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Functional Food Knowledge and Perceptions among Young Consumers in Malaysia

G. Rezai, P.K.Teng, Z. Mohamed, and M.N Shamsudin

***Abstract*—**Changing in consumers lifestyles and food consumption patterns provide a great opportunity in developing the functional food sector in Malaysia. There is only a little knowledge about whether Malaysian consumers are aware of functional food and if so what image consumers have of this product. The objective of this research is to determine the extent to which selected socio-economic characteristics and attitudes influence consumers' awareness of functional food. A survey was conducted in the Klang Valley, Malaysia where 439 respondents were interviewed using a structured questionnaire. The result shows that most respondents have a positive attitude towards functional food. For the binary logistic estimation, the results indicate that age, income and other factors such as concern about food safety, subscribing to cooking or health magazines, being a vegetarian and consumers who have been involved in a food production company significantly influence Malaysian consumers' awareness towards functional food.

***Keywords*—**Binary logistic model, functional foods, knowledge and awareness, perception

I. Introduction

FOOD is the most basic need for all human beings and in the twenty-first century, food is not only used to satisfy hunger and provide necessary nutrients for humans but is also used to prevent disease and improve the physical and mental well-being of consumers [18]. In the last few decades, consumers demand and their satisfactory level in food choice have changed considerably. In addition, the number of consumers believing that food can contribute directly to their health and well being is increasing all over the world [17]. Similarly, this phenomenon is also being felt by Malaysian consumers due to a rapid change in consumers' preference towards food choice, consumers' lifestyle and food consumption patterns.

Driven by a variety of socio-economic demographic characteristics, lifestyle and changes in food consumption patterns, the number of consumers demanding healthy, nutritious, convenient and safe food is steadily increasing.

R.Golnaz is with the Department of Agribusiness and Information Systems, Faculty of Agriculture, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia. (Phone: +603-89474899, fax: +603-89464151, email: rgolnaz@putra.upm.edu.my).

P. K. Teng. is with the Department of Agribusiness and Information Systems, Faculty of Agriculture, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia. (email: girlyphuah@yahoo.com).

Z. Mohamed. is with the Department of Agribusiness and Information Systems, Faculty of Agriculture, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia. (email: zam@agri.upm.edu.my).

M.N. Shamsudin, is with the Department of Agribusiness and Information Systems, Faculty of Agriculture, Universiti Putra Malaysia, 43400 UPM Serdang, Selangor, Malaysia. (e-mail: nasir@agri.upm.edu.my).

One of the recent changes in food consumption patterns among Malaysian consumers is the increased interest in functional foods (FFs) which represent healthy or herbal types of food which have medicinal properties that can prevent or cure some diseases. Among the most popular types of functional food which has been promoted and commercialized in Malaysia is the herbal drink such as *Tongkat Ali* and *Kacip Fatimah* among the Malays and *Ginseng* among the Chinese. It is claimed that these products provide many health benefits for the body. While there is still no universal accepted definition for functional food, the industry is growing steadily worldwide [12]. Annual research conducted by the International Food Information Council between 2002 and 2007 [10,11] shows that demand for functional food has continued to rise. The global market was estimated to amount to around USD32 billion in 2002 which has been rising constantly since its launch [25]. The increasing demand for functional food can be explained by the increasing concerns for consuming healthy products, a steady increase in life expectancy and the desire for the consumers to improve their quality of life [14].

Japan was the first country who started and popularized the functional food market. This was due to the arising awareness of health consciousness from a large percentage of elderly people among its population in 1984 [24]. Japan is the largest market for functional food consumption with a market of USD16 billion, which is a per capita expenditure of USD126 per year, against about USD68 per year (42 Euros) in Europe. Over 5,500 new types of functional food have been introduced to the Japanese market since 1990 [7].

According to Sloan [21], the global functional food market was worth about USD47.6 billion in 2001 and the United States is the largest market segment followed by Europe and Japan. Japan is a very good example for enticing Malaysian consumers to begin considering the claimed health benefits of functional food. However, the definition of functional food in Japan has a similar meaning to nutraceuticals but is different from healthy food [2]. Nutraceuticals means food which provides nutritional, medical or health benefits which include the prevention or treatment of disease in the form of pills or powders [22]. On the other hand, functional food is real food or beverages that offer many opportunities for consumers to improve their diets and reduce their risk of specific diseases [11]. Functional food (FFs) as stated by Teresa et al. [23] is different from enriched, fortified, dietetic nutraceutical, supplements and traditional health food. According to her,

functional food may contribute to maintaining consumers' state of health, which must be scientifically demonstrated and supported by the epidemiological data which prove the statistical validity of the positive effect. However, according to Ma¨kinen-Aakula [19], functional food can be classified into three groups which are (1) ''add wellbeing to your life'' (e.g. improve the regular stomach and colon functions such as prebiotics and probiotics or ''improve children's life'' by supporting their learning capabilities and behaviour), (2) functional food is designed to reduce an existing health risk problem such as high cholesterol or high blood pressure and (3) consists of those products which can make consumers' life easier (e.g. lactose-free, gluten-free products). The only problem of the functional food market, as stated by Childs [5], is that consumers are lacking enough awareness concerning the existence of functional food.

The expansion of the functional food market could be due to several phenomena that have occurred among consumerist groups who have become more aware of the importance of traditional food and food which acts as a preventive measure against certain ailments. Some authors indicate that the development of FF could be due to the world's obsession of promoting an absence of disease, longevity and added performance [15] and the developing world's desire to curb diseases caused by micro-nutrient deficiencies [4]. In some cases, it could be due to the food companies' drive for competitive advantage in introducing new products that create a market niche [20]. Nevertheless, changing socio-economic factors, lifestyles and food consumption patterns could be some of the most important reasons as to why there has been an increase in the demand for convenient, healthy and safe food, which are the three main food requirements among consumers [13].

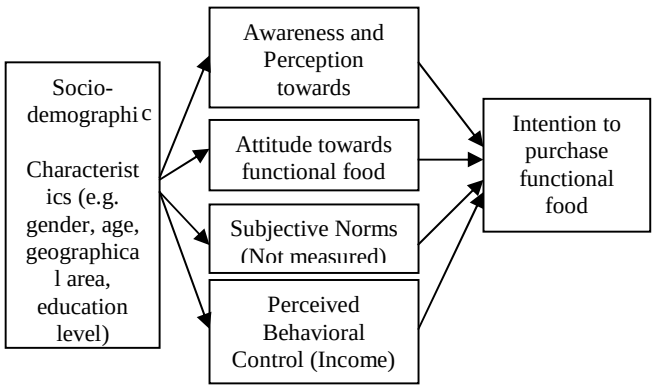
Although the demand for functional food is steadily increasing in the world, a number of factors have been identified as possibly constraining the development of the functional food market in Malaysia. First of all, direct selling outlets in Malaysia are currently active in distributing many types of functional food which claim to be healthy food items placed under the food supplement category [3]. Nevertheless, most of these FF products are not certified by the Malaysian Food and Drug Act 1983 [2]. Therefore, most consumers in Europe do not believe that the Malaysian government gives sufficient protection to consumers when it comes to the health claims made by the direct sellers or food industry in general [8]. So as to control food quality in Malaysia and to ensure the safety of the functional food, the Ministry of Health has assigned three agencies to undertake these tasks, which are the Department of Food Quality, the Malaysian National Codex Committee and the National Pharmaceutical Bureau [2].

In Malaysia, the definition of functional food is still inconclusive and the area of nutraceuticals and functional food is still under active research [3]. Although functional food is becoming popular and the consumption of functional food is increasing, relatively little is known about how consumers perceive these products and what their perception is towards functional food in Malaysia. Furthermore, the majority of the studies on consumers' behavior and their attitudes toward functional food focus on developed countries such as the US, Canada, Finland, Australia, and Sweden [12].Therefore, to gain success in the functional food market, all firms that are involved in the food industry should explore consumers' awareness, perceptions and the reasons as to why consumers choose these products as part of their daily diet.

II. Methodology

A. Conceptual Framework

The Theory of Planned Behavior (TPB) is a motivational theory of consumers' behavior where intention is the most important determinant for a consumer to perform a particular behavior. However, there are three main conceptual independent determinants in TPB which include consumers' attitude, subjective norms and perceived behavioral control. These determinants will influence the consumers' intention to perform certain behavior [1]. Fig 1 shows the conceptual framework of TPB as proposed by Ajzen. TPB is used to assume the consumers' awareness, perceptions, attitudes towards performing a particular behavior and perceived behavioral control to determine the intention of the consumers to purchase functional food. The consumers' awareness and perception towards functional food will influence their attitude towards this food product and it will directly or indirectly influence the consumers' intention to purchase functional food. Consumers' perceived behavioral control (income) will also influence the consumers' intention to purchase functional food because they have the ability to purchase food products. However, socio-economic demographic characteristics such as gender, geographical area, education level and age can influence the consumers' awareness, attitudes and perceived behavioral control. The subjective norms factor was not measured because it is of secondary importance in this study to be considered as behavior to have a direct effect on the health of other people close to the consumer as well as on those who witness the consumer's behavior in public [16,28].



Source: Ajzen (1991) Theory of Planned Behavior

Fig. 1 Conceptual framework of TPB applied to the awareness of functional food among consumers in Malaysia

B. Sample and Questionnaire

This study used data collected from a survey which was conducted in April 2011 until July 2011 in the Klang Valley, Malaysia. The survey was carried out by using a structured questionnaire. A simple random sampling method was used to select the respondents in the Klang Valley. Four hundred and thirty nine (439) respondents were interviewed during the period.

The questionnaire was divided into four sections and contained straightforward questions. Section A looks at consumers' awareness towards the functional food. Respondents were asked to state their level of agreement towards the statements that related to food, agriculture and the environment. Section B looks at the respondents' attitudes and perceptions. It is divided into two parts. The first part asked questions related to the consumers' level of concern towards food, agricultural, and environmental issues while the second part asked questions about the number of factors (e.g. taste, nutritious value, price, labeled organic and many more) that would influence their food purchasing behavior. Section C asked questions related to eating habits such as the average number of times weekly respondents consumed red meat, poultry, fish, seafood, dairy products and eggs. Section D asked questions relevant to the respondents' socio-demographic characteristics such as their gender, race, State of origin, geographical area, marital status, age, household size, education level, income and lifestyle. The questionnaire used a seven point Likert scale and open ended questions where relevant.

C. Method of Analysis

To accomplish the objectives of this study, a reliability test, descriptive statistics and a binary logistic model were used to analyze the information gathered from the questionnaires. Descriptive statistics were used to identify the respondents' socio-economic characteristics. Since the objective of the study is to investigate the extent to which Malaysian consumers' are aware of functional food, a binary logistic model was used to determine to what degree selected socio-economic demographic variables and attitudes influence consumers' awareness of functional food. The equation of the model is shown below. All of the explanatory variables have the value 0 or 1 so that the effect of the categorical variables on the consumers' awareness of functional food can be discovered (Table 1 displays the variables used in the binary logit model).

$$\log it(Y) = natural\ \log(odds) = In(\frac{\pi}{1-\pi}) = \alpha + \beta xi \qquad (1)$$

Y = 'Intention to purchase functional food'
χ_i= attributes and socio-demographic variables

In this regression model, the vectors χ_i consist of the following variables: selected socio-demographic variables (e.g. gender, age, geographical area, education level and income level), whether consumers' are concerned about food safety, are subscribed to cooking or health magazines, are vegetarians and whether consumers' have been a member of a food production company. These variables are all tested to see to what extent they influence consumers' awareness of functional food. Specifically the binary logistic model can be stated as below:

$$In\left(\frac{\pi}{1-\pi}\right) = \beta_0 + \beta_1\chi_{genderv} + \beta_2\chi_{geographic\ alarea} + \beta_3\chi_{income} + \beta_4\chi_{educationl\ evel} + \beta_5\chi_{age} + \beta_6\chi_{foodsafety} + \beta_7\chi_{cookingorh\ ealthmagaz\ ine} + \beta_8\chi_{vegetarian} + \beta_9\chi_{foodproduc\ tioncompan\ y} + \xi_i \qquad (2)$$

TABLE I
EXPLANATORY VARIABLES MEASURED FOR TESTING THEIR INFLUENCE ON CONSUMERS' AWARENESS OF FUNCTIONAL FOOD.

Explanatory Variables	Coding Systems
Gender	0. Male 1. Female
Geographical Area	0. Urban 1. Rural
Income	0. Below RM 2,500 1. Above RM 2,501
Education level	0. Tertiary (Diploma and Bachelor) 1. Higher Tertiary (Master and phD)
Age	0. Below 25 1. Above 26
Food safety	0. Not concerned about food safety 1. Concerned about food safety
Cooking/ Health Magazine	0. Not subscribed to cooking or health magazines 1. Subscribed to cooking or health magazines
Vegetarian	0. Not a Vegetarian 1. Vegetarian
Food production company	1. Have been a member of a food production company 0. Not been a member of food production company

III. RESULTS AND DISCUSSION

The Cronbach's alpha test for consistency and reliability was conducted on all the variables used in the questionnaire. The Cronbach's alpha was 0.893 indicating that there was consistency among the theory of planned behavior statements (attitude, awareness, perceived behavioral control and intention) so that the statements are fit for this study to be conducted.

A. Descriptive Statistics Analysis

A descriptive analysis was used in this study to describe the population and the result of the socio demographic profile of the respondents. The socio-economic demographic characteristics analyzed using descriptive analysis included gender, ethnicity (race), geographical area, marital status, education level, income level, age, and household. Table 2 shows the result of the socio-economic demographic profile of the respondents. In this study, the majority of the respondents are female, 255, (58.1 percent) as compared to male, 184 (41.9

percent). The population in Malaysia consists of many ethnic groups which include Malays, Chinese, Indians and others. In this study, the majority of the respondents are Malays (65.1 percent), followed by Chinese (26.7 percent) and Indians (8.2 percent) and the number of respondents from urban and rural areas are 298 (67.9 percent) and 141 (32.1 percent) respectively.

More than half of the respondents are single (63.3 percent) and the largest age group is between 17-25 years (55.8 percent). The minimum and maximum ages of the respondents are 17 years old and 40 years old respectively. The education level of the respondents is categorized into four categories. Approximately 31.4 percent of the respondents have completed their diploma level, 30.3 percent of the respondents have graduated with a bachelor, 29.6 percent have completed their master degree and 8.7 percent are PhD holders. In terms of income distribution, this study found that 56.9 percent of the respondents have an income below RM 2500.00 per month and 43.1 percent of the respondents have an income above RM 2501.00. In terms of household size, 51.3 percent of the respondents have a household size between 1 and 5 people and 48.7 percent of the respondents have a household size above 6 inhabitants.

TABLE II
SOCIAL DEMOGRAPHIC PROFILE OF THE RESPONDENTS (N= 439)

Characteristic	Percentage	Characteristic	Percentage
Gender		**Education level**	
Male	41.9	Diploma	31.4
Female	58.1	Bachelor	30.3
Ethnicity (Race)		Higher Tertiary	38.3
Malay	65.1	**Income**	
Chinese	26.7	Below 2500	56.9
Indian	8.2	Above 2501	43.1
Area		**Household size**	
Urban	67.9	1-5	51.3
Rural	32.1	6 and above	48.7
Marital Status		**Age**	
Single	63.3	17- 25	55.8
Married	36.7	26-40	44.2

B. Respondents' Perception towards Functional Food

Table 3 shows the mean scores and percentages of the statements that are related to the respondents' attitude towards functional food and were scored by using a seven-point Likert scale (1 to 7). The results show that the majority of the respondents have a positive attitude towards functional food. Most of the respondents agree that functional food is enriched foods. Therefore, it is natural for them to think that functional food is likely to have a beneficial impact on their health and is a convenient way to meet their recommended daily intake of nutrition. The majority of the respondents also think that consuming functional food is part of a natural way of living. However, more than half of the respondents think that functional food is too expensive given their claimed health benefits. Overall, the analysis indicates that the respondents have a positive attitude towards functional food due to the rapid change in food consumption patterns and consumers' lifestyles.

TABLE III
RESPONDENTS' ATTITUDE TOWARDS FUNCTIONAL FOOD

Statement	Likert Scale Score* (Percentage)							Mean
	1*	2*	3*	4*	5*	6*	7*	
Functional food is enriched food	0.0	2.5	5.0	15.3	26.9	40.5	9.8	5.27
Functional food is likely to have a beneficial impact on my personal health	0.2	0.7	1.6	18.0	23.7	38.7	17.1	5.49
I see consuming functional food as being part of a natural way of living	0.9	3.2	8.9	15.5	21.6	28.7	21.2	5.25
Functional food is a convenient way of meeting your recommended daily intake of nutrition, which I would never meet with my conventional diet	1.1	3.9	4.6	19.4	27.6	30.8	12.8	5.12
According to my personal opinion, functional food is too expensive given their claimed health benefits	0.0	1.6	4.8	17.8	31.2	31.2	13.4	5.26

* 1= Strongly Disagree, 7= Strongly Agree

C. Binary Logistic Model

A binary logistic model was used to determine the extent to which selected socio-demographic characteristics (gender, education level, income level, age and geographical area) and attitudes influence consumers' awareness of functional food. Table 4 shows the estimated logit model for consumers' awareness of functional food. The dependent variable was split into two categories which were 'respondents' are aware of functional food' coded as one and otherwise was coded as zero. The result of the logit regression estimation shows that out of the nine variables, six variables have a positive sign and are statistically significant. Thus, some selected socio-economic demographic factors and consumers' attitudes were found to be relevant in explaining consumers' awareness of functional food.

Based on the statistically significant coefficients, gender, age, geographical area, education level and income were the selected socio-demographic characteristics which were statistically significant in explaining consumers' awareness of functional food. The results show that the younger respondents (below 25) are 0.446 times more aware of functional food than the older respondents (above 26). Similarly, for the respondents who have a higher income (above RM2,501), the likelihood of their awareness of functional food is 2.853 times more than the respondents with a lower income (below RM2,500. Consumers' education level is not significant. It

means that both higher and lower levels of educated consumers are aware of functional food and have a positive attitude about it (6, 9, 26, 27). The findings also indicate that consumers who are concerned about food safety are 1.524 times more aware of functional food than other consumers. Similarly, the estimated coefficient for consumers who subscribe to cooking or health magazines is positive and significant at the 90 percent level of confidence. This shows that the respondents who subscribe to cooking or health magazines are 1.532 times more aware of functional food compared to other respondents. The results also show that consumers who are vegetarians are 2.475 times aware of functional food than consumers who are not vegetarians. Consumers who have been a member of a food production company are 1.593 times more aware of the existence of functional food in Malaysia than other consumers. The binary logistic model has shown that there are three important factors which determine consumers' awareness of functional food. These are; the socio-demographic characteristics; income level and age, consumers' attitude towards functional food and consumers' perceived behavioral control (income).

TABLE IV
ESTIMATED LOGIT MODEL FOR CONSUMERS' AWARENESS OF FUNCTIONAL FOOD

Variables	Estimated Coefficient	Standard Error	Significant Level	Exp(B)
Gender	-0.104	0.207	0.615	0.901
Geographical Area	-0.354	0.218	0.104	0.702
Education level	-0.314	0.288	0.276	0.731
Age	-0.808	0.474	0.088*	0.446
Income	1.048	0.515	0.042**	2.853
Food safety	0.421	0.249	0.090*	1.524
Cooking/ Health Magazine	0.427	0.242	0.078*	1.532
Vegetarian	0.906	0.394	0.021**	2.475
Food production company	0.466	0.277	0.092*	1.593
Constant	0.153	0.521	0.769	1.166
-2 Log Likelihood	580.936	Nagelkerke R Square		0.079
Cox and Snell R Square	0.059	Hosmer and Lemeshow Test		0.562

***Statistically significant at the 0.01 level, **at the 0.05 level and *at the 0.10 level

IV. CONCLUSION

This study analyzed young consumers who live in the Klang Valley, Malaysia concerning their awareness and perceptions towards functional food. The Theory of planned behavior (TPB) was used in this study to investigate consumers' awareness and perceptions towards functional food. The results indicate that four independent factors affect consumers' awareness, which are consumers' attitudes, perceptions towards functional food and perceived behavioral control (income). Subjective norms are not measured in this study because consumers' behavior can directly affect their health. It is important for the food industry and marketers to understand the extent of consumers' awareness and perceptions towards functional food because there are many factors that may influence consumers' purchasing decisions.

The results indicate that the majority of the respondents have a positive perception towards functional food. The majority of the consumers believe that functional food is enriched food and it is beneficial to their health. Respondents also view functional food as being part of a natural way of living and a way to meet their recommended daily intake of nutrition. However, many respondents agreed that functional food is too expensive. This study shows that socio-demographic characteristics such as income level and age are important indicators which influence consumers' awareness and perception of functional food. The results suggest that consumers who have higher incomes (RM 2501 and above) and younger generations (aged 25 and below) are more likely to be aware of functional food and have a positive perception towards functional food in Malaysia. This is because consumers' who have higher income levels have the ability to purchase these food products which may not be the case for lower income consumers because functional food is more expensive than conventional food.

In addition, being health conscious is the most important factor for developing a positive perception of functional food. Therefore, understanding consumers' needs and wants, their attitude towards food safety, and their awareness and perception towards functional food will help the food industry promote functional food and therefore increase consumers' intention to purchase functional food. Food manufacturers and marketers need to be able to communicate with consumers in an effective way to further develop the functional food industry. Furthermore, the government should strengthen the rules and regulations which are related to food so that they can protect consumers from false claims and high prices made by direct sellers in Malaysia. At the same time, the government or private sector should promote healthy eating and lifestyle campaigns to educate the public and increase their awareness of the benefits of functional food.

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G. Rezai is a senior lecturer at the Department of Agribusiness Marketing and information Systems, Faculty of Agriculture and Information Systems, Universiti Putra Malaysia since May 2010. She obtained her undergraduate degree in Food Engineering from the Science and Research University Azhad Tehran, Iran in October 2002. She pursued her postgraduate studies in the field of agribusiness at Universiti Putra Malaysia and obtained her Master of Science (Agribusiness) and PhD. (Agribusiness) in 2004 and 2008 respectively. After receiving her PhD, she joined one of the FDA's Pharmaceutical Research in Riverside, CA as a research fellow (Integrated Research Group, 2008-2010). Her research interest is in the field of consumer behaviour and supply chain management in agribusiness. She has authored and co-authored 8 publications in journal articles, and conference proceedings, and presented about 20 papers in both local and international seminars in her area of expertise.

P.K.Teng was born on 13 November 1987 in Ipoh, Perak, Malaysia. She obtains her undergraduate degree in Bachelor Science (Agribusiness) from Department of Agribusiness and Information Systems, Faculty of Agriculture, Universiti Putra Malaysia, Selangor, Malaysia at October 2010. Currently, she continue her study on Master of Science (Agribusiness) in University Putra Malaysia.

Z.Mohamed is a professor at the Department of Agribusiness and Information Systems, Faculty of Agriculture, Universiti Putra Malaysia since 1986. He holds a B.Sc (Animal Science) and M.Sc (Agricultural Economics) from University of Wyoming, USA and Ph.D.

(Agricultural Economics) from Oklahoma State University, USA in 1985. Currently he is heading the Department of Agribusiness and Information Systems which offers Bachelor and Master of Science in Agribusiness and Master of Science and PhD. in Agricultural Economics. His research interest is in the area of agribusiness marketing management, market model and livestock economics. He has published articles in journals, proceedings and occasional papers. He has been teaching Agribusiness and Agricultural Marketing courses to both graduate and undergraduate programs.

M.N.Shamsudin is a Professor of agricultural and resource economics, and dean of the Faculty of Environmental Studies, Universiti Putra Malaysia. He received his B.S. degree in Agricultural Economics from Louisiana State University, and PhD in Agricultural Economics and minor in statistics from Mississippi State University, USA. Professor Nasir has been teaching primarily in International Agricultural Trade, Development Economics, Environmental Economics, and Managerial Economics. His research areas of interest include International Agricultural Trade Policy, Commodity Market Analysis, and Agroenvironmental Economics. He has authored and co-authored more than 140 publications in books, book chapters, journal articles, and conference proceedings, and presented more than 100 papers in both local and international seminars in his area of expertise.