

**FACTORS INFLUENCING CONSUMERS' CONSUMPTION BEHAVIOR OF  
DRINKING WATER IN MALAYSIA**

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## TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENT	i
TABLE OF CONTENTS	ii
LIST OF TABLES	viii
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
ABSTRAK (MALAY)	xii
ABSTRACT	xiii
<b>CHAPTER 1: INTRODUCTION</b>	<b>1</b>
1.1 Introduction	1
1.2 Background	2
1.2.1 Issues with Drinking Water in Malaysia	2
1.3 Problem Statement	3
1.4 Research Objectives	6
1.5 Research Questions	7
1.6 Definition of Key Term and Variables	8
1.6.1 Consumption Behavior	8
1.6.2 Drinking Water	8
1.6.3 Tap Water	8
1.6.4 Bottled Water	8
1.6.5 Organoleptic Properties	9

1.6.6	Risk Perception	9
1.6.7	Perceived Chemical Content	9
1.6.8	Contextual Cues	9
1.6.9	Trust in Water Companies	9
1.6.10	Convenience	9
1.6.11	Price	10
1.6.12	Environmental Attitude	10
1.6.13	Perceived Quality	10
1.7	Significance of the Study	10
1.8	Organization of Remaining Chapters	12
<b>CHAPTER 2: LITERATURE REVIEW</b>		<b>13</b>
2.1	Introduction	13
2.2	Attribution Theory	13
2.3	Consumers' Consumption Behavior of Drinking Water	15
2.4	Organoleptic Properties	25
2.5	Risk Perception	26
2.6	Perceived Chemical Content	28
2.7	Contextual Cues	29
2.8	Trust in Water Companies	30
2.9	Convenience	31
2.10	Price	32
2.11	Environmental Attitude	33

2.12	Summary of Independent Variables	34
2.13	Perceived Quality	35
2.14	Theoretical Framework	36
2.15	Hypothesis Development	38
2.15.1	Organoleptic Properties and Consumption Behavior (Hypothesis H1a)	38
2.15.2	Risk Perception and Consumption Behavior (Hypothesis H1b)	38
2.15.3	Perceived Chemical Content and Consumption Behavior (Hypothesis H1c)	39
2.15.4	Contextual Cues and Consumption Behavior (Hypothesis H1d)	39
2.15.5	Trust in Water Companies and Consumption Behavior (Hypothesis H1e)	40
2.15.6	Convenience and Consumption Behavior (Hypothesis H1f)	40
2.15.7	Price and Consumption Behavior (Hypothesis H1g)	41
2.15.8	Environmental Attitude and Consumption Behavior (Hypothesis H1h)	41
2.15.9	Perceived Quality and Consumption Behavior (Hypothesis H2)	41
2.15.10	Organoleptic Properties and Perceived Quality (Hypothesis H3a)	42
2.15.11	Risk Perception and Perceived Quality (Hypothesis H3b)	42
2.15.12	Perceived Chemical Content and Perceived Quality (Hypothesis H3c)	43
2.15.13	Contextual Cues and Perceived Quality (Hypothesis H3d)	43
2.15.14	Trust in Water Companies and Perceived Quality (Hypothesis H3e)	44
2.15.15	Mediation Effect of Perceived Quality on Organoleptic Properties, Risk Perception, Perceived Chemical Content, Contextual Cues, and Trust in Water Companies, and Consumption Behavior (Hypothesis H4a, H4b, H4c, H4d and H4e)	44
2.16	Summary	45

<b>CHAPTER 3:</b>	<b>RESEARCH METHODOLOGY</b>	<b>47</b>
3.1	Introduction	47
3.2	Design of study	47
3.3	Unit of Analysis	48
3.4	Population	48
3.5	Sampling Technique	49
	3.5.1 Sampling Frame	50
	3.5.2 Sample Size	50
3.6	Data Collection	51
3.7	Instrument Design	51
3.8	Scale of Measure	52
3.9	Data Analysis	55
	3.9.1 Descriptive Analysis	56
	3.9.2 Factor Analysis	56
	3.9.3 Construct Validity	56
	3.9.4 Convergent Validity	57
	3.9.5 Discriminant Validity	57
	3.9.6 Reliability Analysis	58
	3.9.7 Goodness-of-fit Measure	58
	3.9.8 Q2 Assessment via Blindfolding Procedures	59
	3.9.9 Mediation Effect Assessment via Bootstrapping Procedures	59
	3.9.10 Regression Analysis	61
3.10	Pilot Test	62
3.11	Summary	68

<b>CHAPTER 4:</b>	<b>RESULTS</b>	<b>69</b>
4.1	Introduction	69
4.2	Response Rate	69
4.3	Respondents Profile	70
4.4	Goodness of Measures	72
4.4.1	Construct Validity	74
4.4.2	Convergent Validity	76
4.4.3	Discriminant Validity	78
4.4.4	Reliability Test Analysis	80
4.4.5	Goodness-of-fit Measures	81
4.4.6	Q2 Measures via PLS Blindfolding Procedure	83
4.5	Descriptive Statistic Analyses	86
4.5.1	Mean and Standard Deviation for All Scale Items	86
4.6	Hypothesis testing	89
4.6.1	Mediation Testing using Bootstrapping Procedures	96
4.7	Summary of the findings	99
<b>CHAPTER 5:</b>	<b>DISCUSSION AND CONCLUSION</b>	<b>102</b>
5.1	Introduction	102
5.2	Recapitulation of the study	102
5.3	Discussion of the Major Findings	104
5.3.1	Organoleptic Properties and Consumption Behavior (Hypothesis H1a)	104

5.3.2	Risk Perception and Consumption Behavior (Hypothesis H1b)	106
5.3.3	Perceived Chemical Content and Consumption Behavior (Hypothesis H1c)	107
5.3.4	Contextual Cues and Consumption Behavior (Hypothesis H1d)	108
5.3.5	Trust in Water Companies and Consumption Behavior (Hypothesis H1e)	109
5.3.6	Convenience and Consumption Behavior (Hypothesis H1f)	110
5.3.7	Price and Consumption Behavior (Hypothesis H1g)	111
5.3.8	Environmental Attitude and Consumption Behavior (Hypothesis H1h)	112
5.3.9	Perceived Quality and Consumption Behavior (Hypothesis H2)	114
5.3.10	Organoleptic Properties and Perceived Quality (Hypothesis H3a)	115
5.3.11	Risk Perception and Perceived Quality (Hypothesis H3b)	116
5.3.12	Perceived Chemical Content and Perceived Quality (Hypothesis H3c)	117
5.3.13	Contextual Cues and Perceived Quality (Hypothesis H3d)	118
5.3.14	Trust in Water Companies and Perceived Quality (Hypothesis H3e)	119
5.3.15	Mediation Effect of Perceived Quality on Organoleptic Properties, Risk Perception, Perceived Chemical Content, Contextual Cues, and Trust in Water Companies, and Consumption Behavior (Hypothesis H4a, H4b, H4c, H4d and H4e)	120
5.4	Implications of the study	121
5.5	Limitations of the study	128
5.6	Suggestion for Future Research	129
5.7	Conclusion	130
	REFERENCES	132
	APPENDIXES	144



## LIST OF TABLES

	Page	
Table 2.1	Past Studies on Consumers' Consumption Behavior of Drinking Water	18
Table 2.2	Summary of Previous Researches on Independent Variables Influencing Consumers' Consumption Behavior of Drinking Water	34
Table 2.3	Summary of Research Hypotheses	46
Table 3.1	Data Collection Method	51
Table 3.2	Summary of Questionnaire Items Adapted in the Study	53
Table 3.3	Pilot Test Questionnaire Items	62
Table 3.4	Overview Results of Pilot Test (PLS)	65
Table 3.5	Main Loading and Cross Loading of Pilot Test	65
Table 3.6	Respondents' Feedback on the Pilot Test Questionnaire	67
Table 4.1	Summary of Response Rate	70
Table 4.2	Respondents' Demographic Profile	70
Table 4.3	Main Loading and Cross Loading (PLS)	74
Table 4.4	Convergent Validity Measures (PLS)	77
Table 4.5	Discriminant Validity Measure Results	79
Table 4.6	Reliability Test Results	80
Table 4.7	Goodness-of-fit Index Results	82
Table 4.8	Variables' Descriptive Statistics	87
Table 4.9	Summary of Model Construct Results	90
Table 4.10	Path Coefficient Results and Hypothesis Testing	96
Table 4.11	Mediating Effect and Hypothesis Testing	99



## LIST OF FIGURES

		<b>Page</b>
Figure 2.1	Theoretical Framework Model	37
Figure 3.1	Direct Effect and Indirect Effect of Mediation	60
Figure 4.1	Reflective Research Model for Consumers' Consumption Behavior of Drinking Water	73
Figure 4.2	Blindfolding of Perceived Quality (PQ as DV)	84
Figure 4.3	Blindfolding of Consumption Behavior (CB as DV)	85
Figure 4.4	Path Analysis Result	93
Figure 4.5	Bootstrapping Result	94

## LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
AVE	Average Variance Extracted
$\beta$	Beta
C	Convenience
CB	Consumption Behavior
CC	Contextual Cues
CO <sub>2</sub>	Carbon Dioxide
CR	Composite Reliability
DV	Dependent Variable
EA	Environmental Attitude
GoF	Goodness-of-fit
H	Hypothesis
JBA	Jabatan Bekalan Air
L	Liter
MNC	Multinational Company
OP	Organoleptic Properties
P	Price
PBA	Perbadanan Bekalan Air
PBAPP	Perbadanan Bekalan Air Pulau Pinang
PC	Perceived Chemical Content
PET	polyethylene terephthalate
PLS	Partial Least Square
PLS-SEM	Partial Least Square- Structural Equation Modeling
PQ	Perceived Quality
Q <sup>2</sup>	Q Square
R <sup>2</sup>	R Square
RP	Risk Perception
se	Standard Error
SEM	Number of Respondent
SPAN	Normative Susceptibility
SPSS	Statistical Package for the Social Sciences
T	Trust in Water Companies
WHO	World Health Organization

## **ABSTRAK (MALAY)**

Kajian ini menyiasat sama ada ciri-ciri organoleptik, persepsi risiko, persepsi kandungan kimia, petunjuk kontekstual and kepercayaan kepada syarikat air, kemudahan, harga and sikap terhadap alam sekitar mempengaruhi tingkah laku pengguna terhadap air minuman. Rangka kerja untuk kajian ini adalah berdasarkan Teori Atribusi. Soal selidik yang ditadbir sendiri digunakan sebagai kaedah untuk mengumpul data daripada 301 responden yang mengambil bahagian dalam kajian ini. Partial Least Square (PLS) and Statistical Package for Social Sciences (SPSS) telah digunakan untuk menganalisis data. Kepercayaan kepada syarikat air dikenal pasti sebagai faktor penting yang mempengaruhi tingkah laku pengguna, diikuti oleh harga, kemudahah, ciri-ciri organoleptik dan persepsi risiko. Persepsi kandungan kimia, petunjuk kontekstual dan sikap terhadap alam sekitar tidak mempengaruhi tingkah laku pengguna air minuman. Selain itu, persepsi kualiti air minuman mempunyai hubungan positif dengan tingkah laku pengguna air minuman. Ciri-ciri organoleptik, persepsi risiko, persepsi kandungan kimia, petunjuk kontekstual dan kepercayaan kepada syarikat air mempunyai pengaruh positif terhadap persepsi kualiti air minuman. Persepsi kualiti didapati untuk mempunyai kesan pengantara terhadap ciri-ciri organoleptik, persepsi risiko, persepsi kandungan kimia, petunjuk kontekstual dan kepercayaan kepada syarikat air dan tingkah laku pengguna air minuman. Penemuan daripada kajian ini akan membolehkan syarikat air paip, syarikat air botol, kerajaan Malaysia dan agensi-agensi air lebih memahami keperluan dan permintaan pengguna air minuman. Penemuan kajian ini adalah berdasarkan kepada responden di negeri-negeri seperti Pulau Pinang, Selangor dan Negeri Sembilan.

## ABSTRACT

This study investigates whether organoleptic properties, risk perception, perceived chemical content, contextual cues, trust in water companies, convenience, price and environmental attitude influence Malaysian consumers' consumption behavior of drinking water. Attribution Theory underlies the model framework in this study. Self-administered questionnaire was the method for data collection with a total of 301 respondents taking part in this study. Partial Least Square (PLS) and Statistical Package for Social Sciences (SPSS) were utilized to analyze the data. Organoleptic properties, risk perception, trust in water companies, convenience and price were found to be crucial in influencing consumers' consumption behavior of drinking water. Perceived chemical content, contextual cues and environmental attitude do not influence consumers' consumption behavior of drinking water. Perceived quality of drinking water has a positive relationship with consumers' consumption behavior of drinking water. Organoleptic properties, perceived chemical content, contextual cues and trust in water companies have a positive influence on perceived quality of drinking water. Risk perception has a negative influence on perceived water quality. Perceived quality of drinking water was found to mediate the effect of organoleptic properties, risk perception, perceived chemical content, contextual cues and trust in water companies on consumers' consumption behavior of drinking water. Findings from this study will enable tap water companies, bottled water companies, the Malaysian government and water related agencies to better understand the needs and demands of drinking water consumers. The findings are mostly based on respondents in states such as Penang, Selangor and Negeri Sembilan.

# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

Drinking water refers to water or liquids that are safe to be consumed or taken by humans. Besides that, drinking water can be used for household usage; cooking and cleaning (World Health Organization, 2015). Drinking water is a necessity as water helps maintain the balance of fluids in the human body, which in turn enables the body to carry out different functions, such as dilution and circulation of blood, transportation of nutrients, maintenance of body temperature, digestion, and production of saliva. Since the human body comprises of approximately 60 percent of water, a balanced water composition can only be achieved when an average human adult drinks or takes in at least 2 liters of water per day (Gunnars, 2013). Water intake is done by direct consumption of drinking water, or through other foods (e.g. vegetables and fruits) or liquids in other forms (e.g. tea and soft drinks).

Today, access to safe, quality drinking water is one of the many sustainable development issues to be solved by the planet's stakeholders. For one, human can only consume water from fresh water which is available by 2.5% compared to the remaining 97.5% of salt water on earth. To make it more critical is the fact that out of the 2.5% fresh water, humans can directly access less than 1% as the remaining fresh water is located in ice caps (Frost and Sullivan, 2008).

## **1.2 Background**

The water sector industry of today has made an effort to provide consumers with two types of drinking water, which are tap water and bottled water. Tap water is extracted from selected sources such as lakes, streams or groundwater which then undergoes treatments like sedimentation, filtration, ion exchange, absorption and chlorination before it is channeled to users via pipes (Environmental Protection Agency, 2009). Bottled water on the other hand, is extracted from water sources, treated, processed and bottled up before being sold to customers in various forms such as mineral water, distilled water, reverse osmosis water and others (soft drink, coffee, etc.). The issues plaguing safe drinking water access like river pollution and water treatment have caused many people to take in bottled water in their daily life (Hu, Morton and Mahler, 2011). Such change has been observed to have great impact on the growth of many companies that focus on providing consumers in the market place with various kinds of drinking water. Many of the bottled waters have also use tap water as the resource for drinking water.

### **1.2.1 Issues with Drinking Water in Malaysia**

The Malaysian water industry which provides Malaysian consumers with safe drinking water has been plagued by many issues over the years. Disruption of tap water supply to consumer's homes is an example that has been observed to increase in certain areas for various reasons. On several occasions, operations at water treatment plants in Shah Alam, Selangor had to be halted after the detection of high levels of ammonia, due to the decrease in water in rivers and the lack of rain in catchment areas (Muthiah, 2014; Au, 2015). Water crisis due to draught has resulted in the government carrying out water



rationing, cutting the supply of water to consumers in areas such as Perak and Selangor (Dermawan, 2014; Noorazam and Fadzil, 2014). The water rationing that started from 10 March 2014 has been estimated to affect 3.6 million people in Malaysia (Lee, 2014). The water rationing was finally ended on 1 May 2014 after the Sungai Selangor dam's water supply increased above the critical level of 40percent (Muthiah *et al.*, 2014).

The industry of bottled water in Malaysia is also highly competitive. From the year 1989 until 2013, the number of mineral water bottlers in this industry has been reduced from hundreds to only approximately 20 companies (Khoo, 2013). The bottled water industry in Malaysia is highly susceptible to the influence of the Malaysian government, for example the electricity tariff hike of 4.99 cents per kWh in the year 2013 (Shagar, 2013). In addition, bottled water companies were affected by the recent implementations such as minimum wage and the extension of the retirement age. Economic factors such as the weak Malaysia currency have resulted in an increase of raw materials such as PET (polyethylene terephthalate) resin. Subsequently, higher operating costs such as transportation, salary and advertising expenses were incurred in 2014 (Adzman Shah, 2014). This may cause an increase in bottled water prices in Malaysia.

### **1.3 Problem Statement**

There have been many studies carried out on factors that influence the consumption behavior of drinking water in various countries like U.K. and Portugal (Doria, Pidgeon and Hunter, 2009), U.S. (Hu *et al.*, 2011), Shanghai, China (Chen *et al.*, 2012) and Ontario, Canada (Pintar *et al.*, 2009). Although the local literature does involve studies on water consumption in Malaysia, these studies are very limited (e.g. Aini,

Fakhrul-Razi, Mumtazah and Meow Chan, 2007; Abdul Wahid and Chew, 2015; Khattab and Abdul Wahid, 2015). In addition, many studies focused mainly on the technical aspects of water like water quality (Tsuzuki, 2015) and its mineral composition (Platikanov, Garcia, Fonseca, Rullan, Devesa and Tauler, 2013).

Despite the fact that previous studies have been carried out in this area, the way in which various factors interact with to influence perception have yet to be completely understood. Besides that, the possible role of variables such as perception of water chemicals is mostly understudied. Although previous researches in this area have focused on various countries (e.g. Jones *et al.*, 2007; Syme and Williams, 1993), the usage of different research methods makes the task of cross-national comparisons very hard, and it is uncertain how the roles of various factors differ from one country to the other. In addition, even though the bottled water consumption has been growing all around the world, other factors such as convenience are also important. It is also not certain to what degree bottled water is consumed as an alternative to tap water (Anadu and Harding, 2000; Levallois, Grondin and Gingras 1999; Doria, 2006).

Doria (2010) indicated that there is limited knowledge about the relationship between certain physiochemical water parameters and cultural, psychological and social factors that affect perception. The roles and importance of factors such as perceived chlorination health benefits, microbiological parameters, radiological contamination, fluoride (whether to oppose or support fluoridation) and other chemicals (such as hormones and pesticides) are hugely understudied.

The production and distribution of drinking water is also harmful to the environment. When plastic bottles are not recycled, they contribute to landfill overload.

Water bottling factories do have influence on the local streams and groundwater aquifers (Glennon, 2002). Extracting too much water may use up the groundwater reserves and lessen the flow of lakes and streams, thus resulting in environmental stress. Even though 75 percent of bottled water in the world is manufactured and distributed regionally, the transportation and trade of the remaining 25 percent of bottled water causes concern for carbon dioxide emission and pollution (Ferrier, 2001).

The majority of bottled water's bottles are manufactured using PET (polyethylene terephthalate) that mostly cannot be recycled and resulting in most of the waste ending up in landfills (Olson, 1999). Approximately 70 percent of the plastic water bottles are not recycled by the consumers and have ended up in landfills as plastic waste (Government Accountability Office, 2010). Some bottles may end up on in rivers and oceans, or on land as litter. Bottled water production is very inefficient, as a substantial amount of water is wasted in this process (Pacific Institute, 2006). In 2011, more than 2.5 million tons of carbon dioxide (CO<sub>2</sub>) was used to produce bottled water for the consumption of the US consumers, as this energy is required for refrigeration, packaging and transportation (Gleick and Cooley, 2009). Hence, the production and consumption of bottled water do not only waste resources that are valuable, they also have a major and damaging effect on the natural environment and even lead to climate change (Linden, 2013).

For tap water that is carbonated, CO<sub>2</sub> is normally delivered to customers in the form of small cylinders instead of relying on makers of home soda water. This has resulted in the significant increase of overall environmental impact of tap water due to

carbonation process. Besides that, if the process of refrigerating tap water is used, this will cause yet another notable increase in environmental impact (Jungbluth, 2005).

Consumers of drinking water are also concerned about the chemical content of the water that they consume, for example fluoride. The chemical fluoride is normally taken by the human body through drinking or cooking with water that contains fluoride (Tekle-Hamainot *et al.*, 2006). Fluoride that is taken in excess will result in dental and skeletal fluorosis. The symptoms can include brown patches that form irregularly on teeth, bones deformation, joint movement limitation, and crippling fluorosis (last stage of the disease). This is also accompanied by major psychosocial impacts (Tekle-Haimanot, 2005).

In view of all the problems related to drinking water, it is important to examine consumers' consumption behavior of drinking water in Malaysia. This study aims to close the research gap by investigating the factors that influence consumers' consumption behavior of drinking water in Malaysia.

#### **1.4 Research Objectives**

The objective of this research is to understand the consumption behavior of individual consumers in Malaysia. The research objectives of this study include:

1. To investigate whether organoleptic properties, risk perception, perceived chemical content, contextual cues, trust in water companies, convenience, price and environmental attitude influence consumers' drinking water consumption behavior.
2. To examine the relationship between consumers' perceived quality of drinking water and their drinking water consumption behavior.

3. To examine organoleptic properties, risk perception, perceived chemical content, contextual cues and trust in water companies as the factors that may influence consumer's perceived quality of drinking water.
4. To investigate the mediating role of consumers' perceived quality of drinking water between organoleptic properties, perceived risk, perceived chemical content, contextual cues and trust in water companies and consumer's drinking water consumption behavior.

### **1.5 Research Questions**

The research questions of this study include:

1. Do factors such as organoleptic properties, risk perception, perceived chemical content, contextual cues, trust in water companies, convenience, price and environmental attitude influence consumer's drinking water consumption behavior?
2. Does the consumers' perceived quality of drinking water affect their drinking water consumption behavior?
3. Do factors such as organoleptic properties, risk perception, perceived chemical content, contextual cues and trust in water companies influence consumer's perceived quality of drinking water?
4. Does consumers' perceived quality of drinking water mediate the relationship between organoleptic properties, perceived risk, perceived chemical content, contextual cues and trust in water companies and consumer's drinking water consumption behavior?

## **1.6 Definition of Key Terms and Variables**

For the purpose of having good comprehension and common understanding in the following discussions, the key terms and variables used in this research were explained in the section below.

### **1.6.1 Consumption Behavior**

The action that is carried out by consumers in order to find, acquire, employ, assess and discard services and products in which they believe will fulfill their needs (Schiffman and Kanuk, 2004).

### **1.6.2 Drinking Water**

Water that is in utilized for human consumption, household usage, cooking and cleaning (WHO, 2015). Drinking water includes tap water and drinking water.

### **1.6.3 Tap Water**

Water that is supplied by the means of a water distribution system, meant for the consumption of humans (Skipton and Abrecht, 2010).

### **1.6.4 Bottled water**

Water that is stored in bottles that are food-grade, meant for the consumption of humans (Skipton and Abrecht, 2010).

### **1.6.5 Organoleptic Properties**

Sensorial information of an item that is obtained in the form of taste, odour, colour and turbidity (Doria, 2010).

### **1.6.6 Risk Perception**

The subjective judgment of an individual of a product or services, based on qualities that are aesthetic and non-aesthetic (Anadu and Harding, 2000).

### **1.6.7 Perceived Chemical Content**

Consumers' understanding of substances that may be added into water, influencing taste, odor and color (Doria, 2010).

### **1.6.8 Contextual Cues**

Indicators that can give indirect information about an item, which can be interpreted from previous experiences and may induce expectation (Doria, 2010).

### **1.6.9 Trust in Water Companies**

Belief that is entrusted by consumers to companies in order to supply drinking water and also provide related information (Doria, 2010).

### **1.6.10 Convenience**

The time and effort perceptions of consumers that are linked to purchasing or using a service or product (Berry *et al.*, 2002).

### **1.6.11 Price**

Something that consumers have to hand over or trade in order to acquire a product (Zeithaml, 1988).

### **1.6.12 Environmental Attitude**

Psychological tendencies that are conveyed through the assessment of natural environment with a certain level of favor or disfavor (Milfont and Duckitt, 2010).

### **1.6.13 Perceived Quality**

A crucial aspect in which customers rely on in their decision making process, whereby they compare the quality of the product or services to other alternatives that are within the same category (Jin and Yong, 2005).

## **1.7 Significance of Study**

There have been limited researches that focus on the consumption behaviors of drinking water, specifically for individual consumers in Malaysia. This research will provide an insight to companies in the water industry, including tap water companies such as Jabatan Bekalan Air (JBA), Perbadanan Bekalan Air (PBA) Holdings Bhd and Perbadanan Bekalan Air Pulau Pinang Sdn Bhd (PBAPP), and assist them in terms of understanding the consumers' concern pertaining to drinking water. This will allow them to focus on key attributes of the drinking water supplied to homes that can be improved in order to enhance customer satisfaction, such as taste, odour and colour of tap water.

This study looks into the consumption behavior of consumers by utilizing the



Attribution Theory to explain consumers' behavior when drinking water. Besides that, this theory is also used to relate the process of ascriptions or inferences by consumers to the decision they make pertaining to consuming drinking water.

By understanding the importance of the factors influencing the consumption behavior of consumers, marketers of local bottled water companies such as Spritzer and Seamaster can focus on crucial aspects in which they can strategize and market their products effectively, for example through bottled water labeling, bottle designs, mass media channels. Besides that, the findings of this study can assist these marketers to identify the potential target market and market segments that can be tapped into and thus maximizing profit.

In addition, the marketing department of international bottled water companies such as Pere Ocean, Evian and Dasani may use the information obtained from this research to effectively carry out localization strategy, if necessary to produce bottled water that best suit the needs of the Malaysian consumer market. By understanding the preferences of local consumers, marketing mix such as Price, Product, Promotion and Place can be adapted to effectively improve the sales and market share of their product in Malaysia.

In view of the proposed new water tariff rates proposed by PBA holdings Bhd. in 2014 (Looi, 2014) and the water tariff increase in Penang in 2015 (Nambiar, 2015), this study will also look into the factor of price. In addition, the way in which how price influences consumers' consumption behavior of drinking water is examined.

With the increase of public environmental awareness, for example the negative impact of bottled water waste that is disposed irresponsibly such as landfills and ocean

pollution, consumers are more concerned about their drinking water choices. This research may provide understanding about consumers' environmental attitude and how much this factor influences their consumption behavior.

Next, from the findings of this study, government and water related agencies such as the National Water Services Commission (SPAN) may be able to use the finding of this study to formulate strategies to improve the quality of water services throughout Malaysia, with the aim of meeting the expectations have consumers have for their drinking water.

## **1.8 Organization of Remaining Chapters**

This research consists of five chapters. The first chapter introduces this research and provides an overview of this study. Chapter two discusses the literature of previous studies that are related to factors influencing consumers' consumption behavior of drinking water. It also covers the theoretical framework of this study and the development of the hypotheses. The third chapter presents the methods used to conduct this study, which includes the research design, instruments, measurements, questionnaire design, sampling, data collection, data analysis and pilot study. Next, chapter four analyzes the results that were obtained by utilizing the SPSS and PLS softwares. Various analyses such as statistical analysis, descriptive analysis, validation analysis, reliability analysis and structural equation modeling analysis were discussed. Lastly, chapter five discusses the overall findings and implications of this study, followed by the limitation of this study, suggestions for future research and conclusions.

## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter focuses on the review of the literature with regards to relevant theories, and identifies the variables and their relationship that supported this study's intention, particularly in terms of the developed hypotheses and framework of the study.

#### **2.2 Attribution Theory**

In the context of social psychology, the term attribution can have two key meanings. Firstly, attribution may refer to the explanation to one's behavior. Secondly, attribution may also relate to the process of ascriptions or inferences, for example to make a deduction based on one's own observation. The two key meanings have something in common, which is the process of assigning: attribution as an explanation means that a particular behavior is being assigned to its cause; whereas inference is the attribute, trait or quality that is being assigned or appointed to an agent as a result of an observed behavior (Malle, 2011).

According to Attribution Theory, the outcome or result of a particular behavior is influenced not necessarily by reality, but rather the subjective perception of causality (Heider, 1958; Kelley, 1973; Weiner, 1985a, b, 2000). The priority or focus point of Attribution Theory is on the individual's perceived causes of success, and also their direct or indirect influence on the consequent behaviors.

Referring to a model by Kelley (1973), a classification of causes is conceptualized, where different incidents or life events are attempted to be answered or inferred. The attribution theory can be utilized to obtain better generalizability and better understanding of an occurrence through the process of aggregating causal attributions into their underlying factors. By implementing the Attribution Theory, it can be inferred that the consumption behavior of bottled water is influenced by factors such as perceived quality of drinking water, price and convenience of consuming drinking water, and also the environmental attitude of the individual consumer. In the context of perceived quality of drinking water, the individual's perception can be attributed to a combination of factors, such as organoleptic properties (taste, odor, color and turbidity), perception of risk, contextual cues, trust in water companies and perceived chemical content. These factors are treated as the underlying causal factors that lead to the perceived quality drinking water, whether it is perceived as poor, neutral or even excellent. Therefore, by applying the Attribution Theory, the consumption behavior of drinking water in Malaysia can be effectively explained.

As explained by Weiner (1985b, 2000) using the Attribution Theory, the psychological state of an individual is due to the evaluation of causal factors by that individual. One dominant psychological consequence of causal factors is the expectancy of success, a variable that is cognitive in nature. Thus, according to this theory, when an individual recognizes the causal factors of success, then that person believes that he or she can act successfully upon those causal factors, and therefore increasing his or her probability of success. Each and every behavioral consequence, such as an action or decision is affected by a cognitive psychological consequence. This cognitive

psychological consequence can be an expectation or belief. Expectation of success that is high can be attributed to the individual's belief in his or her ability to take advantage of the underlying causal factors in which he or she has identified as affecting his or her success.

As indicated by Anderson (1983), it is the expectancy of success that motivates the individual to control or leverage the causal factors that have been identified via his or her behavior, and thus resulting in a high level of success. Therefore, by applying the Attribution Theory, an individual will choose to consume drinking water (i.e. tap water) if he or she perceives that this water is of high quality for the purpose of his or her consumption. Similarly, if a consumer perceives that the drinking water (bottled water) is of a very high price or expensive, then this may result in him or her choosing the alternative to bottled water, for example tap water.

### **2.3 Consumers' Consumption Behavior of Drinking Water**

In British Columbia, Canada, a cross-sectional survey conducted through telephone by Jones *et al.* (2007) found out that consumer's daily consumption of water was four 250mL servings (1L), even though the responses received were highly variable (0L to 9L). The study also found that bottled water was consumed as the main source of drinking water (more than 75 percent of the total daily water intake) for 23 percent of respondents surveyed, whereas 47 percent of households utilize in-home water treatments.

The bottled water consumption is growing worldwide. Previous researches indicate that a large number of consumers believe that bottled water is more convenient

and has better taste as compared to tap water, in spite of the reports of some water quality incidents related to bottled water (Hu *et al.*, 2011).

Consumers that buy a relatively large amount of bottled water are more inclined to believe that there are no alternatives for bottled water, and decreasing their bottled water consumption would need a substantial change of lifestyle. Next, consumers that purchase a considerable small amount of bottled water are more inclined to have the belief that the difference in taste between tap water and bottled water is insignificant or small, and that decreasing their consumption will not create negative affect to the intake of high quality water or their health (Linden, 2013).

In the U.S., the bottled water consumption was 13.5 gallons per person in 1997, but it has then increased significantly to 29.0 gallons per person in the year 2007 (Rodwan, 2010). The bottled water market is significantly large, as it is the second biggest commercial beverage in the U.S, only after carbonated soft drinks (National Resource Defense Council, 2010).

In many instances, the consumption of bottled water is higher in communities where the tap water is of poor quality. The consumption of bottled water has progressively grown over the last decade; this was significantly influenced by the perception that the public of the tap water quality (Pintar *et al.*, 2009).

A study was conducted by Chen *et al.* (2012) to analyze the drinking water consumption pattern for a decade in Shanghai, China from 2001 until 2011. The results show that the tap water consumption percentage has continued to be stable and is the preferred choice of consumers, with 58.99 percent in 2001 and 58.25 percent in the year 2011. Consumption of bottled water on the other hand has decreased from 36.86 percent

in 2001 to only 25.75 percent in the year 2011. The relationship between perceived quality and consumption behavior is verified as majority of respondents (52.50 percent) believed that tap water is the cleanest and safest water, whereas only 22.50 percent viewed bottled water and barrel water to be the cleanest and safest. This proves that the better the perception of drinking water quality, the higher the consumption of that particular drinking water.

A research conducted by Pintar *et al.* (2009) in Ontario, Canada indicated that amongst the drinking water consumers, 51 percent consumed tap water exclusively, 34 percent consumed bottled water exclusively and 14.5 percent of consumers drank both tap water and bottled water. In a day, the mean volume of drinking water (tap water and bottled water) consumed was 1.39L.

Table 2.1

*Past Studies on Consumers' Consumption Behavior of Drinking Water*

Number	Author	Title	Independent variable	Dependent variable	Findings
1	Doria, Pidgeon and Hunter (2009)	Perceptions of drinking water quality and risk and its effect on behaviour: A cross-national study	<ul style="list-style-type: none"> <li>- perception of quality (organoleptic properties, risk perception, contextual cues, perception of chemicals, trust in water companies</li> <li>- risk perception (organoleptics, perceived water chemicals, external information, past health problems, trust in water suppliers)</li> </ul>	Consumption behavior	<ul style="list-style-type: none"> <li>-Organoleptic properties are highly influential to the consumption behavior.</li> <li>- UK participants are more critical about chemical in drinking water than those from Portugal.</li> <li>- Consumption behavior is influenced by flavor, risk, trust in water companies and familiarity.</li> </ul>
2	Jones, Majowicz, Edge, Thomas, Macdougall, Fyfe, Atashband and Kovacs (2007)	Drinking water consumption patterns in British Columbia: An investigation of associations with demographic factors and gastrointestinal illness.	Age, sex, education and household income	Drinking water consumption patterns	-Bottled water consumption and usage of water treatment devices were common, they were associated with demographics factors (age, sex, education, household income), region of residence and water source type.



Number	Author	Title	Independent variable	Dependent variable	Findings
3	Hu, Morton and Mahler (2011)	Bottled Water: United States Consumers and Their Perception of Water Quality	Perception of water quality, supply water system size, environmental attitudes, region, age, education and gender	Consumption of bottled water	- Respondents who rate the ground water quality as low have higher probability to purchase and consume bottle water as their primary source of drinking water.
4	Doria (2010)	Factors influencing public perception of drinking water quality	Organoleptic properties, risk perception, attitudes towards water chemicals, contextual cues provided by the supply system, familiarity with specific water properties, trust in suppliers, past problems attributed to water quality and information provided by the mass media and interpersonal sources	Perception of drinking water quality	- Organoleptic properties, especially taste has crucial influence on water quality perception - The factor of previous experience should be taken into consideration when carrying out changes to the supply system.
5	Linden (2013)	Exploring beliefs about bottled water and intentions to reduce consumption: The dual-effect of social norm activation and persuasive information	Beliefs about health, taste, water quality, lifestyle, the environment and perceived alternatives	Bottled water consumption	- Concerns related to health, taste and quality of water are important. - Environmental concern has a low correlation with the consumption of bottled water.

Number	Author	Title	Independent variable	Dependent variable	Findings
6	Doria (2006)	Bottled water versus tap water: understanding consumers' preferences	Dissatisfaction with tap water organoleptics, health/risk concerns, demographic variables, perceived quality of water source and trust in water companies	Bottled water consumption	<ul style="list-style-type: none"> <li>- The most influential factors that influence consumption behavior are health/risk concern and organoleptic properties</li> <li>- People commonly value "good quality water" and some are willing to spend money on water that they perceive is "purer" and "healthier"</li> </ul>
7	Pintar, Waltner-Toews, Charron, Pollari, Fazil, McEwen, Nesbitt and Majowicz (2009)	Water consumption habits of a south-western Ontario community	Age, gender and education	Water consumption habits	<ul style="list-style-type: none"> <li>- Demographic variables of age, gender and education influences water consumption habits.</li> <li>- Bottled water is a significant source of daily consumption for Canadians.</li> </ul>

Number	Author	Title	Independent variable	Dependent variable	Findings
8	Mosler, Blochliger and Inauen (2010)	Personal, social, and situational factors influencing the consumption of drinking water from arsenic-safe deep tubewells in Bangladesh	Personal factors, social factors and situational cost.	Consumption of drinking water	-Social factors have the highest influence on drinking water consumption, particularly injunctive norm and descriptive norm. - Prior experiences “good taste” and perceived healthiness of shallow tubewell water prevents or reduces the consumption of deep tubewell water.
9	Chen, Zhang, Ma, Liu, Zheng, Shen, Zhang, Wei, Tian, He and Qu (2012)	Change of water consumption and its potential influential factors in Shanghai: A cross-sectional study	Social demographic factors (gender, age, education, annual income and housing condition), risk perception (personal subjective sensory perception for tap water) and personal belief in what type of water they consider as cleanest or safest	Water consumption	- Consumption of tap water remained as a majority; there was an increase in filtrated water and decrease in bottled or barreled water. - Personal health belief, housing condition and risk perception also affect domestic drinking water choice in urban China
10	McLeod, Bharadwaj and Waldner (2014)	Risk Factors Associated with the Choice to Drink Bottled Water and Tap water in Rural Saskatchewan	Risk factors (household tap water sources, use of a community managed water supply, use of a private water supply and whether the water source is ground water or surface water, aesthetic complaint, perception that top water was not safe to drrink)	Drinking water choice	- Respondents that felt that their tap water was not safe to drink were consistently more likely to choose bottled water than those who felt it was safe regardless of aesthetic concerns.

Number	Author	Title	Independent variable	Dependent variable	Findings
11	Dupont, Waldner, Bharadwaj, Plummer, Carter, Cave and Zagozewski (2014)	Drinking Water Management: Health Risk Perceptions and Choices in First Nations and Non-First Nations Communities in Canada	Trust in institutions, difference in service satisfaction and the inequity of water supply service among First Nations and non-First Nations, and lost control over water resources and traditional lands as a result of land use decisions.	Health risk perceptions towards drinking water	<ul style="list-style-type: none"> <li>- Ontario First Nations communities were more likely than the participants from cross-Canada survey to believe that: bottled water is safer than tap water; more likely to report someone has become ill from tap water; more likely to express health concerns related to tap water consumption and more likely to spend more on bottled water</li> </ul>
12	Saylor, Prokopy and Amberg (2011)	What's Wrong with the Tap? Examining Perceptions of Tap Water and Bottled Water at Purdue University	Environmental impacts, perceived risk from tap water and the perceived safety of bottled water, preference of the taste of bottled water, convenience of drinking bottled water and trust that tap water is clean	Perception of tap water and bottled water	<ul style="list-style-type: none"> <li>- Women drink disproportionately more bottled water than men.</li> <li>- Undergraduate students drink more than graduate students, staff and faculty.</li> <li>- Perceived risk, taste preference and convenience of drinking water are barriers to drinking tap water.</li> </ul>
13	Abdul Wahid and Chew (2015)	Factors Determining Household Consumer's Willingness to Pay for Water Consumption in Malaysia	Taste, filtered water, color, water contamination, drinkable tap water, customer services, uninterrupted water supply and income	Consumer's wiliness to pay for water consumption	<ul style="list-style-type: none"> <li>- Taste, uninterrupted water supply, water contamination and income were significant in influencing willingness to pay for water consumption.</li> <li>- Majority of household consumers is willing to pay a maximum of RM5 bill increase</li> </ul>

Number	Author	Title	Independent variable	Dependent variable	Findings
14	Khattab and Abdul Wahid (2015)	Penang User's Perception of Domestic Water Quality, Health Risk Concern and Willingness to pay: A Pilot Study	Perception of water quality, health risk concern and demographics (age, gender, education level, household income)	Willingness to pay for water	<ul style="list-style-type: none"> <li>- Consumers that were unhappy with the water quality: taste, suspended solids, chlorine content; not for odor or color.</li> <li>- Majority of respondents think that the tariff of water should not be increased at all, especially with the current water quality provided.</li> </ul>
15	Stoler, Tutu and Winslow (2015)	Piped water flows but sachet consumption grows: The paradoxical drinking water landscape of an urban slum in Ashaiman, Ghana	Demographic (age, gender and income), knowledge (education), social attitudes and individual attitudes	Drinking water decisions	<ul style="list-style-type: none"> <li>- Water consumption via sachet is associated with higher disposable income and lack of knowledge about household water treatment methods.</li> <li>- Drinking water decisions are not significantly driven by social processes and attitude towards water quality.</li> </ul>
16	Huber, Bhend and Mosler (2012)	Determinants of exclusive consumption of fluoride-free water: a cross-sectional household study in rural Ethiopia	Risk beliefs, attitudinal beliefs, normative beliefs, ability beliefs and maintenance beliefs	Water consumption	<ul style="list-style-type: none"> <li>- Normative beliefs (status norm) and Ability beliefs (perceived behavioral control) has a high influence on water consumption</li> <li>- Maintenance beliefs (perceived habit) enhances filter water consumption</li> </ul>

Number	Author	Title	Independent variable	Dependent variable	Findings
17	Jones, Dewey, Dore, Majowicz, McEwen, Waltner-Toews, Henson and Mathews (2007)	A qualitative exploration of public perception of municipal drinking water	Sensory quality of water, water contamination, water utility employees, water treatment, municipal water distribution system and government funding	Public perception of municipal drinking water	-Consumers choose to consume bottled water as they consider it to be superior in taste and safety compared to regular tap water. Some may use it because of convenience. - Marketing has influence on the perception of tap water, and thus the use of alternative water sources.