products, traditional products, food and cosmetics. As seen in Table 1.17, the number of adverse reports for traditional products increased by 71 reports from 2008 to 2009 but the number dropped to 57 in 2010. Adverse report for food

products remained the same from 2008 to 2010. However, adverse report for poison and non-poison products steadily increased from 2008 to 2010.

Table 1.17. Number of Adverse Reports by Product Category, 2008-2010

Product Category	2008	2009	2010
Poison	4546	6038	7134
Non- poison	236	236	443
Unregistered Products	80	76	96
Traditional Products	26	97	57
Food	18	-	18
Cosmetics	13	8	5

(Source: Ministry of Health, 2008; 2009; 2010)

Table 1.18 shows the number of adverse reports by pharmacological group in 2010. The table shows that in 2010 there were 127 adverse reports for consuming traditional medicine, 59 adverse reports on vitamins, 57 adverse reports on minerals and 17 adverse reports on food.

Table 1.18. Numbers of Adverse Reports by Pharmacological Group, 2010

Category	2010
Cardiovascular	1451
Anti Diabetic	251
Traditional Medicine	127
Vitamins	59
Mineral	57
Hormone	34
Food	17
Anti Obesity	1

(Source: Ministry of Health, 2010)

1.5 Mixed Opinion Surrounding Functional Food

There are a lot of arguments about the advantages and disadvantages of consuming natural and synthetic functional food. This is confusing for the consumers who cannot identify the difference between natural and synthetic functional food. A few authorities on nutrition have recognized and voiced their concerns over synthetic functional food not being good for the health and even doing more harm than good. According to Marion Nestle (2007), synthetic functional food is about marketing and not health. Moreover no synthetic functional food can ever replace the full range of nutrients and phytochemicals present in fruits, vegetables and whole grains. According to the Organic Consumers Association, at least 95 percent of all the vitamins manufactured today contain some synthetic ingredients. It is probably that health conscious consumers want to believe supplements are free of the pharmaceutical drug stigma and avoid synthetics by looking for the word natural on the product label, but there are no guarantees that natural is what they get (Clement, 2010). However, according to Dietary Guidelines for Americans (2005), it advises

that nutrient needs should be met primarily through consuming natural functional food which are the food that provide an array of nutrients and other compounds such as vegetables and fruits that may have beneficial effects on health. On the other hand, manufacturers claim that their synthetic chemical vitamins concocted in laboratories are identical and just as effective as the naturally occurring vitamins produced in plants in nature. Many medical experts are beginning to speak out about the benefits of supplementation, for example, according to Heber (1998), substantial data shows that if everybody took a few supplements every day, they could significantly lower their risk of a multitude of serious diseases (Heber, 1998).

In fact, no human can live solely on isolated, synthetic nutrients and must eat food created by nature in order to survive. Synthetic functional food are essential to human health as the human body is unable to manufacture most of what it needs. These nutrients must be obtained from the natural functional food that we eat such as vegetables, fruits or meat and other natural food supplements. However, consumer confidence in the idea that our diets can satisfy all of our nutritional needs has plummeted as scientific evidence for diet deficit accumulates (Clement, 2010). A survey conducted in 1994 found that 70 percent of all women in the U.S. believed their diets were adequate for vitamin and mineral intake but by the year 2000, that confidence percentage was dropped down to just 46 percent (Clement, 2010). Nowadays, it is most likely to find that modern facilities are right next door to the traditional medical facilities such as the case is with modern hospitals in China or India. At major medical facilities and hospitals, a person can receive surgery and herbal remedies or diet recommendations all under the same roof. For example, the main hospitals in Shannan, China have modern medical facilities and traditional Tibetan Medicinal practice has also been promoted and a traditional Tibetan medicine hospital was set up with 80 hospital beds. Therefore, consumers are increasingly confused about what to eat, how to eat and when to eat because there are many suggestion and recommendation in having a healthy lifestyle. A survey conducted by USDA shows that consumers agreed strongly that it was hard for them to know what to believe since there were so many recommendations about healthy ways of eating (Frazao, 1999).

1.6 Modern Health Worries

According to Petrie et al. (2001a), modern health worries are significantly related to a preference for food with natural as opposed to synthetic additives. The example of modern health worries are environmental issues, pesticide residues, perception of current health, medication used, busy lifestyle, genetic modified food, hormones and additives in food. Consumers are now more aware of what kind of food they consume. The use of excessive chemicals and additives and synthetic ingredients in food production, manufacturing and pharmaceutical industry has caused health related side effects for consumers. They are now searching for safe to consume and naturally produced products as alternative food or medicine that are functional in combating or preventing some ailments.

1.7 Lack of Accreditation and Certification

Functional food represents one of the most interesting areas of research and innovation in the food industry (Sirò et al., 2008). There are presently commercialized functional products in the Malaysian market. The highest growth is in sub categories such as energy drinks, enhanced shelf stable juices, probiotics, omega fortified food and beverages and also the traditional food and herbs (Stanton et al., 2011). However, lack of accreditation and certification for natural and synthetic functional food has been identified as a possible constraining factor in the development of the functional food market in Malaysia. There, the number of adverse drug reactions was steadily increasing from 1987 to 2010. The lack of government regulations on natural and synthetic functional food has given the companies free rein to make dubious allegations on behalf of their new functional food products. Direct selling outlets in Malaysia are currently active in distributing many types of functional food which claim to be health food items placed under the food supplement category. Nevertheless, most of these functional food products are not certified by the Malaysian Food and Drug Act of 1983 (Arshad, 2002). The area of synthetic additives in functional food is still under active research and justification. Natural functional food is not tightly regulated and the risks of purchasing fake herbs are high. There are also many statements made that functional food will lower cholesterol, fight joint pain or prevent cancer but all these statements are without any strong evidence. The issue of dosage and strength of the food components used for therapy is also questionable (Arshad, 2003).

1.8 Effort by the Government and NGOs

Health is a central issue in Malaysia and healthy individuals can play an effective role in community development and nation-building. The Malaysian government and the NGOs have made strong commitments to organizing various health campaigns to promote healthy lifestyle practices among its citizens and expatriates are welcomed to join. The various campaigns include healthy lifestyle campaign, free medical checkup, health talks, anti-smoking campaign and campaign to increase consumer awareness about cancer, heart health, oral health, mental health and sexual health.

In 2005, Silterra organized a Health Awareness Campaign with the motto "Prevention Is Better than Cure". The health campaign included health exhibitions, blood screening, health talks and online health quiz (Silterra, 2005). The objective of this campaign was to create and enhance health awareness amongst the citizens.

Asian Medical Students' Association (AMSA) Malaysia in collaboration with National Diabetes Institute (NADI), National Kidney Foundation (NFK) and National Cancer Society of Malaysia organized "Love Your Age, Love Your Health" health campaign on 10 July 2010. This campaign promoted awareness regarding geriatrics and health care especially regarding common medical issues among the elderly people such as chronic renal disease and diabetes mellitus (AMSA, 2010). The campaign also aimed at educating the public on the associated health and risk behavior that may influence the mortality, morbidity and quality of life for the elderly. Moreover, the campaign provided a clinical booth for health screening, Body Mass Index calculation, body fat distribution, blood pressure, eye check up for

intraocular haemorrhage and cataract, blood test and mini mental state examination for people over 60 years of age.

On 16 March 2011, MMU Cyberjaya organized One Malaysia Help and Health Campaign (Leanne, 2011). This provided nine services including organ donation campaign, blood donation drive, free medical checkup, CPR awareness campaign, exhibition, demonstration, health talk, international student help line and food bazaar.

On 26 October 2011, MBG Fruit shop organized a Health is Wealth Community campaign to relay the latest health findings to the Malaysian public (MBG fruitshop, 2011). Ms Tan Yen Sing, a clinical dietitian, was invited to give a talk on the latest health issues that affected Malaysian men, women and children and specific health concerns, statistics of major health problems of the time and diseases affecting the Malaysians in particular. The event also included art and drawing competitions, home and corporate deliveries and education and promotion programs for the Malaysian families.

Furthermore, from the 20th to 22nd March 2012, Multimedia University organized a 3 day on campus health awareness campaign. The campaign included blood donation drive (BDD), organ donation campaign, CPR awareness campaign, health screening, eye and ear test, foot massage, Hepatitis B screening, free bone check-up, and an exhibition: from a culture of violence to a culture of peace and a food bazaar (Lee, 2012). The campaign sold Help and Health Campaign 2012 coupon which cost RM10 to students and staff who wanted to do the medical Check-up and foot massage in the event and the total profit of RM 3,000 from the sales of the coupons was donated to the National Kidney Foundation and Kiwanis Down-Syndrome Foundation.

On the 20th and 21st of April 2002, Sedaya College Pharmacy Student Society and Sedaya College organized a Public Health Campaign at Cheras Leisure Mall (Malaysia Pharmaceutical Society, 2002). The objective of the health campaign was to generate public interest on the various common medical disorders such as Asthma, Diabetes, Hypertension and Hypercholesterolaemia and the health hazard of smoking. Brochures and posters pertaining to the medical disorders and smoking were given out. The campaign provided the measurements of blood glucose level, mass scanning, cholesterol level, counseling, blood pressure, pulse rate and body mass index (BMI). A health quiz and a blood donation were also carried out in the event.

A seven day health screening campaign was organized by IIUM Primary Care Clinic (PCC), Department of Family Medicine, Kulliyah of Medicine in collaboration with the Office of the Campus Director (OCD) from 29 October 2012 to 1 November 2012 to promote healthy lifestyle and early identification of cardiovascular diseases amongst the IIUM Kuantan community (Kulliyah of Allied Health Sciences, 2012).

The theme of the campaign was “Healthier Life for Healthy Hearts”. The campaign provided information on individual’s height, weight, Body Mass Index (BMI), waist circumference, blood pressure, pulse rate, fasting blood sugar and Lipids and renal function.

1.9 Problem Statement

The concept of functional food is not new to Malaysian people. Botanical remedies have been an important source of traditional medicine for thousands of years. Alternative food or medicine has been traditionally used by old people for centuries and functional food remedies have been cascaded down from one generation to another. Traditional medicine has made tremendous contributions over the past centuries to the development of some of the most widely used and effective modern supplements or drugs. However, some of the remedial formula for alternative food and medicine has been forgotten due to the advent of pharmaceutical technology and industry. Therefore, consumers have started to consume synthetic functional food. The question now is which group of consumers chooses to consume natural or synthetic functional food if the socio-demographic profiles such as age, education level, income level, gender and marital status influence their acceptance of this food. There is a need for both exploratory factor analysis and confirmatory factor analysis because EFA is use to discover the factor structure of the study and confirm the theory-based assumption. On the other hand, CFA is use to determine the validity and reliability of measurement model and verified the actor structure of a set of observed variables.

Malaysians like other Asians, always seek the benefits and risks of food products and traditional herbs. However, the growth in the economy and increase in the number of health problems has prompted their perception of the chances of being diagnosed with an illness. This perception of a serious illness affecting their life influences them toward taking preventive action. Furthermore, there are mixed opinions and arguments about the consumption of natural and synthetic functional food which cause the consumer not to identify the benefits and barrier of natural and synthetic functional food such as functional food having the ability to decrease their chances of becoming ill. Furthermore, the availability of functional food and the problems associate with them are false health claims and misleading the overall diet (UK-based Corporate Watch, 2000). Although there is an increasing array of functional food available that are designed to confer health benefits, individual attitude and worries about the new technology and modernity such as food safety, lifestyle, taste and preference may influence their acceptance of these products (Petrie et al., 2005b). Moreover, whether the consumers will accept natural and synthetic functional food after all the efforts that have been done by the government, society, advertisements, media encouragement and health campaigns is a serious matter for consideration.

The food industry realizes that functional food have the potential to add value to their business (Kleef et al., 2002). Many food companies are enthusiastic about

developing new types of functional food (McConnon et al., 2002) and most of them are reviewing the nutritional profile of their portfolios (Market Analysis, 2004). Therefore, as competition among those in the food industry has increased, the Malaysian food producers have had to search fresh marketing strategies to combat the new challenges they face in the market place. As the foundation is laid the producers need valid, accessible and practical information about consumer knowledge, acceptance, behavior and intention. Unless this information is made available, it is difficult for the food producers, manufacturers and marketers to know exactly what products should be produced in either category of natural or synthetic functional food. Given all the benefits of functional food and the investment that goes into it, the question is whether the Malaysian consumers are familiar with the concept of functional food and whether they are willing to accept natural and synthetic functional food as part of their daily diet in order to prevent or cure diseases. The impact of consumers' intention to accept natural and synthetic functional food is important, as their dietary attitude will guide them to seek for food products that promote health and concern about food safety (Fraser, 2001).

Although the consumption of functional food is on the rise, relatively little is known about how consumers perceive these products and the factors which affect their acceptance of both categories of functional food in Malaysia. It is still not clear whether the consumers' acceptance is due to their attitude, their desire to take preventive action, being preoccupied with the thought that they might get ill in the future, being afraid of the seriousness of the illness, being encouraged by the government or advertisements or whether they have knowledge of the advantages and disadvantages of consuming natural and synthetic functional food. Therefore, it is important to know how the Malaysian consumers acquire the intention to accept natural and synthetic functional food. To gain success in the functional food market, all firms involved in the food industry should explore the intentions of consumers towards accepting or rejecting functional food with either natural or scientific compounds and the decision they make to consume these food products or to consider them as part of their daily diet.

1.10 Research Questions

- i. To what extent the Malaysian consumers familiar with the functional food concept?
- ii. Who are the natural and synthetic functional food consumers?
- iii. Which factors create the intention for them to accept natural and synthetic functional food as part of their diet?
- iv. Will attitude mediate the relationship between the factors that influence consumers' acceptance and consumers' intention to accept natural and synthetic functional food?
- v. Are socio-demographic variables important factors which moderate the relationship amongst variables in the study?

1.11 Objective of the Study

The general objective of this study is to determine the intention of Malaysia consumers to accept natural and synthetic functional food.

- i. To explore factors influencing the consumers' intention to accept natural and synthetic functional food;
- ii. To examine the mediating role of attitude in the relationship between independent variables and consumer intention to accept natural and synthetic functional food; and
- iii. To determine the ability of socio-demographic variables to moderate the relationship amongst variables in the study.

1.12 Significance of the Study

The study will benefit the ministry of health Malaysia, NGOs, local and international food producers, food manufacturing industry or food marketers which are involved in promoting and educating healthy lifestyles and healthy eating to Malaysia consumers. This is because unhealthy lifestyles and unhealthy eating habits are one of the risk factors leading to chronic "lifestyle related illnesses" among Malaysians. Therefore, understanding the factors which influence the intentions of the Malaysian toward choosing natural and synthetic functional food will help to facilitate the organization of future health campaigns. Organizers of health or healthy eating campaigns will be able to identify the factors based on their influence such as attitude, subjective norm, belief, knowledge and self-efficacy.

This study also helps the marketers to find out about the consumers' purchasing decision towards natural and synthetic functional food and helps them to have a better understanding of consumers' needs and wants and to gain the ability to communicate with them in a more efficient way. By understanding more about the consumers' purchasing behavior, the marketers can facilitate effective marketing strategies to reach the individuals in their target market.

Additionally, the study will also benefit the local or international food producers, manufacturers and food marketers in Malaysia by gaining more information and better understanding of the key factors which influence the intentions of the Malaysian consumers in choosing natural or synthetic functional food. They can strengthen their marketing plans with best strategies to reach their target consumers so that they can maximize the consumer utility and diversify their services. Thus it is hoped that this study will help the local food manufacturers in functional food industry to gain more market share and compete with their peers in the globally expanding functional food market and provide valuable feedback to promote these products in the local market.

The study also hopes to fill the gap of Malaysian consumer intention to accept natural and synthetic functional food in the existing literature. It is hoped that the study will help the functional food industry in Malaysia to expand and reveal health

concerns related to these products. This study also aims at revealing which benefits or risks influence and determine consumer intention to accept natural and synthetic functional food and furthermore give insight into the decision making process of the Malaysian consumers related to these types of food. Finally it will also determine the effect of modern health worries on consumer acceptance of natural and synthetic functional food.

1.13 Organization of the Study

The thesis is divided into seven chapters. Chapter one discusses the background of the study and the formulation of the problem. Malaysia functional food market is discussed in this chapter. Chapter two discusses about the history of functional food. The global functional food market are discusses in this chapter and all the definitions and terms used in this study are listed in this chapter. Chapter three displays a review of literature on previous studies. The focus is on the overview of functional food and overview of the theories and models which have been used in health behavioral research. Chapter four explains the methodology and tools of analysis for this study. Each variable and determinant is theoretically explained and sample procedure and data collection procedure is discussed. The conceptual framework is clearly explained in this chapter. Chapter five and six discusses the analysis and findings of the study. Lastly, chapter seven summarizes the main findings of this study and offers some recommendations for future research. Limitations and implications for the study are also stated in this chapter.

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